

# EU Fuel Quality Monitoring – 2006 Summary Report

**Report to the European Commission, DG Environment**

By Nikolas Hill, Eleanor Glenn and Ferdinando Giammichele

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AEA Energy & Environment  
The Gemini Building, Fermi Avenue  
Harwell International Business Centre  
Didcot, OX11 0QR  
United Kingdom  
Telephone +44 (0)870 190 6490  
Facsimile +44 (0)870 190 6318

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	<b>Name</b>	<b>Signature</b>	<b>Date</b>
<b>Author</b>	Nikolas Hill Eleanor Glenn Ferdinando Giammichele		22/08/08
<b>Reviewed by</b>	Sujith Kollamthodi		22/08/08
<b>Approved by</b>	Sujith Kollamthodi		22/08/08



# Executive Summary

This report produced for DG Environment represents a consolidation of the fifth year of Member States' submissions under Directive 98/70/EC<sup>1</sup>, summarising the quality of petrol and diesel in the Community for the year 2006. The specifications for petrol and diesel sold in the European Community are included in the Directive. Two sets of fuel specifications are included in the Directive, the first entered into force on 1 January 2000 and the second entered into force on 1 January 2005. The Directive also stipulates that Member States are required to report summaries of the quality of fuels sold in their territories. The original reporting format for this was laid out in Commission Decision 2002/159/EC of 18 February 2002<sup>2</sup> (Appendix 1). Additional requirements were defined in the European Standard for fuel quality monitoring systems, EN 14274:2003, required from 2004 under Directive 2003/17/EC.

Agreement was subsequently reached on amendments to the reporting format, with a common format for reporting from 2004 developed in consultation with Member States and other stakeholders in 2004 (Appendix 4). Member States were required under the Directive to report for the first time by 30 June 2002 for the preceding calendar year (i.e. 2001). A summary of the submissions received for 2001 to 2005 were presented in previous reports. The 10 new Member States submitted reports in 2005 for the first time to cover monitoring from May to December 2004. The 2006 results presented in this report therefore represent the first full year of data from these Member States.

Figure E1 below shows the 2006 data (excluding Malta who has not submitted a report) for fuel sales by petrol and diesel grade. The variety of RON and sulphur grade fuels available across the EU decreased in 2005 with the new mandatory limit of <50ppm sulphur. The majority of petrol sales in 2006 comprised RON 95 (83%). Of all petrol sold, 58% was low sulphur (<50 ppm) and 42% sulphur free (<10 ppm). For diesel sold the equivalent split was 69% and 31%. These figures illustrate the further increases in sales of sulphur-free fuels in the EU, particularly in the new EU10 Member States. Sales from the new EU10 Member States comprised 10.1% and 9.9% of total petrol and diesel sales in the EU respectively (down slightly since 2005). Higher proportions of sulphur-free petrol grades were sold in the EU10 (49%) compared to the EU15 (41%). Similarly, much higher proportions of sulphur-free diesel were sold in the EU10 (58%) compared to the EU15 (29%). Figure E2 below illustrates the temporal trend in average sulphur content of petrol and diesel fuels in the EU.

In general the quality of Member State's monitoring system design, level of compliance with limit values (see Figure E3) and information provided in report submissions is still continuing to improve. However, although sulphur-free fuels are accounting for an increasingly significant proportion of fuel grades and sales across Member States, they are still not always labelled at the pump. There are still also significant problems in timely delivery of reports from some Member States. In fact the situation has worsened for these very late reports compared to last year, with Submissions from Belgium, Germany, Luxembourg and Greece received more than 6 months late. Although France submitted a full report for the first time since 2002, full details of the submission were still not received until the end of January 2008. Malta failed to submit a report in 2006.

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<sup>1</sup> O.J. L 350 of 28.12.1998, p. 58

<sup>2</sup> O.J. L 53 of 23.2.2002, p.30

Figure E1: EU Fuel sales proportions by fuel type (%)

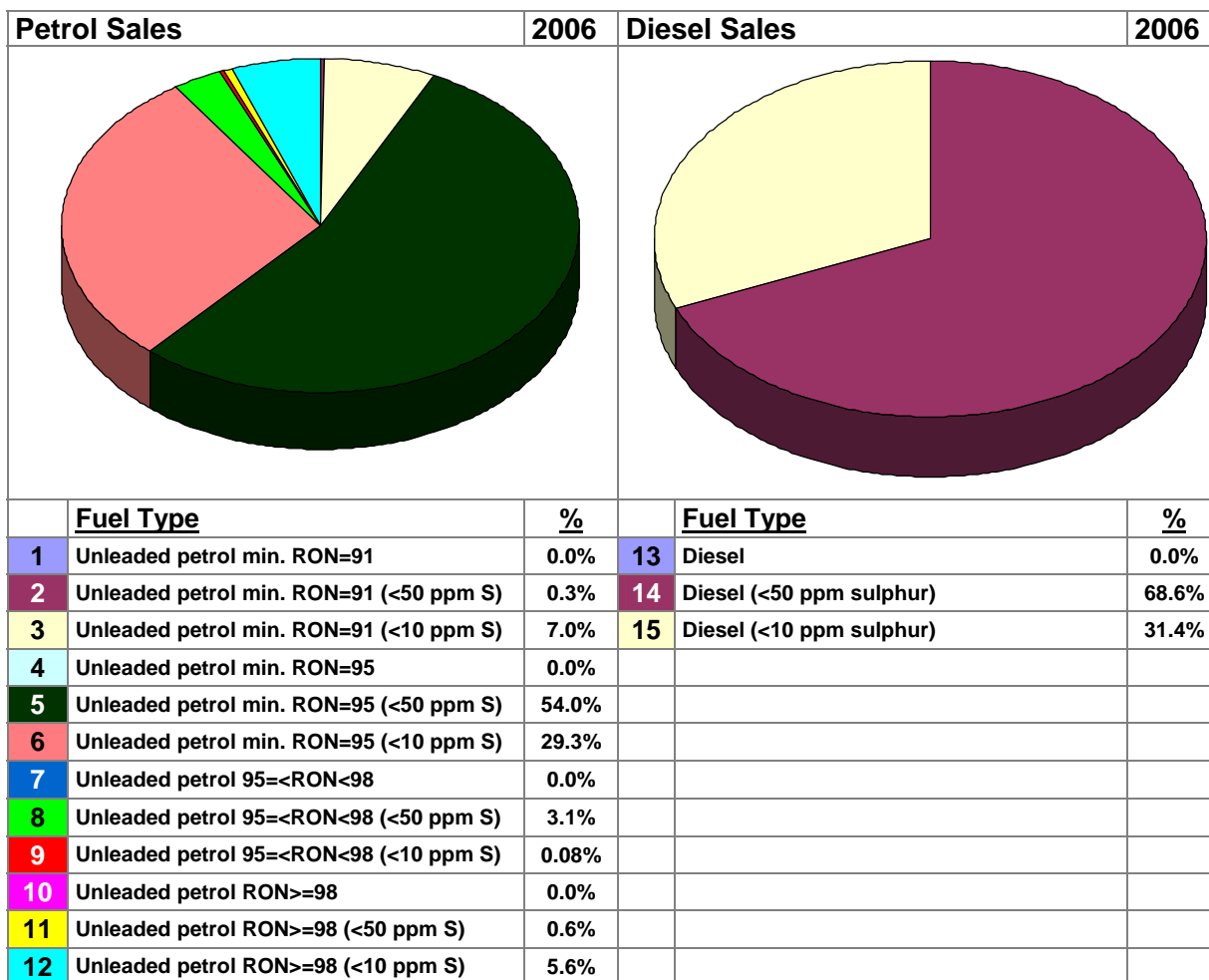
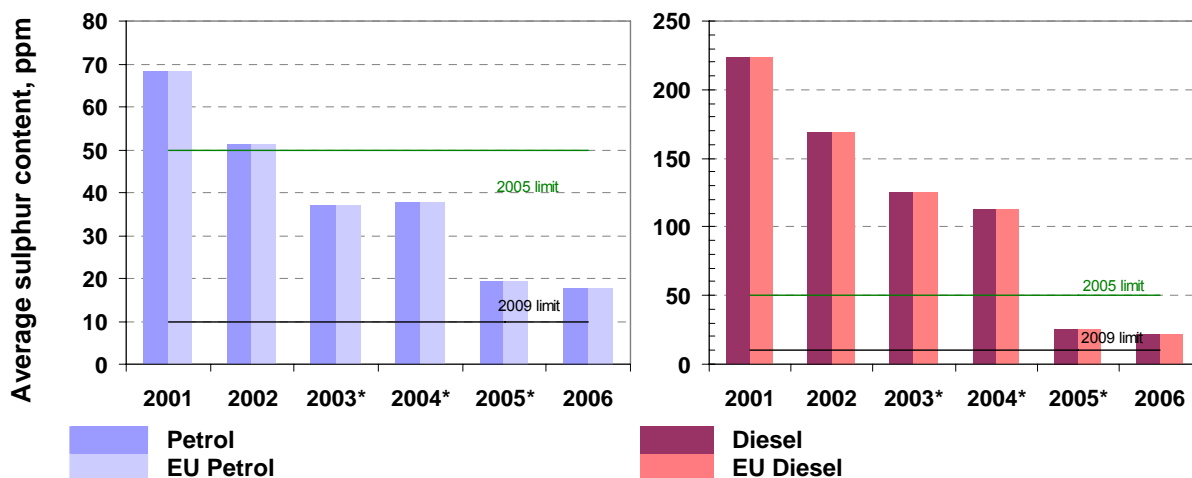
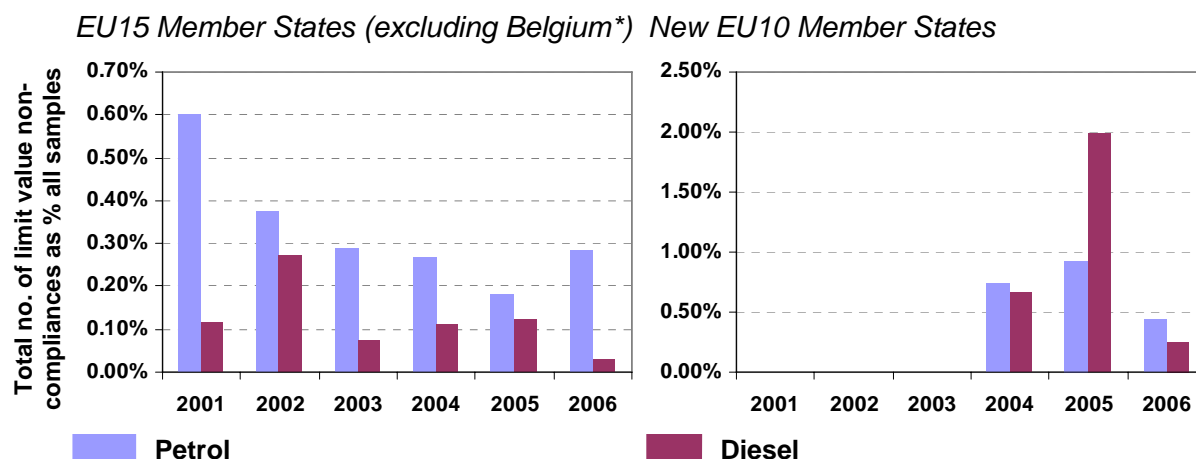


Figure E2: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



**Figure E3: Temporal trends in total limit value non-compliances for petrol and diesel fuels**



\* Excludes France in 2003 - 2005, as no submissions were provided. Also excludes Belgium, as the very large number of sample analyses (and therefore also non-compliances) hides general trends. The % of non-compliances in Belgium (at around 3.5% for 2005) is above other Member States.

In summary, revisions to the reporting format from Commission Decision 2002/159/EC and European Standard EN 14274: 2003 outlined in the Excel reporting template, have enhanced the usefulness of the information and facilitated analysis of EU trends. The quality of the monitoring systems' design, compliance with limit values and information provided in report submissions is continuing to improve in most cases. However, there are still a few key areas for improvement, summarised as follows:

#### Key Areas for Improvement

- 1) A small number of Member States (including Belgium, France, Luxembourg and the UK) are consistently submitting reports very late after the 30 June deadline each year, they are encouraged to report on time to avoid undermining the efforts of others.
- 2) Regarding monitoring system and reporting consistency with EN 14274 requirements:
  - a) Several Member States do not fulfil sufficient sampling for all fuel grades (e.g. France, Netherlands) or are not sampling in sufficient numbers at refuelling stations (as opposed to depot/refinery).
  - b) Where Member States use their own National Systems rather than one based upon the European Standard, there needs to be a description of this system. This description should also provide an assessment that shows the monitoring system's equivalency in statistical confidence to EN 14274: 2003. This has *still* not been provided in most cases for 2004-2006 monitoring and needs to be provided in future.
  - c) Where EN 14274 Statistical Model C is used, Member States should present a clear rationale for its use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions. For several Member States using Model C (and not providing this information) there appears to be a good case on the basis of NUTS regional classification for instead using Model's A or B. These include Austria, Czech Republic, Hungary, Ireland and Slovakia.
- 3) In relation to the availability of sulphur free fuels, it is necessary for these fuels to be clearly labelled to ensure that the consumer has the opportunity to choose them. Belgium, Czech Republic, Ireland, Latvia, Luxembourg, the Netherlands, Slovakia and Slovenia need to take action to ensure this in 2006 onwards. Reporting on this labelling could help the automotive industry gain confidence in their availability so that vehicles taking full advantage of the fuel are more widely introduced. The UK, Malta and Cyprus also still need to introduce <10ppm fuels.

- 4) It would also be valuable, for the Member States not already doing so, to report separately (to <50pm fuels) the results of sulphur content analyses that were carried out on fuels sold as sulphur-free to further confirm their quality. These analyses need not be additional to existing sample analyses, but simply a subset of the existing total sampling and analysis requirement as part of their monitoring systems, as provided for in the Excel reporting template.
- 5) Temporal information provided indicates that significant advances have been made by the new EU10 Member States to reduce non-compliance compared to the EU average. This good work should be continued in order to further bring down the levels of non-compliances.

Following the success of the Excel reporting templates, revised templates for reporting on 2005/6 monitoring were produced, taking into account additional standard test methods introduced in EN 228:2004 and EN 590:2004 and providing an additional line to allow for separate reporting on sulphur content analyses of samples from fuel sold as sulphur-free. There have been no significant changes to the template for 2007 reporting (presented in Appendix 6). The 2007 template will be sent to Member States as in previous years. The use of the template should further assist Member States in their data reporting and again facilitate accurate data collation and analysis for the 2007 summary report.



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# Glossary

<i>&lt;10 ppm fuels</i>	See sulphur free fuels
<i>Cetane Number</i>	Measure of fuel ignition characteristics. Like the octane number used for petrol, the higher the value, the better the fuel performance.
<i>Commission Decision 2002/159/EC</i>	Commission Decision of 18 February 2002 on a common format for the submission of summaries of national fuel quality data
<i>Commission Recommendation 2005/27/EC</i>	of 12 January 2005 on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis
<i>Directive 98/70/EC</i>	of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC
<i>Directive 2003/17/EC</i>	of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels
<i>EN 14274: 2003</i>	Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS)
<i>Euro standards</i>	European Union emission regulations for new vehicles, e.g. Euro 3
<i>Fuel Dispensing Sites</i>	See <i>refuelling stations</i> .
<i>FQMS</i>	Fuel Quality Monitoring System
<i>MON</i>	Motor Octane Number (petrol vehicles, related to RON)
<i>National fuel grade</i>	Member States may, define 'national' fuel grades that must still, however, respect the specification of the <i>parent fuel grade</i> . For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, <50 ppm sulphur petrol, zero sulphur diesel, <50 ppm sulphur diesel, etc.
<i>Parent fuel grade</i>	Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include: (i) regular unleaded petrol (RON>91), (ii) unleaded petrol (RON>95) and (iii) diesel fuel.
<i>PAH</i>	Polycyclic Aromatic Hydrocarbons, also known as PAH, are chemical compounds formed by the incomplete combustion of hydrocarbons and also contained in small amounts in diesel, other fuels. Many of them are known or suspected carcinogens and are consequently restricted in content in diesel.
<i>Refuelling Stations</i>	Sites, retail or commercial, where fuel is dispensed into road vehicles for propulsion (as defined in EN 14274: 2003)
<i>RON</i>	Research Octane Number (petrol vehicles, related to MON). The octane number is a performance rating used to classify motor fuels by grading the relative antiknock properties of petrol grades.
<i>Sulphur free fuels</i>	Petrol and diesel fuels that contain less than 10 mg/kg (ppm) of sulphur (whether actual distinct national fuel grades, or simply marketed products meeting this criterion)
<i>The Sulphur Review</i>	'Consultation on the Need to Reduce the Sulphur Content of Petrol and Diesel Fuels Below 50 ppm: - A Policy Maker's Summary'. A report produced for the European Commission, DG Environment; George Marsh, Nikolas Hill and Jessica Sully, November 2000; AEA Technology Environment, UK.
<i>Zero sulphur fuels</i>	See: <a href="http://europa.eu.int/comm/environment/sulphur/summary.pdf">http://europa.eu.int/comm/environment/sulphur/summary.pdf</a> See <i>sulphur free fuels</i> .



# 1 Introduction

This report produced for DG Environment represents a consolidation of the fifth year of Member States' submissions under Directive 98/70/EC<sup>3</sup>, summarising the quality of petrol and diesel in the Community for the year 2006. The specifications for petrol and diesel sold in the European Community are included in the Directive. Two sets of fuel specifications are included in the Directive, the first entered into force on 1 January 2000 and the second entered into force on 1 January 2005. The Directive also stipulates that Member States are required to report summaries of the quality of fuels sold in their territories. The original reporting format for this was laid out in Commission Decision 2002/159/EC of 18 February 2002<sup>4</sup> (Appendix 1). Additional requirements were defined in the European Standard for fuel quality monitoring systems, EN 14274:2003, required from 2004 under Directive 2003/17/EC.

Agreement was subsequently reached on amendments to the reporting format, with a common format for reporting from 2004 developed in consultation with Member States and other stakeholders in 2004 (Appendix 4). Member States were required under the Directive to report for the first time by 30 June 2002 for the preceding calendar year (i.e. 2001). A summary of the submissions received for 2001 to 2005 were presented in previous reports. The 10 new Member States submitted reports in 2005 for the first time to cover monitoring from May to December 2004. The 2006 results presented in this report therefore represent the first full year of data from these Member States.

## 1.1 Report Structure

This report follows the same basic format developed for the preceding years reporting, agreed with the European Commission and validated at expert meetings with stakeholders, including Member State and EU candidate country representatives, the auto industry and the oil industry. In addition, a new section 2 outlines the format for Member State summary chapters.

**Section 1** begins by setting out the background and context for the control of fuel quality and its relation to harmful tailpipe emissions from vehicles.

**Section 2** outlines the format for the summary chapter on each EU Member State, along with an explanation of the fuel quality monitoring and reporting requirements being assessed in each part of the chapter.

**Sections 3 to 29** summarise the information reported by individual EU Member States (including Bulgaria and Romania, although they did not join until 2007), as part of their submissions of summaries of national fuel quality data. This includes information on:

- Sales quantities of different fuel grades;
- Availability of low or sulphur-free petrol and diesel grades;
- Summary descriptions of the monitoring systems in place;
- Compliance with sampling, reporting requirements and with Directive 98/70/EC limits;
- Trends in sales and availability of low or sulphur-free grades since 2001.

**Sections 30 and 31** provide an overall EU summary, discussion of the 2006 reporting and conclusions/recommendations for future reporting.

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<sup>3</sup> O.J. L 350 of 28.12.1998, p. 58

<sup>4</sup> O.J. L 53 of 23.2.2002, p.30

## 1.2 Context

Concerns over air quality and climate change have grown significantly in the past decade. Reduction of fuel consumption and associated greenhouse gas and other emissions has therefore become a higher priority for governments, the public, vehicle manufacturers and the fuel industry alike. Transport is a significant contributor to carbon dioxide (CO<sub>2</sub>), as well as other emissions and demand is increasing. By far the largest single portion of transport emissions derives from passenger cars, which account for around half of the total transport CO<sub>2</sub> emissions in the European Union. Fuel quality has strong links to both CO<sub>2</sub> and air quality related emissions; the following sections briefly outline the main policy drivers relating to fuel consumption, CO<sub>2</sub> emissions, air quality and their influence on fuel quality legislation.

### 1.2.1 Fuel Consumption and Carbon Dioxide Emissions

The Community's strategy<sup>5</sup> to reduce CO<sub>2</sub> emissions from passenger cars and improve fuel economy is aimed at delivering an average CO<sub>2</sub> emission value for new passenger cars equal to 120 g CO<sub>2</sub>/km. It will help the EU meet its commitments under the Kyoto Protocol, and reduce the EU's dependency on imported oil supplies.

The automobile industry committed itself through voluntary agreements to improving the fuel economy of vehicles produced such that it aims to deliver an average CO<sub>2</sub> emission figure for new passenger cars sold in the EU of 140 g CO<sub>2</sub>/km by 2008/2009. As part of the second phase of the European Climate Change Programme<sup>6</sup>, the Commission has reviewed the CO<sub>2</sub> and cars strategy with a view to moving further towards the Community objective of 120 gCO<sub>2</sub>/km. Several pieces of research<sup>7</sup> have been carried out on behalf of the EC recently, looking at the possibilities for further reductions in CO<sub>2</sub> emissions using both supply (technological improvements in vehicles in their component) and demand (e.g. labelling or taxation) measures. There was no indication from the review that fuel specification changes are required to enable further fuel efficiency progress.

On 7 February 2007, the Commission adopted the Communication (COM(2007) 19) outlining a comprehensive new strategy to reduce carbon dioxide emissions from new cars and vans sold in the European Union. The new strategy, together with a revision of EU fuel quality standards proposed on 31 January 2007, further underline the Commission's determination to ensure the EU meets its greenhouse gas emission targets under the Kyoto Protocol and beyond. The strategy will enable the EU to reach its long-established objective of limiting average CO<sub>2</sub> emissions from new cars to 120 grams per km by 2012 - a reduction of around 25% from current levels. This will focus on mandatory reductions of the emissions of CO<sub>2</sub> to reach the objective of 130 g/km for the average new car fleet by means of improvements in vehicle motor technology. The draft legislation COM(2007)856 is currently in codecision. Moreover, a further reduction of 10 g/km of CO<sub>2</sub>, or equivalent if technically necessary, will be reached by other technological improvements and by an increased use of bio-fuels, specifically:

1. Setting minimum efficiency requirements for air-conditioning systems;
2. The compulsory fitting of accurate tyre pressure monitoring systems;
3. Setting maximum tyre rolling resistance limits in the EU for tyres fitted on passenger cars and light commercial vehicles;
4. The use of gear shift indicators, taking into account the extent to which such devices are used by consumers in real driving conditions;

<sup>5</sup> (COM(95) 689 final, supported by the Council in 1996 and the European Parliament in 1997

<sup>6</sup> See [http://forum.europa.eu.int/Public/irc/env/eccp\\_2/library?l=/light-duty\\_vehicles&vm=detailed&sb=Title](http://forum.europa.eu.int/Public/irc/env/eccp_2/library?l=/light-duty_vehicles&vm=detailed&sb=Title)

<sup>7</sup> See [http://ec.europa.eu/environment/co2/co2\\_studies.htm](http://ec.europa.eu/environment/co2/co2_studies.htm)

5. Fuel efficiency progress in light-commercial vehicles (vans) with the objective of reaching 175 g/km CO<sub>2</sub> by 2012 and 160 g/km CO<sub>2</sub> by 2015;
6. Increased use of bio fuels maximizing environmental performance.

The above are to be measurable, monitorable, accountable and non double-counting the reductions of CO<sub>2</sub>. By improving fuel efficiency, the revised strategy is aimed to deliver substantial fuel savings for drivers. The Commission is also inviting manufacturers to sign an EU code of good practice on car marketing and advertising to encourage the car industry to compete on the basis of fuel efficiency instead of size and power. As part of the revised strategy, the Directive on CO<sub>2</sub> labelling of cars will be revised. On the fuel side, the Commission has also proposed the introduction of compulsory requirements aimed at the gradual decarbonisation of road fuels, through an amendment of the fuel quality directive.

The automobile industry has also attached a great importance to the availability of low sulphur (<50 ppm) and sulphur-free (<10 ppm) fuel to meet both the mandatory emission limits for nitrogen oxides (and diesel particulates) and the targets for reduced CO<sub>2</sub> emissions. Sulphur free fuels enable the use of improved catalytic technology and reduce particle emissions, facilitating compliance with existing (and future) emissions standards and helping to improve fuel efficiency (in particular for the purpose of implementing direct injection). Under the Directive Member States had to have this fuel available *'on an appropriately balanced geographical basis'* from 2005, with mandatory full conversion by 2009. The progress against this requirement is discussed within the individual Member State chapters of this report and in the EU Summary chapter.

### 1.2.2 Air Quality

In September 2005 the European Commission adopted a Thematic Strategy on Air Pollution, defining the ambition level for further improvements in some key environmental problem areas related to air pollution in the European Community up to the year 2020. One of the key measures of the Thematic Strategy was a proposal for a new directive on air quality, bringing together a number of separate instruments into a single legal act<sup>8</sup>, as well as introducing new limit values and exposure related objectives for PM<sub>2.5</sub>. This new Directive<sup>9</sup> was adopted on 21 May 2008. Member States have two years to transpose the Directive; until then the existing legislation generally applies, with some provisions of the new Directive to be implemented sooner.

Releases of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM) from vehicles are covered under the vehicle emission standards (so-called Euro standards). These are all measured separately for petrol and diesel cars as well as light and heavy goods vehicle classes, and contain maximum permitted emissions over a standard drive cycle. There are currently four stages for cars and Light Commercial Vehicles (LCVs) – conventionally labelled with Arabic numerals - that have progressively tighter emissions limits. Euro 4 has been in force for new types of vehicles since 1 January 2005 and since 1 January 2006 for all new vehicles. A further two new standards, Euro 5 and Euro 6, were introduced in Regulation No 715/2007<sup>10</sup>, June 2007. Euro 5 will apply from 1 September 2009 and sets tighter emission limits of particles and NO<sub>x</sub> for new cars and vans sold in the EU, for example an 80% reduction in PM emissions and a 20% reduction in NO<sub>x</sub>

<sup>8</sup> The Framework Directive 96/62/EC, the first Daughter Directive 1999/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air, the second Daughter Directive 2000/69/EC relating to limit values for benzene and carbon monoxide in ambient air, the third Daughter Directive 2002/3/EC relating to ozone in ambient air, and the Exchange of Information Decision 97/101/EC.

<sup>9</sup> Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

<sup>10</sup> Regulation No 715/2007 on on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information. Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:171:0001:0016:EN:PDF>

emissions from diesel cars compared with Euro 4 limits. Euro 6, which will enter into force on 1 September 2014, sets significantly lower limits for NO<sub>x</sub> emissions from diesel cars (68% lower than the current Euro 4 limits).

The emission classes for Heavy Duty Vehicles (HDVs) are conventionally labelled with Roman numerals. Euro IV entered into force on 9 November 2006 for new types of vehicles, while Euro V will enter into force on 1 October 2008 and sets a 43% reduction in the NO<sub>x</sub> emission limit compared with Euro IV. In December 2007 the European Commission released a proposal for a further, Euro VI stage which would apply from 1 April 2013 for new vehicle types and 1 October 2014 for all new registrations<sup>11</sup>. Under Euro VI, the emission limits for HDVs would be reduced by 80% for NO<sub>x</sub> and 68% for PM.

The stakeholder consultations for the Euro V and VI emission limits have shown only one parameter to be of importance for them to be met, which is the availability of sulphur-free fuels. As already discussed, mandatory full conversion to sulphur-free petrol and diesel fuels is required under the fuel quality directive by 2009.

### 1.2.3 Fuel Quality

There are currently five key documents that set requirements for the quality of fuel sold in the EU and the monitoring and reporting of fuel quality. These are as follows (a more detailed summary of these requirements is discussed in section 2, Box 1):

- Directive 98/70/EC
- Commission Decision 2002/159/EC (Appendix 1)
- European Standard EN 14274:2003
- Directive 2003/17/EC
- Commission Recommendation 2005/27/EC (Appendix 5).

The parameters covered in the fuel quality standards outlined in Directive 98/70/EC fall loosely into two categories. The first include physical properties, such as octane number (RON and MON) for petrol; Cetane number and density for diesel. These need to be within certain limits in order for internal combustion engines to function efficiently, and have an impact on emissions of both air quality pollutants and CO<sub>2</sub>. The second category includes fuel content that may be more directly linked to harmful emissions, such as hydrocarbons, sulphur and lead content. The standards are listed within Commission Decision 2002/159/EC found in Appendix 1 of this report.

A general ban on the marketing of leaded petrol was agreed by EU institutions from 2000. Sulphur is of particular interest as its presence in fuels can harm the effectiveness of several existing and emerging automotive technologies such as three-way catalytic converters, oxidation catalysts, NO<sub>x</sub> adsorber catalysts (NACs) and particulate traps. The mandatory limit for sulphur in 2005 is set at 50 ppm for petrol and diesel. Some EU states already provided fuel in previous years at <50 ppm ahead of this mandatory requirement. Debate as to whether the 2005 limit should be reduced further prompted the EC to launch a consultation with stakeholders in 2000<sup>12</sup>. The decision to amend Directive 98/70/EC resulted in a requirement for introduction of sulphur-free fuel (<10 ppm sulphur) to be made available “on

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<sup>11</sup> Proposal for a Regulation of the European Parliament and of the Council on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information. Available at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0851:FIN:EN:PDF>

<sup>12</sup> The results of this consultation may be found on in the following report available on DG Environment's website: 'Consultation on the Need to Reduce the Sulphur Content of Petrol and Diesel Fuels Below 50 ppm: - A Policy Maker's Summary'. A report produced for the European Commission, DG Environment; George Marsh, Nikolas Hill and Jessica Sully, November 2000; AEA Technology Environment, UK.

*an appropriately balanced geographical basis*” from January 2005<sup>13</sup> (with annual reporting in availability<sup>14</sup>). Full mandatory conversion to sulphur-free petrol is to be achieved by 2009. Full conversion to sulphur-free diesel is also foreseen for 2009, subject to confirmation in the review of Directive 98/70. The Commission has not found any grounds to propose prolonging that date. These requirements are implemented under the amending Directive 2003/17/EC<sup>15</sup>.

The reasoning behind this amendment is that by 2009 the composition of vehicle fleets able to take full advantage of the lower sulphur content should be sufficient to offset any disadvantages due to additional refining of the fuel. The availability of sulphur-free petrol (<10 ppm) would lead to an improvement in the fuel economy of future gasoline direct injection cars by 1-5%, compared to similar vehicles using fuel containing a maximum of 50 ppm sulphur. It would also lead to lower emissions of conventional pollutants from the existing fleet of petrol vehicles.

With regard to heavy duty vehicles, exhaust after-treatment devices will perform better and be more durable with sulphur-free diesel. The fuel economy of other diesel vehicle types and technologies would also improve by using sulphur-free fuels (for example, reduced regeneration frequency of particulate filters) and its use by the existing fleet could also lead to lower emissions of pollutants such as particulate matter.

The European Commission has conducted a review of the fuel quality Directive (98/70/EC), according to the requirements outlined in Directive 2003/17/EC, in Article 9(1), which states that: *“the Commission shall review the fuel specifications of Annexes III and IV with the exception of sulphur content and propose amendments, if appropriate, in keeping with current and future requirements of Community vehicle emission and air quality legislation and related objectives”*.

Input to the review has been provided by the Commission's Joint Research Centre on a number of aspects and through position papers from stakeholders. The publicly available information is published at [http://forum.europa.eu.int/Public/irc/env/fuel\\_quality/library](http://forum.europa.eu.int/Public/irc/env/fuel_quality/library). Following this review, the Commission made a proposal in early 2007 to modify certain aspects of the Directive, which is discussed further later in this section.

### **Reporting on Fuel Quality from 2005**

Amendments to Directive 98/70/EC made in 2003 (Directive 2003/17/EC) require Member States to develop Fuel Quality Monitoring Systems (FQMS) in accordance with European Standard EN 14274:2003, to have been in place from 1 January 2004. A summary of monitoring and reporting requirements under the standard follows:

1. Specification of information requirements in order to set up the FQMS, including regional level data (number of refuelling stations, sales, population and number of vehicles);
2. The system is to be run twice a year, for the summer and the winter periods (as summer and winter fuels have different specifications);
3. Specification of the minimum number of sample sites of fuel grades required (in order to make the FQMS as robust and representative as possible), depending on the statistical model being used (chosen depending on the size of the country and how it is split into regions);
4. Specification of a list of all retail (public vehicle) and commercial (private fleet) fuel dispensing sites is required (by region) and that sampling should take place across randomly selected samples of these;

<sup>13</sup> Directive 98/70/EC also specifies that Member States shall adopt and publish the laws, regulations and administrative provisions necessary to comply with the Directive by 30 June 2003.

<sup>14</sup> Article 8 of Directive 98/70/EC, as amended by Directive 2003/17/EC

<sup>15</sup> O.J. L76 of 22.3.2003, p. 10

5. Specification of the minimum number of samples/sites for fuel grades with less than 10% of sales.

Directive 2003/17/EC requires that Member States report on the geographical availability of sulphur free fuels, but neither the Directive nor EN 14272 defines what the appropriate geographical availability should be or how to measure this. These issues were addressed in Commission Recommendation 2005/27/EC, which contains guidance on what constitutes appropriate geographical availability and suggests a range of methods (options) by which Member States can calculate and report on geographical availability. However, the recommendations are not mandatory and many Member States have not supplied this level of detail in their 2005 reports.

The progressive adoption of EN 14272 by Member States is leading to greater consistency in the data available for assessment of the various fuel quality parameters. However, there is an option in Directive 2003/17/EC, in which: *“the use of an alternative fuel quality monitoring system may be permitted provided that such a system ensures results of equivalent confidence”*. This means that some Member States use alternative systems, i.e. national systems, thus reducing both the ease of direct comparisons between different Member States and the guarantee of availability of certain data. Some Member States have indicated that they are in transition from a national system to EN14272.

### **Proposed Amendments to the Fuel Quality Directive**

EU Directive 98/70/EC as amended specifies mandatory quality requirements for all petrol, diesel and gas oil for use in non-road mobile machinery (NRMM) sold in the EU. The specified quality requirements are designed to deliver air quality benefits directly (e.g. by limiting lead and benzene content of petrol) or indirectly (e.g. by limiting sulphur content to enable efficient and durable operation of catalytic aftertreatment systems) and to standardise key operability parameters (e.g. octane rating of petrol and cetane number of diesel) to support a common market for vehicles.

The Commission's proposed amendments to the Directive delete a number of now obsolete requirements from the existing Directives. In addition the proposals make a number of changes to the existing requirements, summarised briefly as follows:

1. The introduction of a requirement for fuel suppliers to report on the lifecycle greenhouse gas emissions of their fuels and reduce these by 1% per year (per unit of fuel energy) between 2010 and 2020. This requirement applies to total fuel supply.
2. Revision to the definition of 'Arctic or severe' conditions based on winter temperatures being below the EU average.
3. A separate vapour pressure relaxation for petrol containing ethanol to allow up to an 8kPa increase in vapour pressure, depending on ethanol content, over the (non-arctic) 60kPa limit only. Petrol-ethanol blends in summer arctic petrol would still have to meet the 70kPa limit.
4. Introduction of a new grade of petrol with up to 10% ethanol by volume (the current limit is 5%. The 10% blend would be marked as 'High biofuel petrol' and petrol meeting the current <5% ethanol content has to be marked as 'Low biofuel petrol'.
5. A reduction to the maximum permissible Polycyclic Aromatic Hydrocarbon (PAH) content of diesel from 11% to 8% by mass.
6. The proposal also tasks the Commission with developing a test methodology for approving metallic additives for use in fuels. Although metallic additives are not currently widely used in EU fuel, there are concerns that some additives may impair the functioning of certain vehicle technologies or may result in emissions of metallic particles, which could have adverse health impacts. At present there are no legislative restrictions on the use of these additives.



7. A further reduction to 10mg/kg (virtually 'sulphur free') from 31st December 2009 in line with road fuel levels (from the current limit of 2000mg/kg reducing to 1000mg/kg from 1st January 2008). This is to enable the use of catalytic emissions control technologies that would otherwise be poisoned by high fuel sulphur content.
8. For inland waterway fuel the sulphur content would only be tightened to 300mg/kg from 31<sup>st</sup> December 2009 and would then be further tightened to the 10mg/kg level from 31st December 2011. The less stringent requirements for inland waterway fuel are due to the emissions standards for these engines not being sufficiently stringent as to force the adoption of catalytic after-treatment systems.

## 2 Member State Summaries: Reporting Format and Requirements

This introductory section outlines the format for the subsequent summary chapter on each EU Member State, together with an explanation of the fuel quality monitoring and reporting requirements being assessed in each part of these chapters.

The information reported by individual Member States, as part of their annual submission of national fuel quality data, includes:

- Sales quantities of different fuel grades;
- Availability of sulphur-free petrol and diesel grades;
- Summary descriptions of the monitoring systems in place;
- Compliance with sampling and reporting requirements and with Directive 98/70/EC limit values in the analysis of samples.

Box 1 summarises the requirements of the five key documents relating to fuel quality monitoring and reporting in the EU. The EU Fuel Quality Monitoring Submissions Reporting Template (Appendix 6) was designed based on the reporting requirements of the Directives and additional supplementary information to assist evaluation. It is divided into mandatory reporting requirements under the Directives (including EN 14274 requirements) and optional reporting fields as per the Commission Decisions. Examples of these supplementary fields include test methods used for each parameter, which is important information to determine compliance with limit values, and the number of samples non-compliant with the limits and their values, which give an indication of the scale of the issue. Completion of these parts of the template reduces the need to seek clarifications or additional information from Member States.

### **Box 1: Key documents and requirements relating to fuel quality**

#### **Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC**

Specifies for the parent fuel grades, RON>91, RON>95 and diesel:

- Limit values (and tolerance limits according to EN ISO 4259:1995) for each fuel parameter. The limit values are either a minimum (e.g. RON) or maximum (e.g. vapour pressure, DVPE).
- Test methods for monitoring the above.

Two sets of fuel specifications are included in the Directive, the first entered into force on 1 January 2000 and the second entered into force on 1 January 2005 (as amended by Directive 2003/17/EC). The Directive also stipulates that Member States are required to report summaries of the quality of fuels sold in their territories.

#### **Commission Decision 2002/159/EC on the common format for the submission of summaries of national fuel quality data. (Appendix 1)**

- *Format:* Provides a common report template covering all parameters in Directive 98/70/EC. Reports to be submitted in both paper and electronic formats.
- *Date:* Reports to be submitted by 30 June each year, data for the preceding calendar year.

#### **European Standard EN14274:2003, Automotive fuels – Assessment of petrol and diesel quality – Fuel quality monitoring system (FQMS)**

- Each Member State must establish a **Fuel Quality Monitoring System (FQMS)**, taking into account factors such as the number of refineries supplying the market, the

- number of fuel grades available and the sales volumes of different types of fuel.
- Summary of sampling requirements:
 

<i>Sampling parameter</i>	<i>Requirement</i>
By whom	Sampling by appointed organisations; analysis by accredited laboratories
Where	Refuelling stations
When	Separate summer and winter sampling and reporting periods
Number of sites	Minimum numbers for each of the summer and winter periods, according to statistical Model A, B or C or a national system.
Sample selection	Randomly in each region, to fulfil the minimum number of sample sites.
Methods	Specified in Directive 98/70/EC or EN228:2000 (petrol) and EN590:2000 (diesel), or later versions.
  - Builds on and expands the reporting format specified in Commission Decision 2002/159/EC.

**Directive 2003/17/EC amending Directive 98/70/EC relating to the quality of petrol and diesel fuels**

- In each Member State from 1 January 2005, sulphur-free (<10ppm) fuels were required to be made available “on an appropriately balanced geographical basis”. From 1 January 2009 only sulphur-free fuels will be permitted, throughout the EU (to be confirmed for diesel).
- Requires Member States to annually report on the availability of sulphur-free fuels.

**Commission Recommendation 2005/27/EC (Appendix 5)**

Guidance on what constitutes availability of fuels “on an appropriately balanced geographical basis”. Excepting special cases where there is very high availability or a single terminal/island market, Member States may choose to calculate availability by:

- Option A, proportion of refuelling stations with sulphur-free grade available by region;
- Option B, average distance between refuelling stations with sulphur-free grade available;
- Option C, availability of sulphur-free fuels at large refuelling stations;
- Option D, availability of sulphur-free fuels at highway/motorway refuelling stations; or
- Their own alternative means.

The information reported by each Member State is presented in summary chapters under the headings in the following sections. An overall summary of EU fuel quality monitoring and reporting is presented in a separate section.

## 2.1 FUEL AVAILABILITY

For each Member State a table is presented listing the fuels that were reported to be available nationally, where full sales data were provided and the category under which sample analysis results were reported. It lists the parent fuel grades as specified in Directive 98/70/EC and each corresponding national fuel grade.

Each Member State’s fuel availability table will be a subset of the full list of the basic fuel grade categories shown below. Sales in the EU of fuels containing more than 50ppm sulphur content were no longer permitted from 1 January 2005. Therefore fuels under categories 1, 4, 7, 10 and 13 are no longer available.

**Table 1: Basic European fuel grade categories**

Reference no.	Basic fuel grades
1	Regular unleaded petrol (minimum RON = 91)
2	Regular unleaded petrol (minimum RON = 91 & < 50 ppm Sulphur)
3	Regular unleaded petrol (minimum RON = 91 & < 10 ppm Sulphur)
4	Unleaded petrol (minimum RON = 95)
5	Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)
6	Unleaded petrol (minimum RON = 95 & < 10 ppm Sulphur)
7	Unleaded petrol (minimum 95 =< RON < 98)
8	Unleaded petrol (minimum 95 =< RON < 98 & < 50 ppm Sulphur)
9	Unleaded petrol (minimum 95 =< RON < 98 & < 10 ppm Sulphur)
10	Unleaded petrol (minimum RON >= 98)
11	Unleaded petrol (minimum RON >= 98 & < 50 ppm Sulphur)
12	Unleaded petrol (minimum RON >= 98 & < 10 ppm Sulphur)
13	Diesel fuel
14	Diesel fuel (< 50 ppm sulphur)
15	Diesel fuel (< 10 ppm sulphur)

In some cases Member State do not provide separate analyses for <50 and <10ppm sulphur-content variants of a fuel grade, in which case the Reporting Category is designated as the <50ppm fuel grade. In other cases sample analysis results of all petrol RON/sulphur grades are reported under a single category and then the analysis 'reporting category' will be different from the base fuel reference number, for example for the highlighted fuels (3,6 and 15) below:

Reference Number	Parent fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	ON EN 228 "Normal"	2
3	RON 91	<10 ppm	ON EN 228 "Normal"	2
5	RON 95	<50 ppm	ON EN 228 "Super"	5
6	RON 95	<10 ppm	ON EN 228 "Super"	5
12	RON 98	<10 ppm	ON EN 228 "Super Plus"	12
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

### 2.1.1 Sales

In this section, separate pie charts are presented for petrol and diesel fuels, showing the proportion of each of the 15 fuel grade categories sold in the Member State. The charts are useful for comparing the degree to which different fuel grades have permeated the market in each Member State, as there is much variability across the EU.

Separate sales figures for low or sulphur-free fuel grades were not available in previous years reports for some Member States. However it is known that fuels complying with these criteria were available in many cases, e.g. Belgium, Denmark, Finland, Hungary, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal and Slovakia. In the past there has been significant variation in reporting on sales between different Member States. There can be defined four distinct levels of fuel grade categorisation, each a subset of the former level, under which Member States have previously reported sales quantities (or sample analyses). These levels are as follows:

- 1) **Parent fuel grades** – defined according to Directive 98/70/EC (i.e. minimum RON 91 unleaded or minimum RON 95 unleaded petrol);
- 2) **National fuel grades** – defined at a national level with additional requirements to the Directive parent grades, for example minimum RON 98 unleaded petrol, or sulphur-free fuels;

- 3) **Marketed fuel grades** – fuels may be marketed and sold by fuel suppliers as distinct grades with additional specifications beyond Directive and national requirements, e.g. higher RON levels or sulphur-free fuel grades;
- 4) **Sulphur content split of fuel grades** – in some cases fuels are available meeting lower (e.g. sulphur-free) sulphur specifications to those required by the Directive or Nationally, but not specifically marketed as a separate grade by fuel suppliers.

An indication of the application of this distinction in the reporting is provided in the Member State sections, where information is available.

### 2.1.2 Sulphur content

As outlined in section 1.2.3, according to the Directive, the sulphur content of all petrol and diesel sold in the EU must be less than 50ppm ('low' sulphur) from 1 January 2005. In addition, 'sulphur-free' petrol (<10ppm sulphur) must be made available "on an appropriately balanced geographical basis"<sup>16</sup>.

This section provides summary details about the sulphur content and availability of different fuel grades available in the Member State, with information under the following headings:

- **Geographical availability of sulphur-free fuels:** Reporting required by Directive 2003/17/EC. Ideally this should be determined by one of the methods in the Commission guidance note (Recommendation 2005/27/EC<sup>17</sup>), except in special cases where there is very high availability (e.g. 60-80%) or a single terminal/island market.
- **Are sulphur-free grades clearly labelled differently / marketed separately? :** Separate labelling and marketing is not strictly required by the Directives, but it is important for consumers to have the opportunity to choose sulphur-free fuels. This is essentially a prerequisite for the introduction of vehicles using technology requiring the fuels before full mandatory introduction in 2009.
- **Average sulphur content of all petrol and diesel sold:** the mean sulphur content of sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold
- **Additional information.**

The section also includes a table of the average sulphur content for each year 2001 to 2005, for petrol and diesel. A chart in the section on temporal trends (see 2.3) displays the same information graphically (to compare with the proportions of 'official' sulphur grades) with yearly comparisons against the EU averages for petrol and diesel sulphur content.

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<sup>16</sup> Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC

<sup>17</sup> Commission Recommendation 2005/27/EC of 12 January 2005 on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis.

## 2.2 FUEL QUALITY MONITORING

### 2.2.1 Description of system

This section outlines a summary of the key information components of the Fuel Quality Monitoring System (FQMS), under the following headings:

- **Responsible organisation(s):** Responsible for monitoring and reporting on fuel quality in the Member State, but not necessarily the actual sampling which is often carried out by fuel companies.
- **Format of Fuel Quality Monitoring System (FQMS):** EN 14274 statistical model A, B or C, or a national system.
- **Country Size:** Large (greater than 15 million tonnes automotive fuel dispensed per year), or Small.
- **Summer Period:** 1 May to 30 September (normal), or 1 June to 31 August (for Member States experiencing arctic or severe weather conditions). Different grades are available in the summer and winter periods. As far as reporting is concerned the summer period is mainly relevant to vapour pressure limit values, but also separate reporting tables on analyses for summer and winter periods is specified in EN 14274.
- **Location(s) of sampling:** At refuelling stations (as required by EN 14274), and/or refineries or terminals/depots.
- **Time/frequency of sampling:** EN 14274 requires that sampling is undertaken in both the winter and summer periods.
- **Specification of test methods:** As per Directive 98/70/EC.
- **Collection of sales data:** by the responsible organisation, from fuel companies or other sources
- **Other details:** for example about the number of refineries and distribution of fuel in the country, or about progress on implementing EN 14274.

### 2.2.2 Sampling and reporting

For each Member State a summary of reported sampling is provided, along with an assessment of compliance with the various elements of Directive 98/70/EC and EN14274.

Directive 98/70/EC specifies the parameters that are to be monitored for petrol and diesel fuels (18 and 5 parameters respectively). Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless given dispensation by the European Commission to use their own National System where it is of equivalent statistical confidence.

EN 14274 specifies separate reporting for Summer and Winter periods, and sets minimum sampling numbers for each fuel (dependant on the statistical model used and sales proportion). The standard specifies a minimum number of samples to be taken per fuel grade (in each of the winter and summer periods), see Table 2.2. This is to ensure a high level of statistical confidence (95%) that the results are representative of all the fuel sold in the territory.

**Table 2.2: Sampling requirements for different Fuel Quality Monitoring Systems**

Model	Samples per grade and per winter and summer period*	
	Small Country	Large Country
EN 14274 Statistical Model A	50	100
EN 14274 Statistical Model B	100	200
EN 14274 Statistical Model C	50	-
National System	-	-

\* Annual sampling requirements are therefore double the table values per grade.

The countries defined as “large” are France, Germany, Italy, Spain and the UK according to the definition contained in the European Standard EN 14274 (greater than 15 million tonnes automotive fuel sales per year). The standard also specifies that individual samples are to be taken at separate refuelling stations. In Member States where sampling also takes place at other points of the distribution chain, the number/proportion of samples taken at refuelling stations needs to be reported.

Definitions of the three statistical models from the standard are presented in Box 2, with the corresponding total sampling requirements previously identified in Table 2.2. In the macro region model (A), regions are defined with similar fuel sales and number of supply sources. For very small countries such as Luxembourg, Malta and Cyprus, where there is basically only supply from one source and it does not make sense to divide the country into separate regions, Model C may be applied. Other Member States have also previously chosen to use Model C and in these cases a clear rationale for its use should be demonstrated on the basis of both number of fuel sources/supply points and size/possibility of division of the territory into regions. Similarly, Member States choosing to use own National Systems should provide information on the fuel supply situation in their country and the statistical confidence of their system in order to demonstrate compliance with Directive 98/70/EC as amended by Directive 2003/17/EC.

**Box 2: Models for the FQMS defined in EN 14274:2003**

For each model, the number of samples per grade per region or macro region (Model A) is obtained by setting the number of samples (diesel fuel and petrol fuel separately) to be proportional to the volume sales within each region, macro region, or sub-region.

Model A – Macro regions

In this model, the regions within the country are grouped (preserving some geographical identity) into macro regions so that they have similar total sales volumes relative to each other and also about the same number of different supply sources. This approach is recommended for countries as it is designed to capture fuel variation efficiently and hence requires a smaller number of samples. If geographical, and destructive or other circumstances do not allow fulfilment of the requirements for the design of this preferred model, Model B shall be considered the next best model.

Model B – Non-macro region

If the construction of macro regions (based on fuel supply patterns) is not possible within the country, then the country shall be divided into regions using only geographic and administrative criteria. To ensure that fuel variability is reliably captured, a large number of samples per grade are required: 100 for small-size countries and 200 for large-size countries.

Model C – Non-region model

If the country is small-sized and when it can be demonstrated that a division into macro regions or non-macro regions is not possible, having considered the procedures and provisions given in this European standard, then the country shall be considered as one region for sampling purposes.

### 2.2.3 Compliance with fuel quality limit values

This section provides details for each grade of fuel sold in the Member State on any non-compliances with the limit values specified in Directive 98/70/EC, and associated and tolerance limits for the test methods. It gives an indication of the number of non-compliances, their magnitude and statistical significance.

Directive 98/70/EC sets test methods, limit values and tolerance limits for a total of 18 parameters for petrol and 5 for diesel. The permitted test methods are those specified in Directive 98/70/EC or EN 228:2000 for petrol and EN 590:2000 for diesel, or later versions.

Each test method has a tolerance limit, based on the reproducibility of the method. The tolerance limit is the value that gives 95% statistical confidence of being equal to the limit value.

For each parameter Member States are required to report the minimum, maximum, mean and standard deviation of values, as per the reporting template. The Directive (and European Standard) does not require Member States to report the test method used for each parameter, although this information is required to confirm whether samples have exceeded limits where there is more than one possible method. Additional information is usually sought from Member States in order to determine compliance with the tolerance limits in these cases, because the test reproducibility (determining the tolerance limit) varies according to each specific analysis. Fields are provided in the Excel reporting template to allow Member States to provide this information with their submission.

This situation has been improved upon for the petrol and diesel distillation limit values in Directive 98/70/EC, for which the European Committee for Standardization (CEN) derived fixed precision statements (reproducibility) based on an extensive analysis of large sets of distillation data of petrol and diesel from national monitoring schemes. As recommended by CEN, these fixed precision statements were incorporated into the Excel reporting template and are now used to determine compliance where the reproducibility of a specific test is unavailable.

To facilitate improved compliance with fuel quality standards, Directive 2003/17/EC states *“Member States shall determine the penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties determined must be effective, proportionate and dissuasive.”* The Excel reporting template provides fields for Member States to describe punitive action taken against companies supplying non-compliant fuel.

In evaluating different Member State submissions there are clear variations in trends that emerge. Sample analysis results for different parameters show different trends with regards to levels of compliance with limit values and the range distribution of sample analysis results in relation to the mean and Directive limit values. In some cases the mean of sample values can appear very close to the Directive limit values even without any reported exceedances of these limits by any of the samples. As part of the assessment of the compliance in relation to these analyses it is therefore useful to understand the reasons behind these differences.

Discussion with members of CEN Technical Committee 19, which deals with fuel quality issues, has helped provide valuable insight in this area. A summary of the parameters covered by the Directive and the likely proximity of the market quality to the limit values is presented in Box 3. Essentially there are at least three types of sample analysis distributions associated the different fuel quality parameters:



1. Distributions for properties of relevant "economic" value, e.g. Research Octane Number (RON) for petrol and Cetane Number (CN) for diesel. In this case most results are just above the limit value (95 for RON and 51 for CN) and the distribution of sample analysis results is quite asymmetrical.
2. Distributions for properties that are quite easily fulfilled, e.g. percentage of petrol evaporated at 100°C. In this case the distribution of sample values is more normal (closer to a more typical symmetrical 'bell shaped' distribution).
3. Distributions for properties with tighter limits to be adopted in the near future (e.g. moving from <50ppm to <10ppm sulphur). In this case distributions are again not very normal as the decrease of sulphur content follows strategies that can be different from company to company and from region to region (and from country to country).

There is therefore no typical distribution curve associated with each test method (and these distributions can also change over time). A variety of functions might be generated to describe the distribution, based on the summary data supplied by each Member State, but these would not provide much insight unless one understands what is really motivating the particular refiner to meet the specification. The fuels supplied to many Member States are sourced from quite a wide variety of different companies (and different refineries from the same company). Therefore individual Member State submissions on analysis of sampling carried out across the fuel network will most likely contain a mix of fuels produced by different refineries with varying (and unknown) strategies. This means that the actual distribution curves of sample analysis would vary depending on the combination of these different fuels.

As a result there does not appear to be a suitable way available to statistically verify Member State submission analysis results with a level of demonstrable confidence with the available information currently provided. This would only be possible with the full sample analysis dataset, which would require a very significant additional reporting burden on Member States as well as a considerable increase in submission evaluation effort. There does not appear to be evidence to suggest this level of additional effort would provide significant benefits to the fuel quality monitoring process to warrant consideration.

### **Box 3: Likely distribution of samples against fuel quality specifications**

The following provides a brief overview (provided by CEN) of the parameters covered by the Fuel Quality Directive and the likely proximity of the market quality to the maximum or minimum limit value specifications:

#### **Petrol**

- *Research Octane Number (RON)*: It is usual for a refinery to be tight to specification on either RON or MON - it is unusual to be tight to both specs.
- *Motor Octane Number (MON)*: This is usually the most limiting specification for European refineries.
- *Vapour Pressure for the Summer Period*: It is always difficult to meet this specification, whilst maintaining octane and not exceeding the maximum aromatics specification. Refineries try to maximise butane into the blend as it provides high octane but also has a high vapour pressure. The problem is made worse when ethanol is blended to the petrol due to its azeotropic effect causing a rapid increase in vapour pressure. It is therefore expected to see all countries tight to this specification.
- *Distillation*: This is generally not tight to specification, but may change in the future with the blending of ethanol, which causes a shift in the distillation curve.
- *Hydrocarbon Analysis*: Generally refineries will be tight to the maximum aromatics and benzene specifications. Some refineries will be tight to the maximum olefin specification but this is more unusual.

- *Oxygenates*: Due to the biofuels obligations in Europe there will be a move to be tight to the maximum ethanol, ETBE and oxygen specifications in future years.
- *Sulphur Content*: There are strong economic and supply reliability reasons for refiners to blend tight to the sulphur specifications. The industry tends to run tight to spec to maximise the hydrotreating catalyst lifetime and the energy consumption at the refinery. Thus for a 10ppm max sulphur specification blending is usually targeted around 8ppm max to account for downstream contamination issues in the distribution system where product can interface with 1000ppm gas oil and kerosene. Because of the uncertainty in testing this means that the real blend target can be as low as 6ppm. This is reaching the limit of the desulphurising capacity of the refinery and rapidly increasing energy consumption and reducing the catalyst life. The 10ppm sulphur specification is lower than may be required for many vehicle aftertreatment systems. In the USA legislation has settled on a maximum of 30ppm for petrol and 15ppm for diesel. Therefore, from an environmental perspective running tight to the maximum sulphur specification for sulphur-free fuels should not be construed as an indication of non-compliance.

### Diesel

- *Cetane number*: There are strong economic drivers to upgrade lower quality high acid crude oils particularly as North Sea crude runs out. These lower quality crudes yield low cetane diesel that is brought up to specification by the use of cetane improver (2 ethyl hexyl nitrate). The cetane improver content is optimised such that cetane will be tight to specification at many refineries.
- *Density*: At the 845 kg/m<sup>3</sup> limit for this parameter it is unlikely that many refineries will be consistently tight to this specification unless they have medium/high pressure hydrofining. However, the blending of FAME (density approx 890 kg/m<sup>3</sup>) is likely to result in density being tighter to the maximum specification in the future as increasing amounts of biofuels will need to be blended with conventional fuels to achieve European biofuel targets.
- *Distillation 95% recovered*: This can be limiting but not all refineries are tight to this specification.
- *Polycyclic aromatic hydrocarbons*: The highest European levels are around 8 - 8.5%, so well under the maximum specification of 11%.
- *Sulphur content*: As for petrol there are strong economic and supply reliability reasons for refiners to blend tight to the sulphur specifications.

## 2.3 Temporal trends

Temporal trends are depicted for each Member State in the form of graphs for total volume of petrol and diesel sold and the percentage of 'regular' (pre-2005), <50ppm and <10ppm sulphur-content fuels, for each year 2001 to 2006. This year also sees the introduction of a graph comparing average sulphur content for petrol and diesel in the MS with the EU average.

The information about fuel sales by volume and sulphur content over time, while not required by the Directive/other, is useful to monitor progress towards the Directives' 2005 and 2009 requirements for sulphur-free fuel. The trend graphs have been particularly instructive in showing the rapid conversion to lower sulphur fuel types in most Member States over the period 2001 – 2006, and particularly the low sulphur requirements that commenced in 2005.

The EU25 chapter also includes new trend graphs on a number of reporting and compliance issues, with pairs of graphs for the EU10 (from 2004) and EU15 (from 2001).

## 2.4 Member State Summaries

A summary has been prepared for each Member State listing the key areas for further improvement. The recommendations cover areas such as non-compliance or uncertainty about compliance, EN14274 sampling requirements, reporting issues and fuel availability. Examples of the types of recommendations include:

### Key Areas for Improvement

- MS is not taking sufficient samples to comply with Statistical Model A
- MS is only carrying out sampling at refineries and depots. Samples should be taken from refuelling stations.
- Sulphur free fuels are not widely available
- MS has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard.
- MS was X months late in submitting its report
- MS is not/only partially compliant with reporting requirements, for example:
  - The MS did not sample/report all of the required reporting parameters (18 for petrol, 5 for diesel), or
  - The MS has provided no assessment of the geographical availability of sulphur-free fuels in its territory
- MS reported a significant number of non-compliances with limit values (note any particular ones)...indication of actions to be taken?

## 3 Austria

### 3.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
3	RON 91	<10 ppm	Normal	3
6	RON 95	<10 ppm	Super	6
12	RON 98	<10 ppm	Super Plus	12
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

#### 3.1.1 Sales

Figure 3.1: National fuel sales volume proportions by fuel type (%)

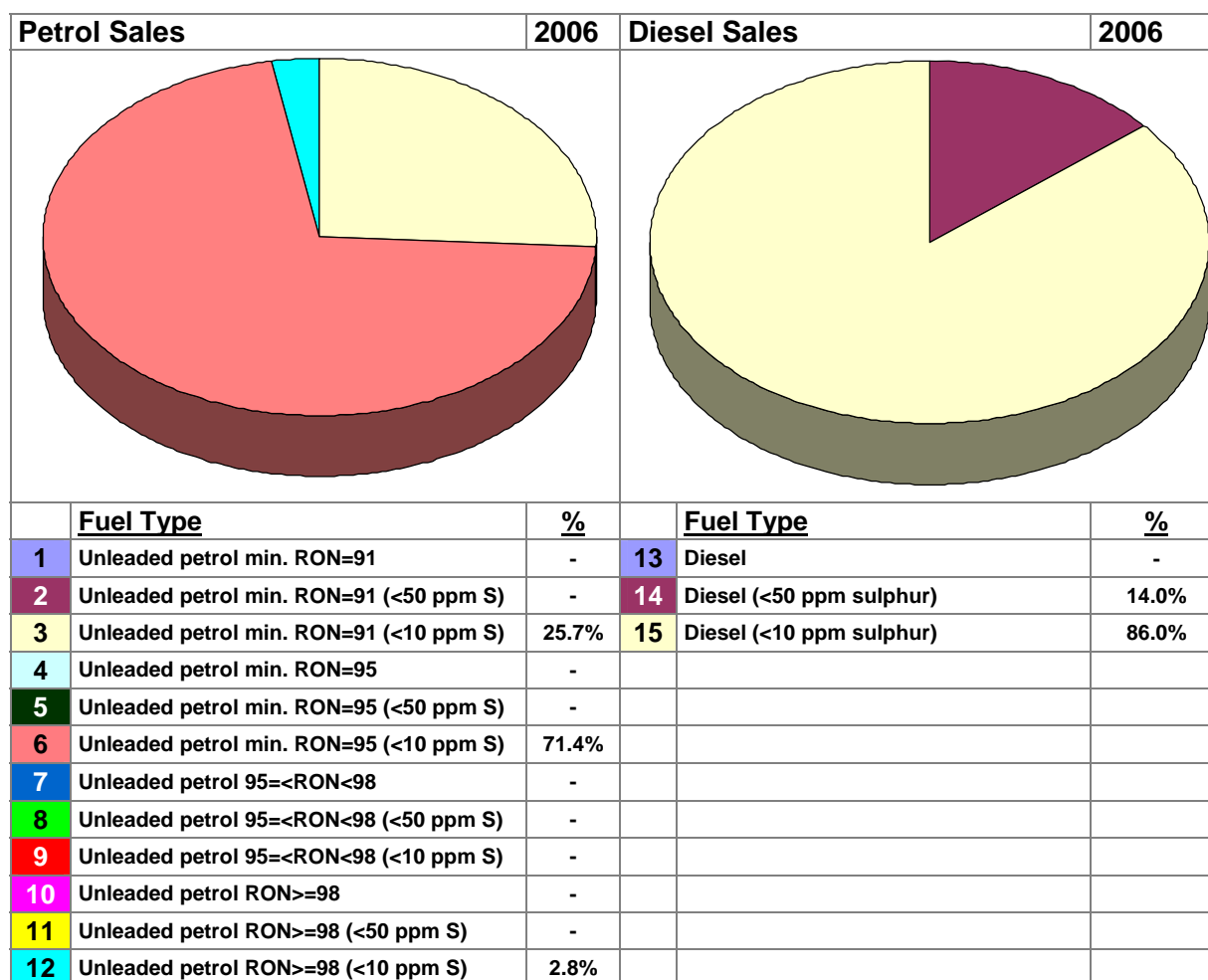


Figure 3.1 clearly shows that RON 91 petrol was still sold widely in Austria in 2006, accounting for 25.7% sales (30% in 2001), sales of RON 95 petrol were 71.4% compared to

65% in 2001, with RON 98 only accounting for 2.8% sales. Since 2005 only sulphur free (<10 ppm) petrol has been marketed in Austria. Since 2003 significant quantities of sulphur-free diesel have been made available and comprised 86% (extrapolated from sampling) of sales in 2006 (87% in 2005).

### 3.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** An agreement was made in 2003 between the Federal Minister for Land, Forest, Environment and Water Management and the General Director of OMV AG (Austrian mineral oil administration) that from the 1st January 2004 a countrywide availability of sulphur free petrol and diesel will be guaranteed.

From February 2004 it can be assumed that sulphur-free fuel will be available on a countrywide level from all public petrol stations. The statistical survey of the amounts of fuels sold found no difference in the sulphur content. The fuel quality sampling showed that it can be assumed that all petrol fuels have a maximum sulphur content of 10ppm. The sampling indicated an average sulphur content of 9.5 ppm for diesel. Of the 100 tested samples, 14 had a sulphur content greater than 10ppm. It can therefore be reckoned that there is an approximate 86 % availability of sulphur-free diesel.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Sulphur free fuels are not labelled, however all petrol is sulphur-free as well as most (86%) of the diesel.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** From the sample analysis the average sulphur content of the 3 petrol grades has been found to be well below the 10ppm limit, with 6.2ppm for RON91, 5ppm for RON 95 and 3.7ppm for RON 98, which implies an average content (weighted by numbers of sales) of 5.27 ppm.

**Additional information:**

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 3.1: Annual trend in average sulphur content in petrol and diesel fuels

AT	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	21	17	14	7	5	5	18
<b>Diesel</b>	277	236	213	14	13	10	22

## 3.2 Fuel Quality Monitoring 2006

### 3.2.1 Description of system

**Responsible organisation(s):** Umweltbundesamt GmbH (Environmental Protection Federal Agency Ltd.).

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** 245 Refuelling stations

**Time/frequency of sampling:** Samples were taken equally across the winter and summer periods (50 each) for all grades, except for Grade 12 of which 3 samples were taken in summer only.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** Reporting to the Federal Ministry for Economy and Work, according to the Oil - Stocks and Reporting Law via a reporting obligation.

**Other details:** Austria is served by a single refinery installation (Refinery Schwechat). The production of this refinery accounts for most of the domestic demand. The remaining demand is accounted for by imports from Germany, Italy, Slovakia and Hungary. Data on the regional distribution of the imported fuel in Austria is not available at the current time. The fuel controls carried out in recent years show no regional quality differences from which it can be assumed that there is a continual single quality of imported and domestically produced fuel.

### 3.2.2 Sampling and reporting

Austria was fully compliant with the sampling and reporting requirements in 2006. The following Table 3.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 3.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	25.7%	50	50	100	Yes	All of 18	
6	RON 95 <10 ppm S	6	71.4%	50	50	100	Yes	All of 18	
12	RON 98 <10 ppm S	12	2.8%	3	0	3	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>103</b>	<b>100</b>	<b>203</b>			
14	Diesel <50 ppm S	14	14.0%	50	50	100	Yes	All of 5	
15	Diesel <10 ppm S	14	86.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>100</b>			

**Notes:** S = Summer; W = Winter

### 3.2.3 Compliance with fuel quality limit values

#### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Normal Petrol**

**Detail:** The Aromatics maximum limit value (35%v/v) was exceeded with by some samples with a maximum of 35.3%v/v.

**Statistical significance:** The Aromatics tolerance limit for statistical significance is 36.0 %v/v, therefore the samples could be judged compliant with the Directive.

**Member State's notes:** -

### **Super Petrol**

- Detail:* Research Octane Number (RON) and Motor Octane Number (MON) minimum limit values (95 and 85 respectively) was exceeded by some samples (with 94.6 and 84.6 respectively).  
Summer vapour pressure maximum limit value (60 kPa) was exceeded by some samples (with 61 kPa).  
Aromatics maximum limit value (35%v/v) was not complied by 1 sample with 36.3 %v/v.
- Statistical significance:* The tolerance limits for statistical significance for the test methods used for RON (94.6), MON (84.5), and summer vapour pressure (61.8 kPa) were not exceeded and these samples were compliant with the Directive.  
Aromatics' tolerance limit for statistical significance (36.0%v/v) was exceeded by 1 sample and, therefore, it was non-compliant with the Directive.
- Member State's notes:* A complaint was raised as a result of this non-compliance with the Directive.

### **Super Plus Petrol**

- Detail:* Summer vapour pressure limit value (maximum 60 kPa) was exceeded by 1 sample with 67.6 kPa.
- Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure (61.8 kPa) was exceeded and therefore the sample was non-compliant with the Directive.
- Member State's notes:* A complaint was raised as a result of this non-compliance with the Directive.

### **Diesel**

- Detail:* Cetane number limit value (minimum 51) was exceeded by some samples with a minimum of 50.9.
- Statistical significance:* The tolerance limit for statistical significance for the cetane number (48.5) was not exceeded and the samples were compliant with the Directive.
- Member State's notes:* -

**Additional information:** In addition to the above non-compliances with the Directive were two exceedances of the <10ppm sulphur content limit for petrol fuels marketed as sulphur-free, with a sulphur content of 25.1 ppm (Normal Petrol, RON 91) and 13.5 ppm (Super Petrol, RON 95).

## **3.3 Temporal trends**

The following Figure 3.2 to Figure 3.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol and diesel have slightly decreased since 2005 by 4% and 2% respectively. However, of the petrol sales, regular grade sales have all converted to sulphur-free (< 10 ppm) grades and also now make up the majority of diesel sales (86%).

Figure 3.2: Temporal trends in national sales of petrol and diesel (million litres)

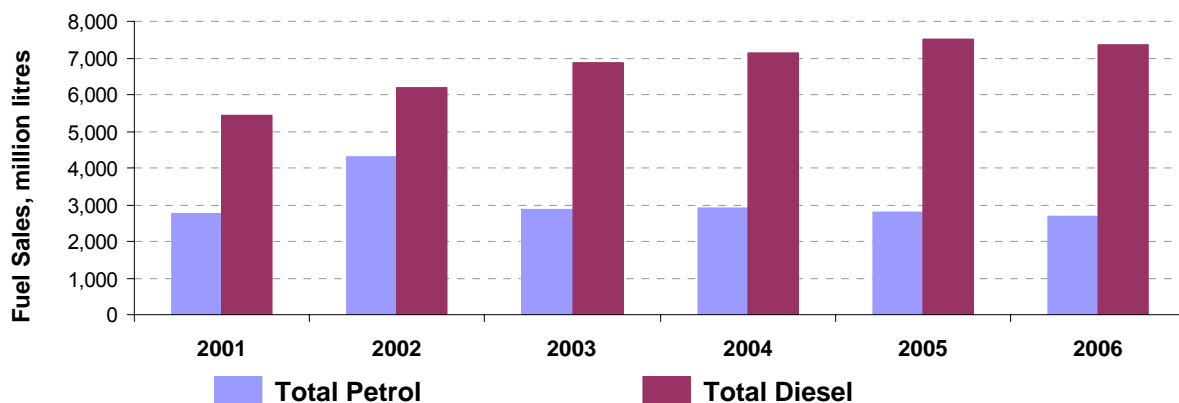


Figure 3.3: Temporal trends in national sales of low sulphur petrol (%)

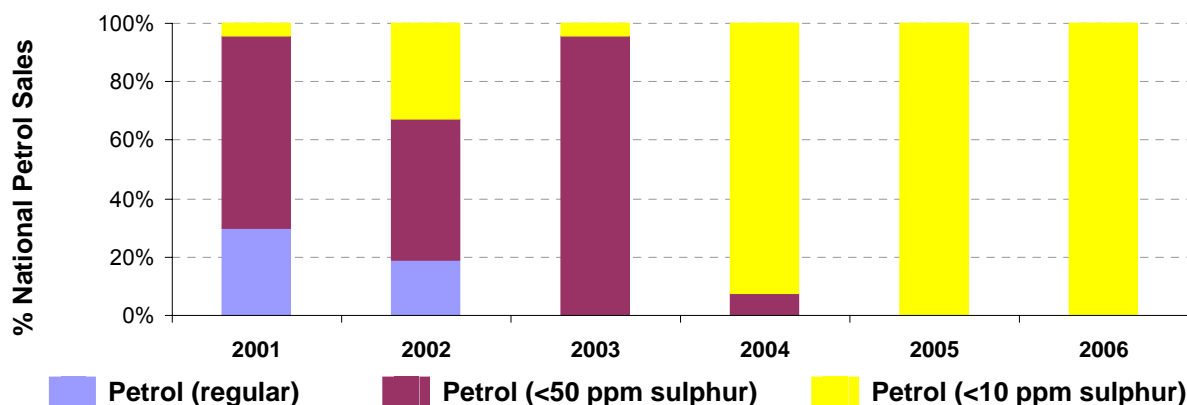


Figure 3.4: Temporal trends in national sales of low sulphur diesel (%)

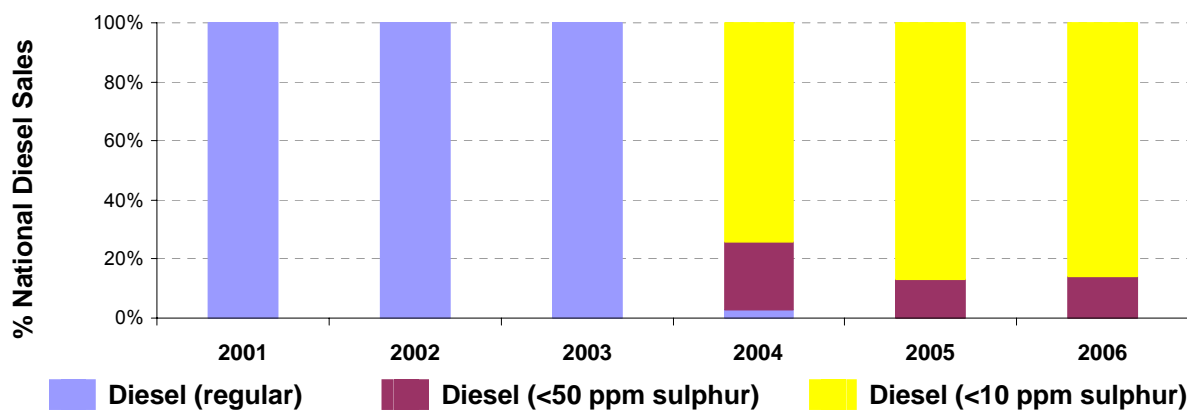
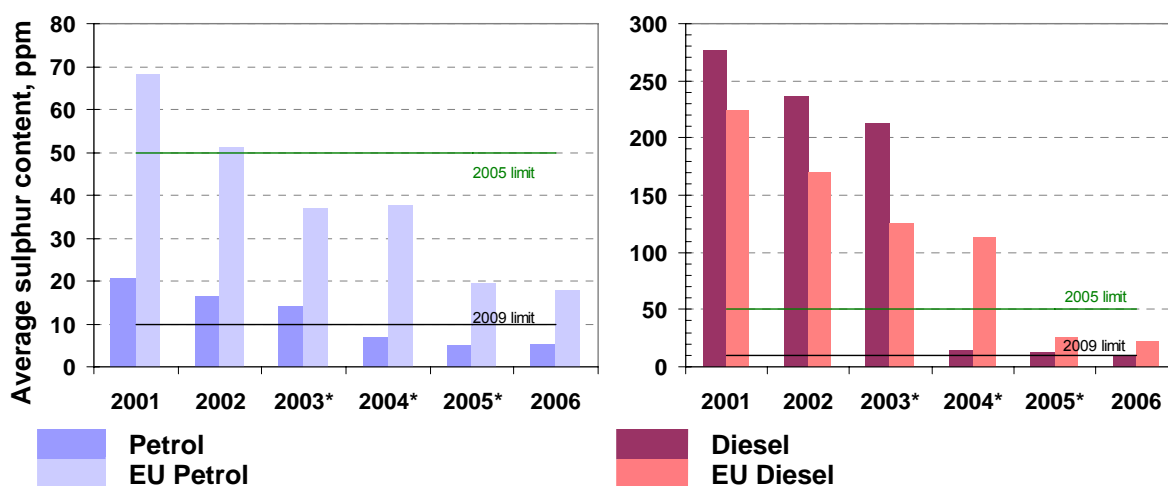


Figure 3.1 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The reduction in average sulphur content of both petrol and diesel fuels since 2001 continued in 2005 with full market conversion to <10ppm fuels of petrol in 2005. The average sulphur contents were well below the 2005 limit, EU average and forthcoming 2009 limit.



**Figure 3.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

### 3.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

#### Key Areas for Improvement

- Austria has stated that it uses Statistical Model C, however this does not appear entirely consistent with the European Standard specification (discussed in section 2.2.2). Instead statistical Model A seems more appropriate, which would require further information to be reported on sample numbers in different regions.

## 4 Belgium

### 4.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2005 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Eurosuper 50S	5
6	RON 95	<10 ppm	Eurosuper 10S	6
11	RON 98	<50 ppm	Super+ 50S	11
12	RON 98	<10 ppm	Super+ 10S	12
14	Diesel	<50 ppm	Diesel 50S	14
15	Diesel	<10 ppm	Diesel 10S	15

#### 4.1.1 Sales

Figure 4.1: National fuel sales volume proportions by fuel type (%)

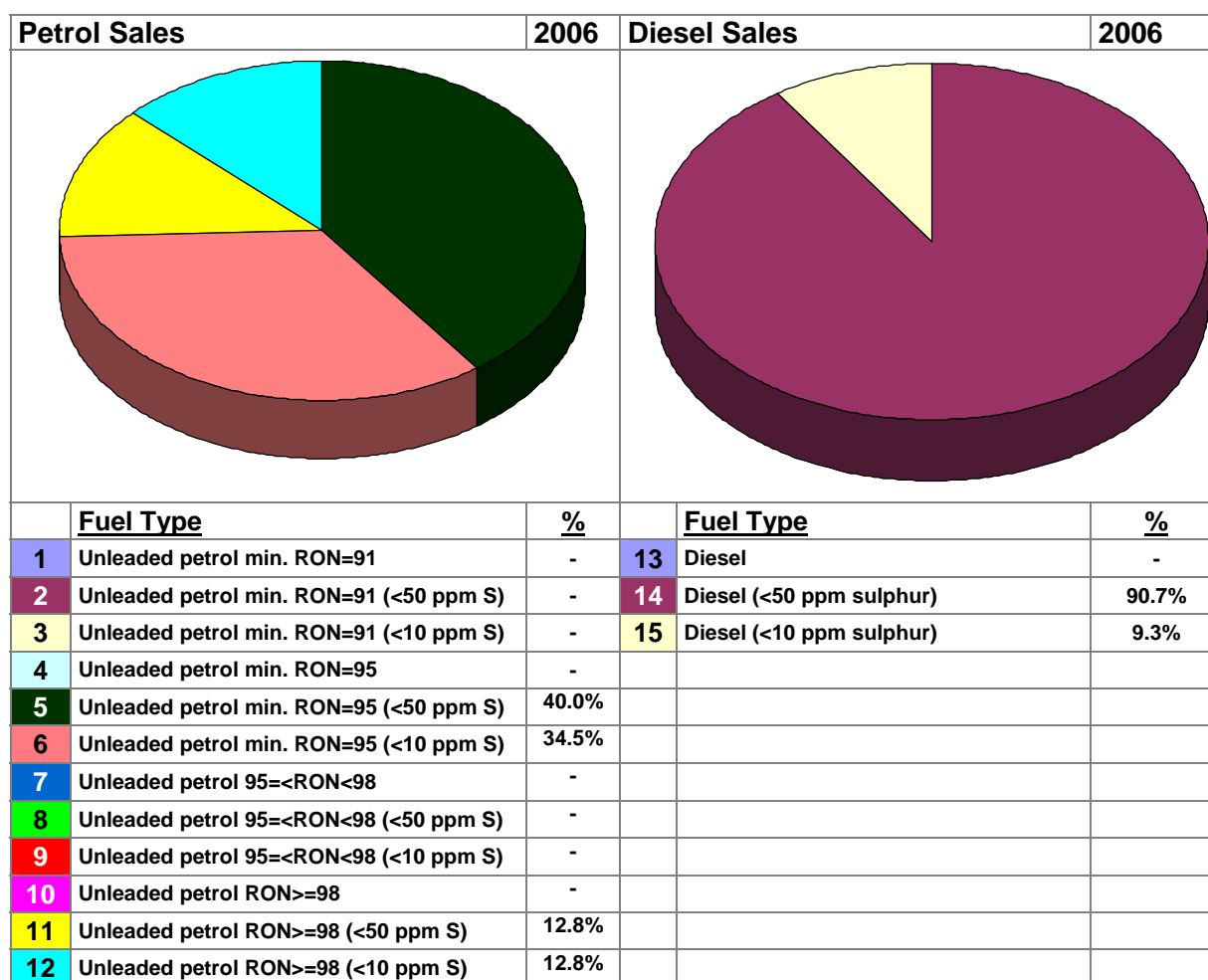


Figure 4.1 above shows that the majority (74.5% compared to 72% in 2005) of petrol sold in Belgium in 2005 was still RON 95 (up from 66% in 2001), with the remainder being sales of

RON <98 fuel. Between 2002 and 2003 Belgium switched completely from regular RON <98 to low sulphur (<50 ppm) RON <98 and between 2003 and 2004 switched from regular to low sulphur RON 95 fuel. Low sulphur diesel (< 50 ppm) has comprised 100% of sales since beginning of 2002.

#### 4.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** No information was provided. However, the reported sales volumes of petrol and diesel with <10 ppm (Grades 6, 12, and 15) are estimates.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No information provided.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes.

**Average sulphur content of all petrol and diesel sold:** see Table 4.1.

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 4.1: Annual trend in average sulphur content in petrol and diesel fuels

BE	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>	68	44	42	33	14	11	18
<i>Diesel</i>	269	47	40	40	31	24	22

## 4.2 Fuel Quality Monitoring 2005

### 4.2.1 Description of system

**Responsible organisation(s):** FAPETRO (Fonds d'Analyse des produits Petroliers), which is part of the Federal Public Service for the Economy, Small and Medium-sized Enterprises, Small Traders and Energy, formerly the Ministry of Economic Affairs. The authorities and the petroleum industry run FAPETRO jointly.

**Format of Fuel Quality Monitoring System (FQMS):** National System

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Weekly checks on both public service stations and private distribution points and samples taken at random throughout the year.

**Specification of test methods:** in accordance with the Directive.

**Collection of sales data:** National petroleum statistics. The reported sales volumes of petrol and diesel with <10 ppm (Grades 6, 12, and 15) are estimates.

**Other details:** Belgium's monitoring system was introduced in 1996 and this monitoring system allows fraud to be detected for individual products. To guarantee 95% reliability FAPETRO cooperates with other registered laboratories, which analyse samples within 24

hours following collection. In case of non-compliance of the sample, another registered laboratory ensures a second check within 24 hours, thus the administration has final results within 2 to 3 days after the initial sampling body at a rate of 10 samples per week as a double-check on sampling and analysis.

#### 4.2.2 Sampling and reporting

Belgium was for the most part compliant with the sampling and reporting requirements in 2006, however no information on oxygen content was reported for all petrol grades as well as for MON, summer vapour pressure and sulphur content for two grades.

Furthermore, there was no separate reporting for summer and winter and no information was provided on equivalence to the requirements of EN 14274. However, sampling numbers are extremely high (2,412 for RON 95 <50 ppm, 2,266 for RON 98 <50 ppm, and some 5,242 for Diesel <50 ppm) in comparison to other Member States, so it is expected that the Belgian system provides a high level of confidence.

The following Table 4.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 4.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	40.0%	1036	1376	-	No	17 of 18	(1)
6	RON 95 <10 ppm S	6	34.5%	0	21	-	No	13 of 18	(1) (2)
11	RON 98 <50 ppm S	11	12.8%	981	1285	-	No	17 of 18	(1)
12	RON 98 <10 ppm S	12	12.8%	0	23	-	No	14 of 18	(1) (3)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>2017</b>	<b>2705</b>	<b>-</b>	<b>No</b>	<b>10 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	90.7%	1988	3254	-	No	5 of 5	
15	Diesel <10 ppm S	15	9.3%	0	34	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>			<b>1988</b>	<b>3288</b>	<b>-</b>	<b>No</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) Oxygen content had not been reported
- (2) MON, summer vapour pressure, benzene, and sulphur content had not been reported
- (3) MON, summer vapour pressure and sulphur content had not been reported

### 4.2.3 Compliance with fuel quality limit values

Oxygen content was not reported for all four petrol grades.

#### **Non-compliance with Directive 98/70/EC limit values**

*(Details on the limit values, test methods and tolerance limits can be found in Appendix 2)..*

#### **Petrol RON 95 <50 ppm**

*Detail:* The RON and MON limit values of 95 and 85 were exceeded with values of 85.7 and 83.6 respectively. Also, summer vapour pressure limit of 60 kPa was exceeded with a value of 87.9 kPa.

Aromatics and olefins limits of 18 and 35 %(v/v) were exceeded with values of 32.8 and 43.4 %(v/v). Finally, the other oxygenates limit value of 10 %(v/v) was exceeded with a value of 10.1 %(v/v).

*Statistical significance:* Tolerance limits for statistical significance were exceeded by samples for RON (94.6), olefins (19.5 %(v/v)) and aromatics (36 %(v/v)). Also, tolerance limits of MON (84.5) and summer vapour pressure (61.8 kPa) were exceeded by one or more samples.

All the abovementioned samples were therefore in non-compliance with the Directive.

*Member State's notes:*

#### **Petrol RON 95 <10 ppm**

*Detail:* RON limit value of 95 was exceeded with a value of 57.1.

Information on MON, summer vapour pressure, benzene, and sulphur content was not provided.

*Statistical significance:* The tolerance limit for statistical significance for RON (94.6) was exceeded by one or more samples collected and, therefore, they were in non-compliance with the Directive.

*Member State's notes:*

#### **Petrol RON 98 <50 ppm**

*Detail:* MON minimum limit value of 85 was exceeded with a value of 84.9, as was summer vapour pressure value (60 kPa) with 90.8 kPa.

Other values which were exceeded include distillation at 150 °C (51.1 with 75 %(v/v)), olefins and aromatics (18 with 30.3 and 35 with 39.8 %(v/v) respectively), as well as tert-butyl alcohol limit value of 7 with 12.7 %(v/v)

*Statistical significance:* Samples of summer vapour pressure exceeded the relative tolerance limit for statistical significance (61.8 kPa). Also, samples of distillation at 150 °C, olefins, aromatics, and tert-butyl alcohol exceeded the relative tolerance limits for statistical significance (72.6, 19.5, 36, and 7.4 %(v/v) respectively). All five abovementioned parameters were, therefore, not in compliance with the Directive.

*Member State's notes:*

**Petrol RON 98 <10 ppm**

*Detail:* No parameters exceeded the limit values. However, no information on MON, summer vapour pressure and sulphur content was provided.

*Statistical significance:* No parameters exceeded the tolerance limits for statistical significance and they were therefore compliant with the Directive

*Member State's notes:*

**Diesel <50 ppm**

*Detail:* All parameters exceeded the limiting values: cetane (limit value of 51 with 23.6), density at 15 °C (845 with 857.8 kg/m<sup>3</sup>), distillation 95 % point (360 with 366.9 °C), polycyclic aromatic hydrocarbons (11 with 24.1 % m/m), and sulphur content (50 with 121.9 mg/kg)

*Statistical significance:* Samples of all the above parameters exceeded their respective tolerance limits for statistical significance – cetane: 48.5, density at 15 °C: 845.7 kg/m<sup>3</sup>; distillation 95 % point: 365.9 °C; polycyclic aromatic hydrocarbons: 13.2 % m/m and sulphur content: 61.8 to 54.0 mg/kg – and were, therefore, non-compliant with the Directive.

*Member State's notes:* Cetane index reported was calculated and not measured

**Diesel <10 ppm**

*Detail:* Cetane limit value of 51 was exceeded with 47.6

*Statistical significance:* The tolerance limit for statistical significance for cetane is 48.5. Samples taken exceeded this limit and were, therefore, non-compliant with the Directive.

*Member State's notes:*

**Additional information:** In addition to the above non-compliances with the Directive, it is worth noting that the national Diesel 10S (<10 ppm) grade reported exceedance of the <10ppm sulphur content limit (for diesel fuel marketed as sulphur-free) with a sulphur content of 16.9 ppm

## 4.3 Temporal trends

The following Figure 4.2 to Figure 4.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales.

Total sales of petrol have decreased by 30% since 2001, whilst those of diesel have increased by 17%, with the proportion of sulphur-free diesel increasing almost 5-fold compared to the previous year.

It is worth mentioning that information on the proportion of sales being sulphur-free (47.3% for petrol, 9.3% for diesel) is, however, based upon estimates.

Figure 4.2: Temporal trends in national sales of petrol and diesel (million litres)

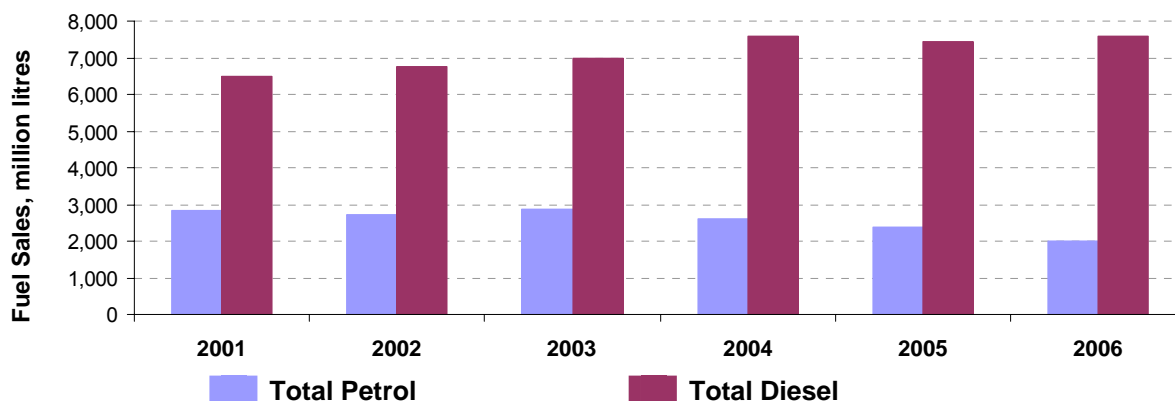


Figure 4.3: Temporal trends in national sales of low sulphur petrol (%)

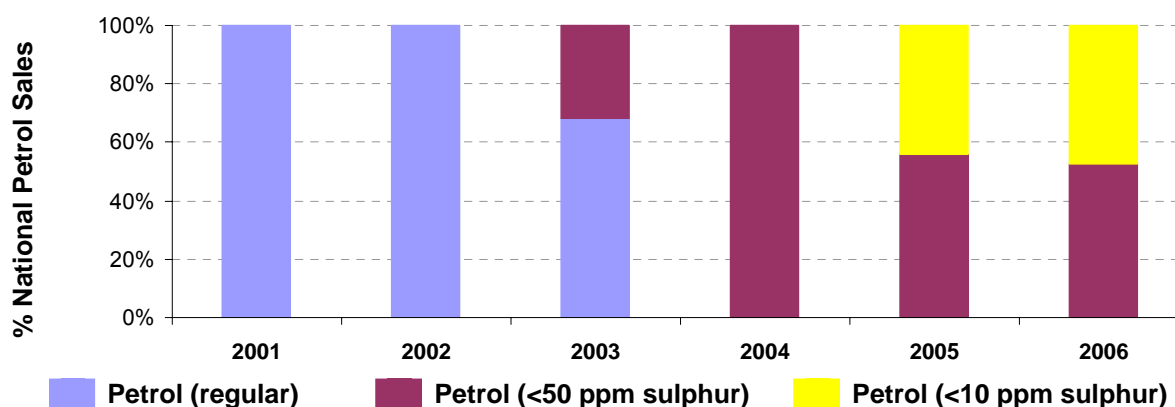


Figure 4.4: Temporal trends in national sales of low sulphur diesel (%)

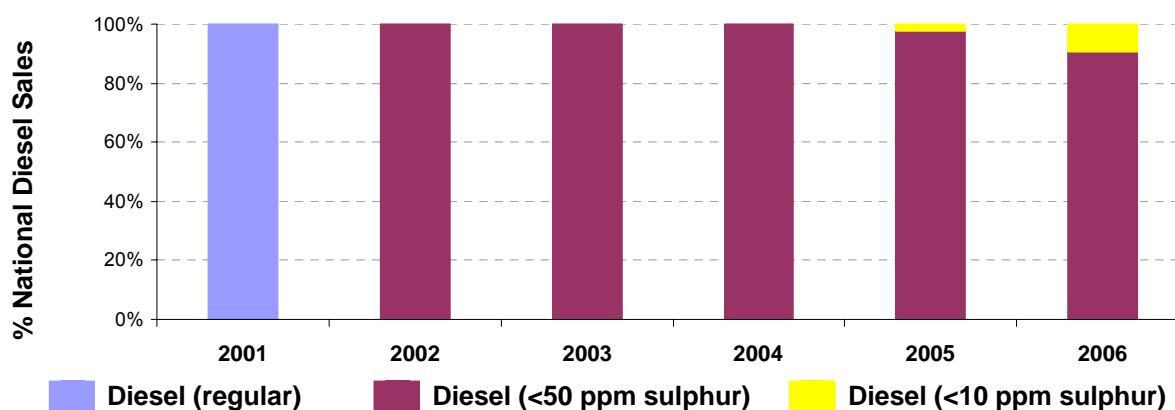
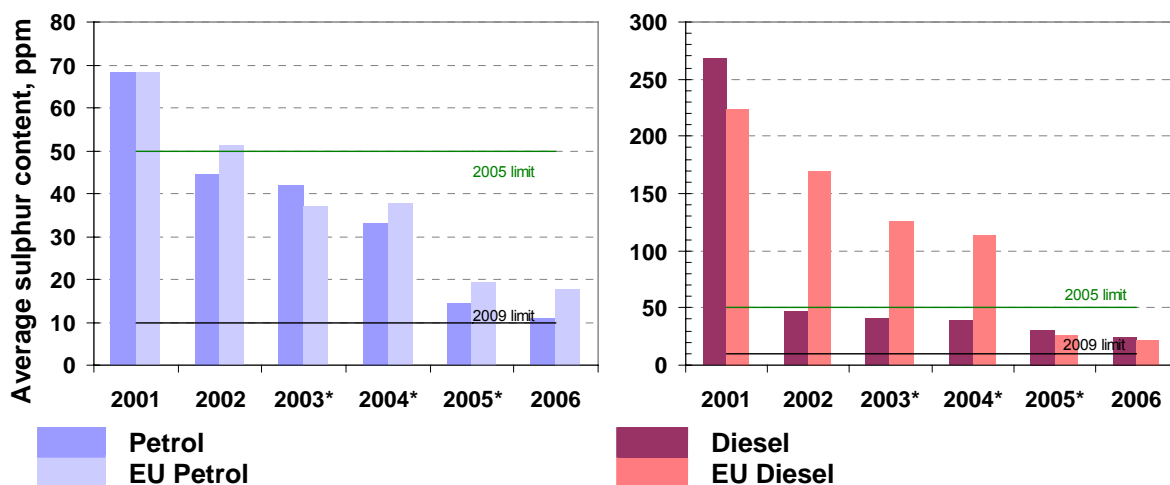


Figure 4.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). Average sulphur content of petrol has reduced by about half since 2004 and is below EU averages. Diesel sulphur levels are above the EU average and has also significantly reduced since 2004.

**Figure 4.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 4.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The report submission was received after the 30 June deadline – over 7 months late.
- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle. Fuels meeting the <10ppm specification been sold (sales values provided are estimates). Information on geographical availability was therefore also absent from the report.
- Belgium has reported a higher proportion of non-compliant samples than other Member States.
- Summer and winter results should ideally be reported separately.
- Information for as many as eight parameters for two petrol grades reported was missing, as was oxygen content for all four petrol grades reported.



## 5 Bulgaria

Although Bulgaria did not join the EU until 2007 and is not required to report on 2007 monitoring in 2008, it has provided information for 2005 and 2006 fuel quality monitoring carried out in the country.

### 5.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Note that Bulgaria joined the European Union on 1 January 2007. Therefore in 2006 the 50ppm sulphur limit under the Directive did not apply. Bulgaria has advised that since EU accession, only low sulphur and sulphur free fuels have been marketed in its territory.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<150 ppm	Petrol regular grade (RON 92)	1
5	RON 95	<50 ppm	Petrol premium grade (RON 95)	4
13	Diesel	<350 ppm	Diesel	13

#### 5.1.1 Sales

Figure 5.1: National fuel sales volume proportions by fuel type (%)

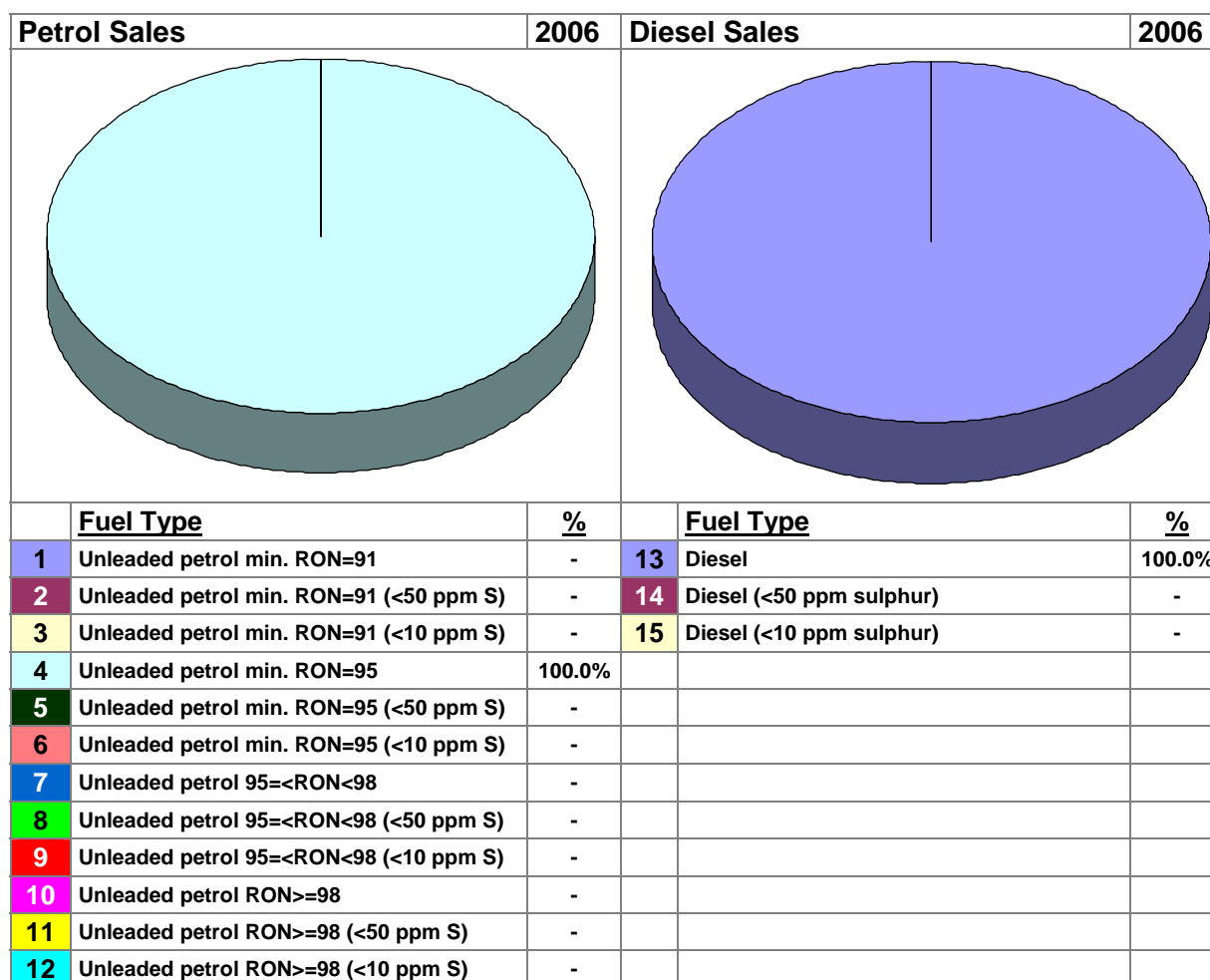


Figure 5.1 shows that all the petrol sold was of the <150 ppm quality – although RON 91 grade fuel was available, separate sales data for RON 91 and RON 95 grades were not available. All the diesel sold was of the <350 ppm quality. Bulgaria was not a member of the European Union in 2006 and so did not have to comply with the <50ppm limit values until it joined in 2007.

### 5.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were not available in Bulgaria in 2006. From 2007 the producers and/or importers of liquid fuels are required provide /ensure marketing of petrol and diesel fuel with maximum sulphur content of 10 mg/kg, while the final distributors realize their sales in fuel stations with capacity over 1000 m<sup>3</sup> yearly per each of the fuel.

**Are sulphur-free grades clearly labelled differently / marketed separately?** N/A

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** N/A.

**Average sulphur content of all petrol and diesel sold:** Table 5.1 shows the average content of fuel sold in 2005 to 2006 in relation to the EU25 average. Since Bulgaria only joined the EU in 2007 it does not have to meet the limit values until this year.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 5.1: Annual trend in average sulphur content in petrol and diesel fuels

BG	Average Sulphur Content, ppm					EU25	
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>					131	137	18
<b>Diesel</b>					246	468	22

## 5.2 Fuel Quality Monitoring 2006

### 5.2.1 Description of system

**Responsible organisation(s):** Ministry of Environment and Water and State Agency for Metrological and Technical Surveillance (SAMTS) – Directorate General “Quality control of liquid fuels”

**Format of Fuel Quality Monitoring System (FQMS):** National system, based on EN 14274.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** The relevant period for assessment of compliance is 1st May to 30th September (Normal), however the official national period is 15th April – 15th October.

**Location(s) of sampling:** Public and private refuelling stations spread in the Bulgarian territory.

**Time/frequency of sampling:** Upon special private and police request. Only 24 samples of petrol and 16 samples of diesel were taken in 2006. (In 2005, samples were taken regularly

each week with a maximum of 6 samples a day. In total 711 petrol samples and 392 diesel samples.)

**Specification of test methods:** In compliance with Directive 98/70/EC for all available testing equipment. Sulphur content - according to the requirements of EN ISO 8754 due to the available equipment.

**Collection of sales data:** the National Statistic Institute is responsible for the collection of data on fuel consumption.

**Additional information:** The Bulgarian fuel quality monitoring system was introduced on 1st of October 2003 after the Clean Air Act and the Regulation on liquid fuels quality and procedures and methods of their control were adopted. The Regulation implements the requirements of the Directive 98/70/EC and 2003/17/EC. On the basis of the Regulation the Directorate General "Quality control of liquid fuels" was created. The Directorate consists of three regional departments for control collecting samples, one department for testing fuels with its own accredited laboratory and one department for control, issuing the experts' conclusion about the compliance /non-compliance of the tested fuels. Each of the regional departments is responsible for a region, defined on the basis of approximate number of residents, motor vehicles and fuel stations. Also, each of the departments takes approximately equal number of samples for fuel quality control.

During the year 2006 the testing laboratory was repaired/upgraded and the Directorate General collected samples only upon special private and police requests and the results are not considered as representative. Thanks to the realization of the European Aid Project 121584/D/S/BG (PHARE project BG 20031004-937.02.01) during the year 2006 the laboratory for testing of fuels within the State Agency for Metrological and Technical Surveillance was supplied with the necessary equipment for carrying out the analyses required by the Decision 2002/159/EC and Directive 98/70/EC amended by Directive 2003/17/EC.

## 5.2.2 Sampling and reporting

Bulgaria was not compliant with the sampling and reporting requirements in 2006, however it is not required to adhere to the Directive requirements until the 2007 monitoring year. The following Table 5.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 5.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
1	RON 91	1	0.0%	0	10	-	No	6 of 18	(1)
4	RON 95	4	100.0%	1	13	-	No	6 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>1</b>	<b>23</b>	<b>-</b>		<b>6 of 18</b>	
13	Diesel	13	100.0%	0	16	-	No	3 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>0</b>	<b>16</b>	<b>-</b>		<b>3 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) During the year 2006 the testing laboratory was repaired/replaced and the Directorate General collected samples only upon special private and police requests and the results are not considered as representative.

### 5.2.3 Compliance with fuel quality limit values

Bulgaria did not join the EU until 2007 and fuel quality in 2006 was not bound by the Directive limit values. However, a comparison of the analysis results against the requirements of the directive is presented below for information.

#### **Non-compliance with Directive 98/70/EC limit values**

*(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).*

##### **RON 91 Petrol**

*Detail:* Two samples were below the minimum limit value for RON (95), with the lowest being 87.7.

*Statistical significance:* The tolerance limits for statistical significance for the RON test method is 90.6 and both samples were below this value and therefore would have been non-compliant with the Directive.

*Member State's notes:*

##### **RON 95 Petrol**

*Detail:* In two samples the RON value was below the minimum limit value of 95, with the lowest value being 92.5.

*Statistical significance:* The tolerance limit for statistical significance for the RON test method is 94.6, and both these samples were below this and therefore non-compliant with the Directive.

*Member State's notes:*

##### **Diesel**

*Detail:* The sulphur content (regular grade) limit value of 150 mg/kg was exceeded by 5 samples with a highest value of 1504 mg/kg, suggesting contamination with gas oil.

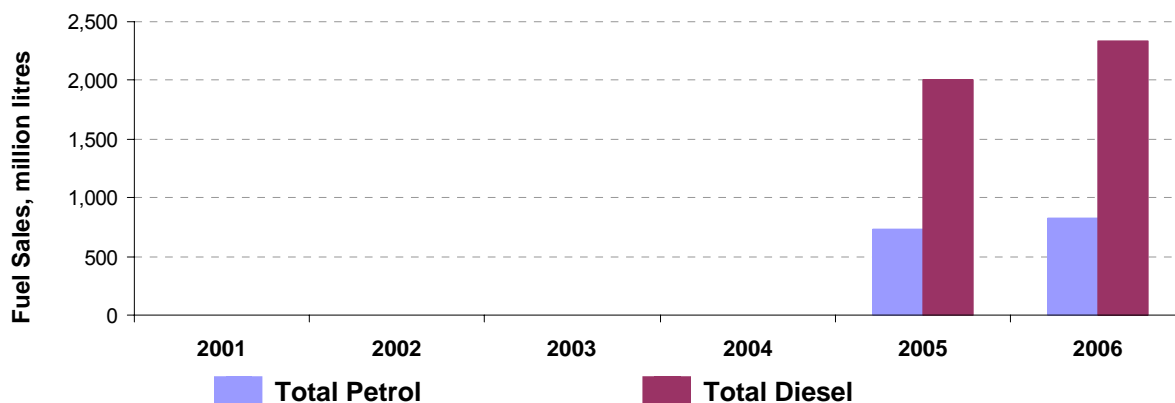
*Statistical significance:* The tolerance limit for statistical significance for the sulphur content (regular grade) testing method was exceeded by these samples, therefore the samples were non-compliant with the national limits. (A more stringent <50 ppm sulphur limit was in place in the EU in 2006, which was exceeded by the majority of the fuel sold in Bulgaria in 2006).

*Member State's notes:*

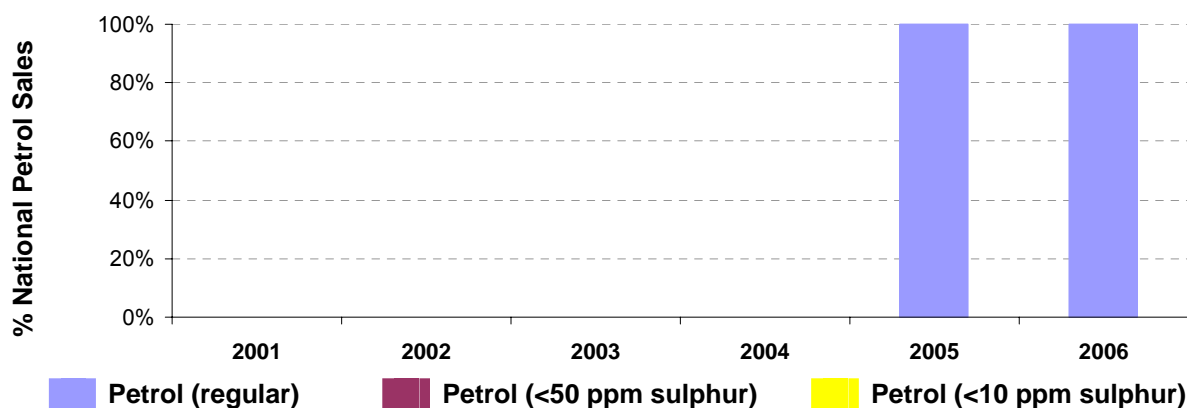
## 5.3 Temporal trends

The following Figure 5.2 to Figure 5.5 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales increased by 12% and diesel sales increased by 17% from 2005 to 2006. Bulgaria has yet to introduce low- or zero- sulphur fuels to the market.

**Figure 5.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 5.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 5.4: Temporal trends in national sales of low sulphur diesel (%)**

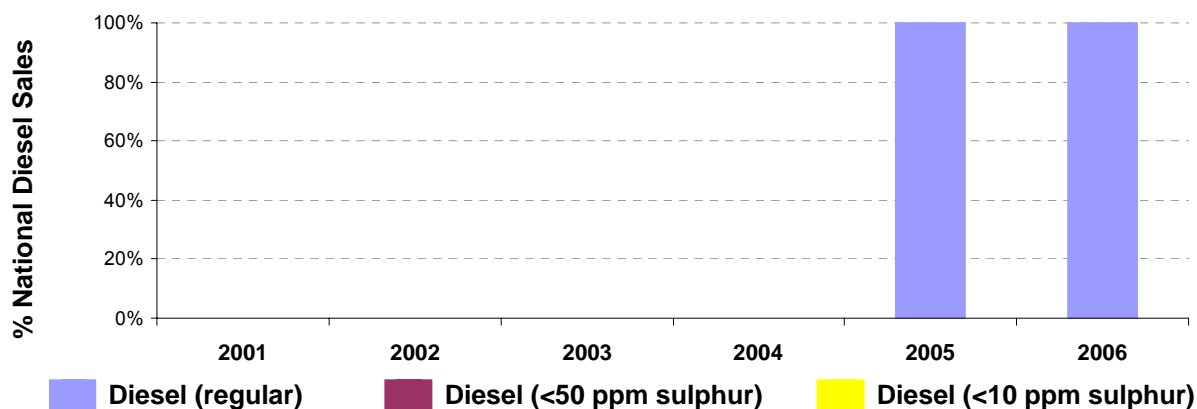
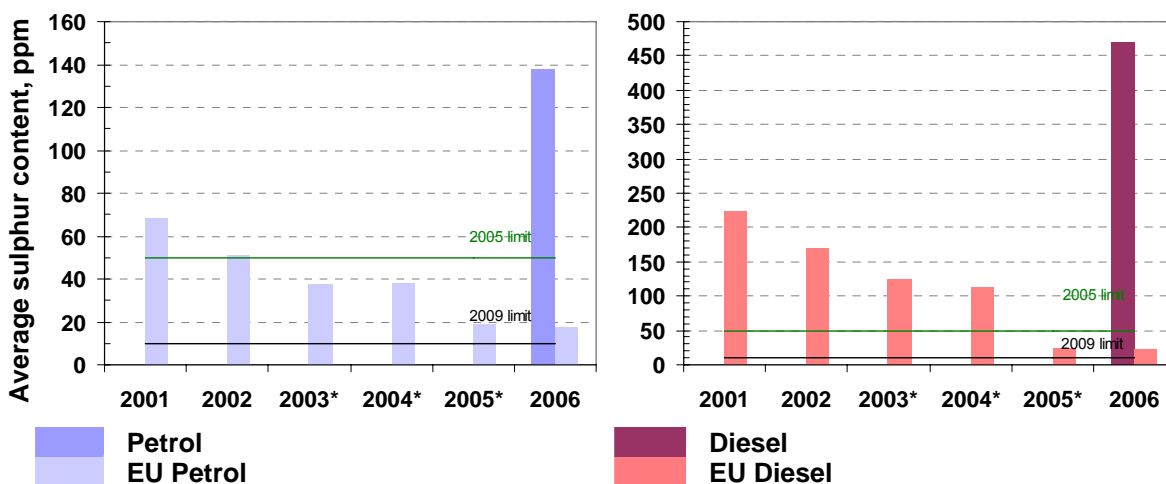


Figure 5.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. Bulgaria did not need to comply with the current EU <50ppm limit on sulphur in 2006, as it did not join the EU until 2007.

**Figure 5.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 5.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Bulgaria was partially compliant with sampling and reporting requirements compared to the European Standard as:
  - Separate sales data was not provided for different RON petrol grades;
  - Insufficient samples were taken;
  - Summer and winter results should be reported separately;
  - Not all of the required parameters were analysed.
- Bulgaria has also not provided the European Standard statistical model basis for its national FQMS.
- Low sulphur fuels will be mandatory from 2007 for Bulgaria, together with the introduction of sulphur-free fuels also. Sulphur-free fuels will be mandatory from 2009.

## 6 Cyprus

### 6.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Unleaded RON 95	5
11	RON 98	<50 ppm	Unleaded RON 98	11
14	Diesel	<50 ppm	Diesel	14

#### 6.1.1 Sales

Figure 6.1: National fuel sales volume proportions by fuel type (%)

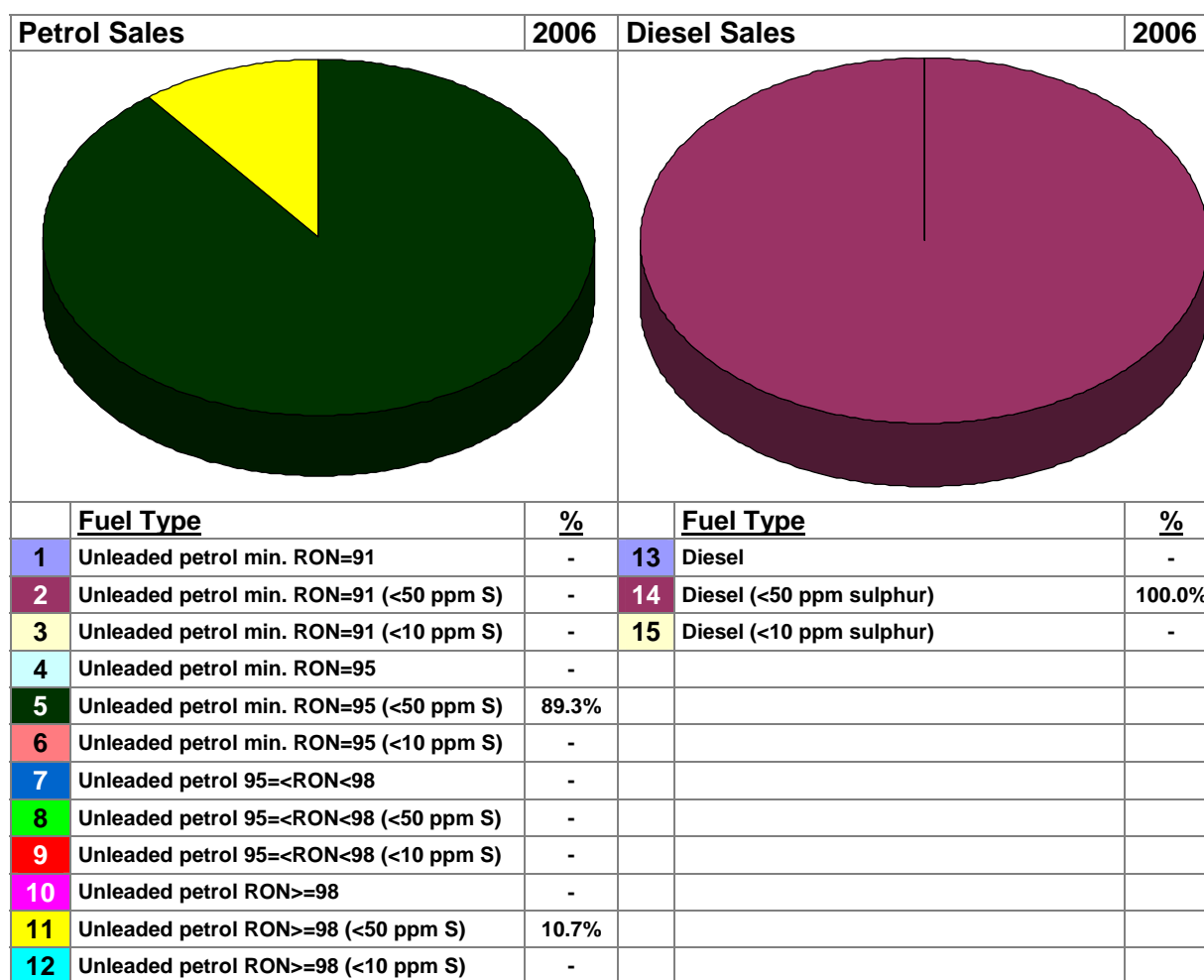


Figure 6.1 shows that the majority of fuel available in 2006 in Cyprus was RON 95 (89.3%, up from 86.5% in 2005) and that no specific sulphur-free grades of petrol or diesel were available.

In addition to the fuel grades reported above, some very small quantities of unleaded petrol RON 100 and biodiesel produced from used edible oils were marketed in 2006. The proportion of these fuels in the total sales volume was less than 0.4%.

## 6.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None available in 2006.

**Are sulphur-free grades clearly labelled differently / marketed separately?** N/A, none available.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** N/A.

**Average sulphur content of all petrol and diesel sold:** Table 6.1 shows the average content of fuel sold in relation to the EU25 average.

### Additional information:

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 6.1: Annual trend in average sulphur content in petrol and diesel fuels

CY	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>				70	30	28	18
<i>Diesel</i>				197	46	24	22

## 6.2 Fuel Quality Monitoring 2006

### 6.2.1 Description of system

**Responsible organisation(s):** Energy Service of the Ministry of Commerce, Industry and Tourism

**Format of Fuel Quality Monitoring System (FQMS):** National System.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations and terminal

**Time/frequency of sampling:** Monthly throughout the year.

**Specification of test methods:** in compliance with Directive 98/70/EC.

**Collection of sales data:** From Oil Companies and the statistical service of Cyprus.

**Other details:** Cyprus depends solely on imported petroleum products. The network of importing, handling and distributing of petroleum products in Cyprus is compact and simple in operation. The installations of the oil marketing companies and the tank farm of the Cyprus Petroleum Storage Company Ltd (former Refinery) are located in a single depot at the Larnaca coastal area. There are 268 petrol stations throughout the country.

Bearing in mind that Cyprus is considered as a single region and the supply, distribution and retail of petroleum products are carried out only by the four marketing companies, which are



utilizing a single depot, Cyprus suggests that the number of the samples taken in 2006 was adequate to monitor the distribution chain.

At the end of the year 2006, the Ministry of Commerce, Industry and Tourism signed a contract for the supply of a mobile lab. The Energy Service will be able in this way to monitor the quality of fuels with its own lab whenever this is needed at petrol stations. The Energy Service received the mobile lab on May 2007 and the first tests have already been carried out. More details regarding the mobile lab will be available at the FQMS Report for the year 2007.

According to a new ministerial Order issued on 26/05/2006, the seasonal transition period (from the summer to winter and vice versa) extended from 4 weeks to 8 weeks.

## 6.2.2 Sampling and reporting

Cyprus was mostly compliant with the sampling and reporting requirements in 2006, except that only full year data were provided and some petrol parameters were not sampled and reported. The following Table 6.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 6.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Category	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	89.3%	29	23	-	No	11 of 18	(1)
11	RON 98 <50 ppm S	11	10.7%	32	35	-	No	11 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>61</b>	<b>58</b>	<b>-</b>	<b>No</b>	<b>11 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	100.0%	11	42	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>11</b>	<b>42</b>	<b>-</b>	<b>No</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) MON and oxygenates (other than ethers with more than 5 carbon atoms per molecule) were not reported.

## 6.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 95 Petrol**

**Detail:** Summer vapour pressure limit value (60 kPa) was exceeded by some samples, with a maximum value of 63.6 kPa.

One or more samples exceeded the maximum limit value for aromatics (35.0 %v/v), with 35.4%(v/v).

**Statistical significance:** The tolerance limit for statistical significance for the vapour pressure test method (61.7 kPa) was exceeded for some samples, which were therefore non-compliant with the Directive.

The tolerance limit for statistical significance for the aromatics test method (36.0% v/v) was not exceeded for these samples. Hence the samples were in compliance with the Directive.

*Member State's notes:* According to a new ministerial Order issued on 26/05/2006, the seasonal transition period (from the summer to winter and vice versa) extended from 4 weeks to 8 weeks. Any variations of the vapour pressure specifications regarding RON 95 and 98 samples were within the transition period from winter to summer specifications.

### **RON 98 Petrol**

*Detail:* The tolerance limit for statistical significance for the vapour pressure test method (75.8 kPa) was exceeded for some samples, which were therefore non-compliant with the Directive.

One or more samples exceeded the maximum limit values for aromatics (35.0 %v/v), with 35.4%, and sulphur (50 ppm), with 52.1 ppm.

*Statistical significance:* The tolerance limits for statistical significance for the aromatics (37.2% v/v) and sulphur (54.0) test methods were not exceeded for these samples. Hence the samples were in compliance with the Directive.

*Member State's notes:* As for RON 95 petrol.

### **Diesel**

*Detail:* The distillation 95% point limit value (max 360 °C) was exceeded by one or more samples with a maximum of 363 °C.

*Statistical significance:* The tolerance limit for statistical significance for the test method (365.9 °C) was not exceeded for these samples, which therefore complied with the Directive.

*Member State's notes:*

## **6.3 Temporal trends**

The following Figure 6.2 to Figure 6.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. In 2006 petrol sales have risen by 6% compared to 2005, whereas diesel sales have decreased by 3.9%. It is also worth noting that, since the first year of reporting for the new EU Member States in 2004, sales have increased by 67% for petrol and 46% for diesel.

**Figure 6.2: Temporal trends in national sales of petrol and diesel (million litres)**

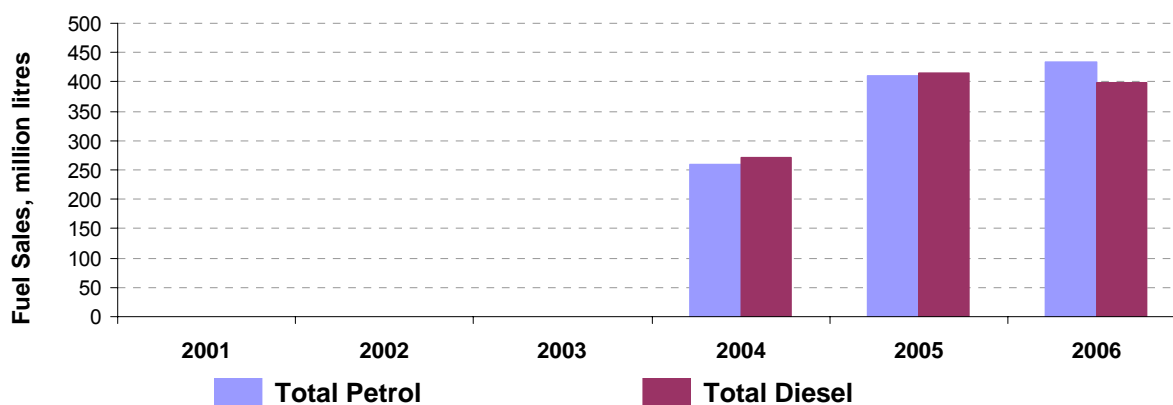


Figure 6.3: Temporal trends in national sales of low sulphur petrol (%)

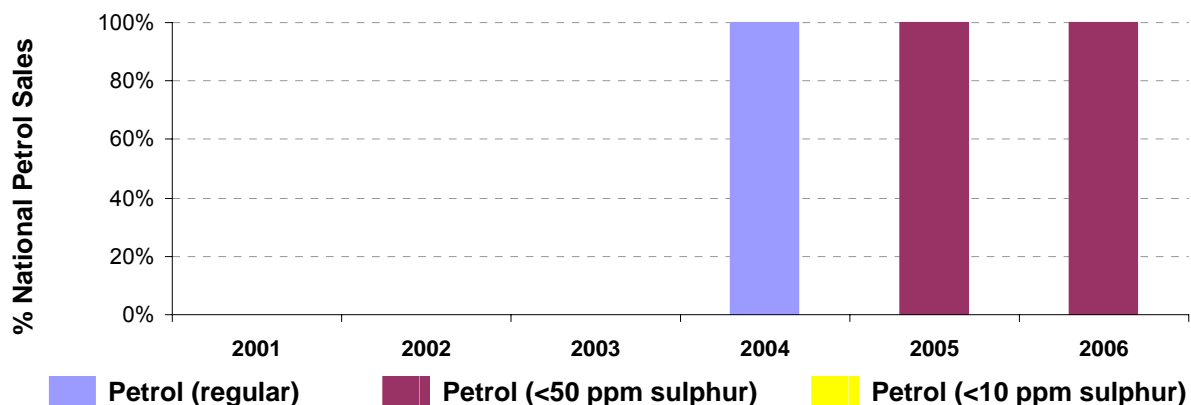


Figure 6.4: Temporal trends in national sales of low sulphur diesel (%)

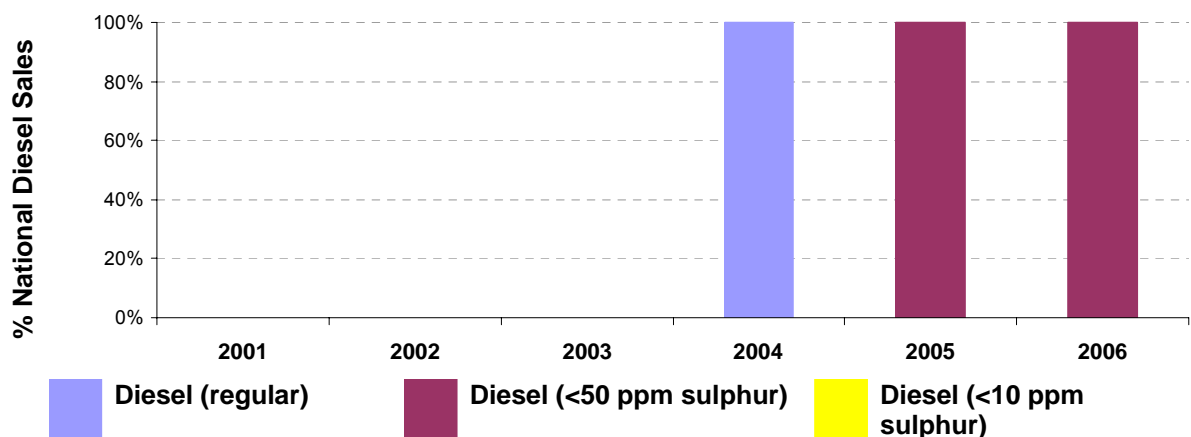
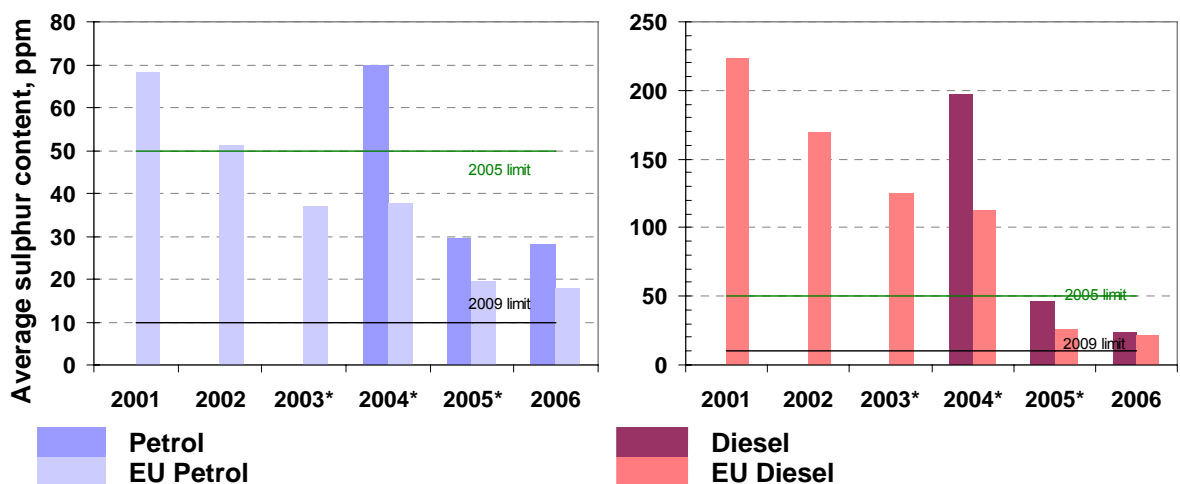


Figure 6.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). Average sulphur content has reduced since 2004, with the mandatory limit of <50ppm since the start of 2005. Sulphur levels are above EU averages.

Figure 6.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 6.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Sulphur free fuels are not available as required under the Directive.
- Some fuel parameters were not analysed for in this year's monitoring (including MON and some of the oxygenates).
- Summer and winter results should be reported separately, as there are different fuel quality requirements in summer and winter as well as requirements to take a minimum number of samples in each period.

## 7 Czech Republic

### 7.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	Normal BA-91 and Special BA-91	2
5	RON 95	<50 ppm	Super BA-95	5
11	RON 98	<50 ppm	Super Plus BA-98	11
14	Diesel	<50 ppm	Motorová nafta	14

#### 7.1.1 Sales

Figure 7.1: National fuel sales volume proportions by fuel type (%)

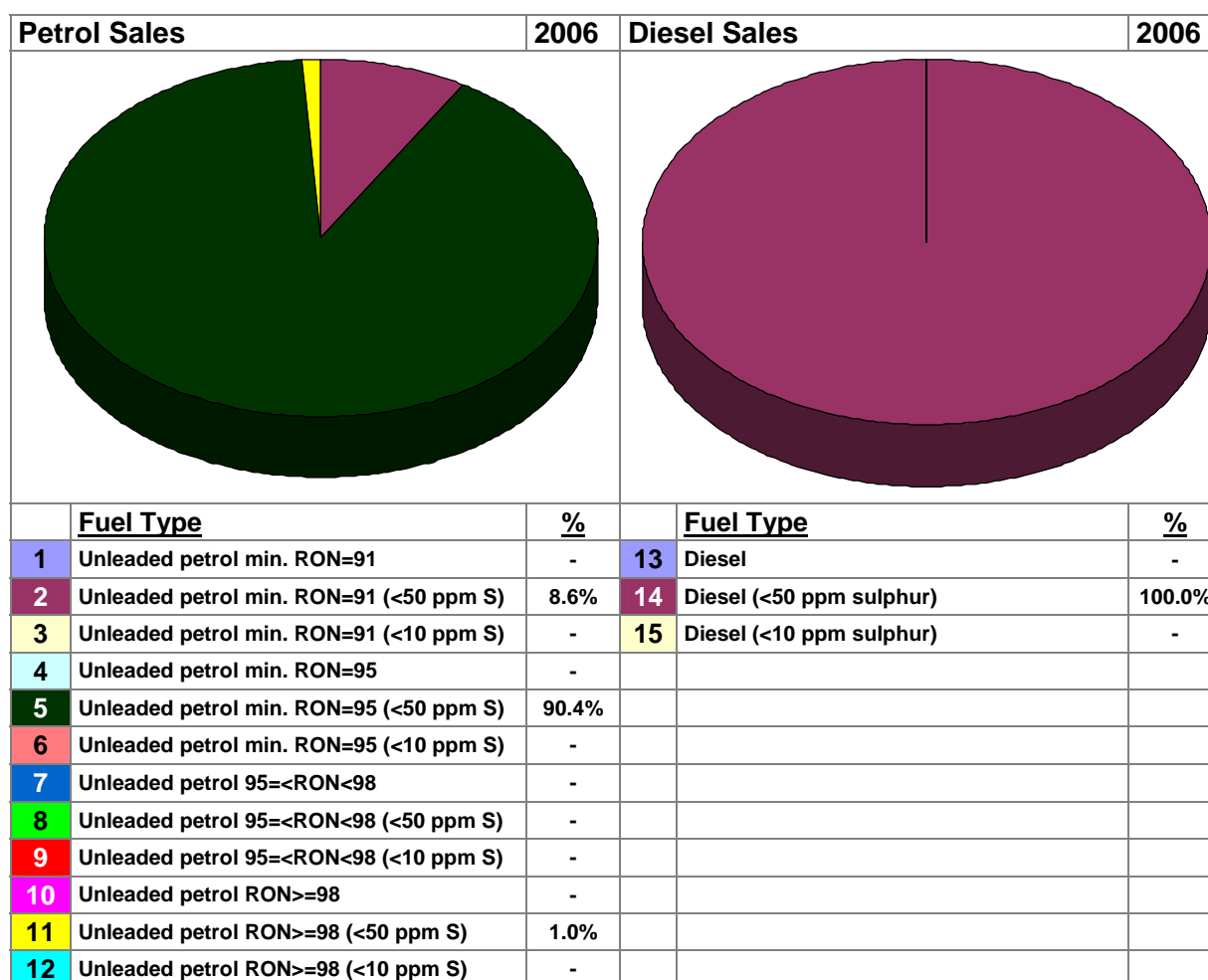


Figure 7.1 only shows sales data for low sulphur (<50 ppm) fuel grades, as only very small amounts of sulphur free (<10 ppm) fuels are supplied to the Czech market. RON 91 only comprised of less than 9% of all petrol sales (9.1% in 2005), with RON 95 accounting for

90.4% (90% in 2005) and RON 98 only 1% (same as 2005). There was only one grade of diesel available (<50 ppm).

## 7.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels are produced in the Czech Republic and supplied to the market until now by a few suppliers of automotive fuels.

**Are sulphur-free grades clearly labelled differently / marketed separately?** These fuels are not in most cases labelled yet.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** Table 7.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 7.1: Annual trend in average sulphur content in petrol and diesel fuels

CZ	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>				132	27	26	18
<i>Diesel</i>				238	32	20	22

## 7.2 Fuel Quality Monitoring 2006

### 7.2.1 Description of system

**Responsible organisation(s):** The Ministry of Industry and Trade of the Czech Republic has in its responsibility monitoring and quality inspection of automotive fuels marketed in the Czech Republic and ensures both tasks in conjunction with The Czech Trade Inspection (CTI).

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Samples were taken monthly throughout the year.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** Sampling in compliance with EN 14275:2003 is carried out by the Czech Trade Inspection (CTI) primarily at refuelling stations (RS).

**Other details:** A large number of samples are taken (in view of the fact that the Czech Republic is a "small country"), because, in addition to the parameters required by the FQMS for environmental purposes, other quality markers are also tested for customer protection reasons. Outlets where non-compliant fuels have been detected are controlled more frequently.

## 7.2.2 Sampling and reporting

The Czech Republic was essentially compliant with the sampling and reporting requirements in 2006. The following Table 7.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 7.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
2	RON 91 <50ppm S	2	8.6%	41	77	9	Yes	All of 18	
5	RON 95 <50 ppm S	5	90.4%	288	445	100	Yes	All of 18	
11	RON 98 <50 ppm S	11	1.0%	8	12	2	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>337</b>	<b>534</b>	<b>111</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	414	650	100	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>414</b>	<b>650</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 7.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 91 Petrol**

*Detail:* The summer vapour pressure values (of max 60.0 kPa) was exceeded by 1 sample. .

At least one sample was below the limit value and tolerance limit for distillation at 150 °C (minimum 75 %v/v and tolerance limit 72.6%v/v), with a minimum sample value of 72.0%v/v.

*Statistical significance:* The tolerance limit for statistical significance for the vapour pressure parameter test method was not adhered to and therefore the sample was non-compliant with the Directive.

One or more samples were not compliant with the directive with respect to the distillation limit.

*Member State's notes:* According to the law about CTI the Czech Trade Inspection (CTI) imposed relevant sanctions to those filling stations where samples exceeded specifications (penalty, sales suspension or closing of the filling station). In the case of the vapour pressure non-compliance, this was due to a mixture of summer and winter quality petrol.

#### **RON 95 Petrol**

*Detail:* The RON, MON, summer vapour pressure, distillation at 100°C and 150 °C, aromatics, benzene and oxygen content limit values (of min. 95, min. 85, 60.0 kPa, min. 46 %v/v, min 75 %v/v, 35.0 %v/v, 1.0 %v/v and 2.7 %m/m) were exceeded by 5, 5, 1, 1, 1, 2, 4 and 1 samples respectively.

*Statistical significance:* The tolerance limits for statistical significance for these parameter test methods were not adhered to and therefore the samples were non-compliant with the Directive.

*Member State's notes:* According to the law about CTI the Czech Trade Inspection (CTI) imposed relevant sanctions to those filling stations where samples exceeded specifications (penalty, sales suspension or closing of the filling station). In the case of the non-compliance, the following additional notes were provided:

*RON:* contamination with gasoline lower octane level (91)

*MON:* contamination with gasoline lower octane level (91)

*SVP:* mixture of summer and winter quality gasoline

*Distillation:* contamination with diesel

*Aromatics:* contamination with higher aromatic content product

*Benzene:* contamination with higher benzene content product

*Oxygen content:* higher content of mixture of ethanol and MTBE

### **RON 98 Petrol**

All samples tested were in compliance with limit values.

### **Diesel**

*Detail:* The density at 15°C, distillation 95 % point and sulphur content limit values (of max. 845 kg/m<sup>3</sup>, 360°C and 50 ppm) were exceeded by 2 (range 845.5-847.6), 7 (range 377.2-400.0) and 9 (range 76.0-1517.0) samples. (The very high values for distillation – up to 400.0 – and sulphur content – up to 1517 – in some samples suggests contamination or substitution with gas oil.)

*Statistical significance:* The tolerance limits for statistical significance for these parameter test methods were not adhered to and therefore the samples were non-compliant with the Directive.

*Member State's notes:* According to the law about CTI the Czech Trade Inspection (CTI) imposed relevant sanctions to those filling stations where samples exceeded specifications (penalty, sales suspension or closing of the filling station). Gross breaches, deemed to constitute attempt at tax evasion, are currently dealt with by the Czech financial and criminal police forces. Breaches of limit values were due to contamination with other fuels.

## **7.3 Temporal trends**

The following Figure 7.2 to Figure 7.5 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Although for the new Member States 2005 was the first full year of reporting, Czech Republic also supplied full sales data for the 2004 year. As a whole, both petrol and diesel sales slightly decreased compared to 2005 sales (-2.1% and -1.8% respectively). As for 2005, sales in 2006 comprised 100% low sulphur (<50 ppm) fuels.



Figure 7.2: Temporal trends in national sales of petrol and diesel (million litres)

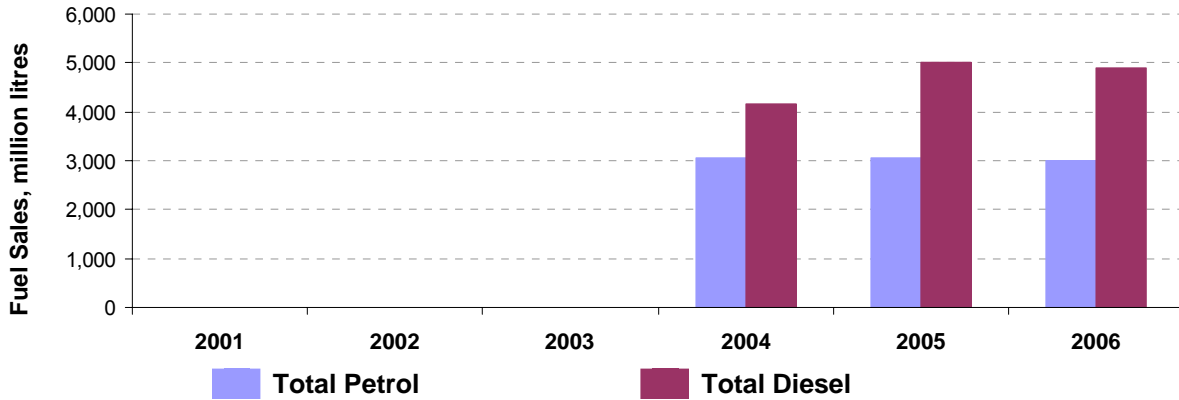


Figure 7.3: Temporal trends in national sales of low sulphur petrol (%)

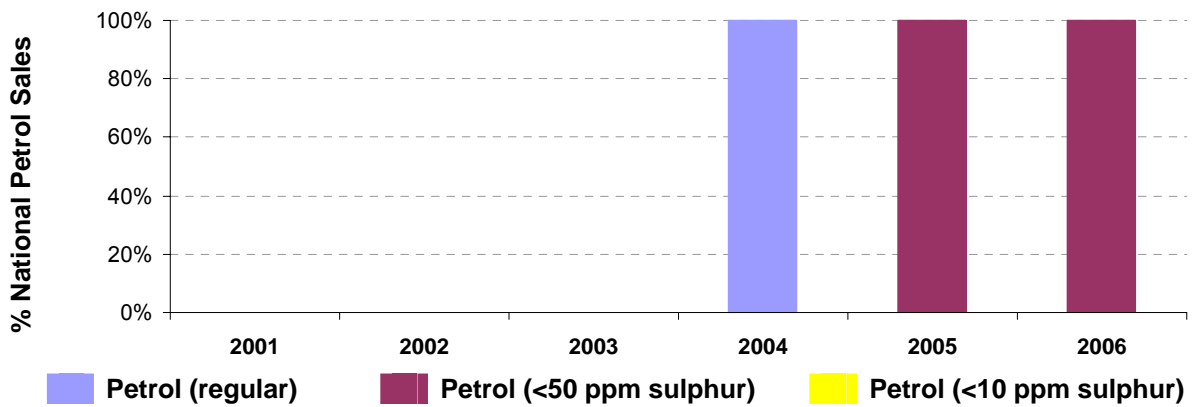
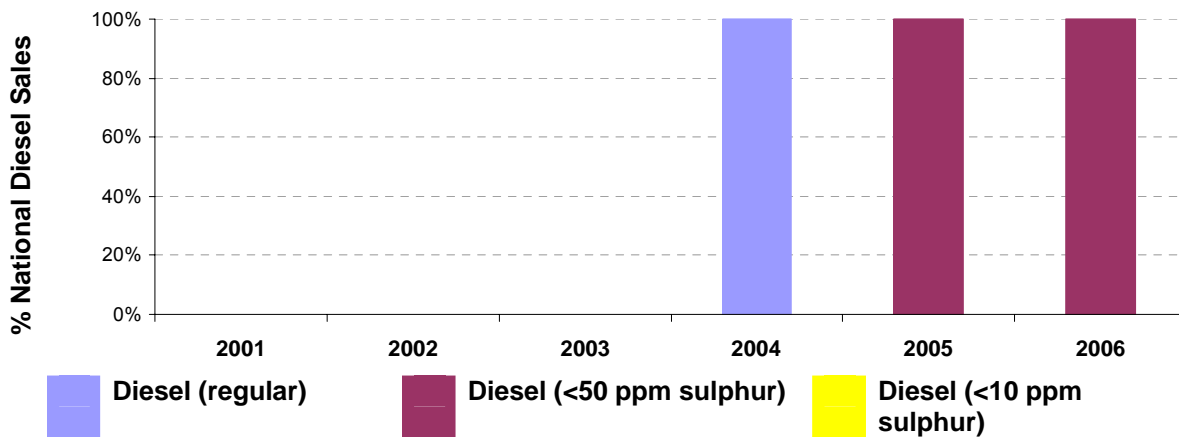
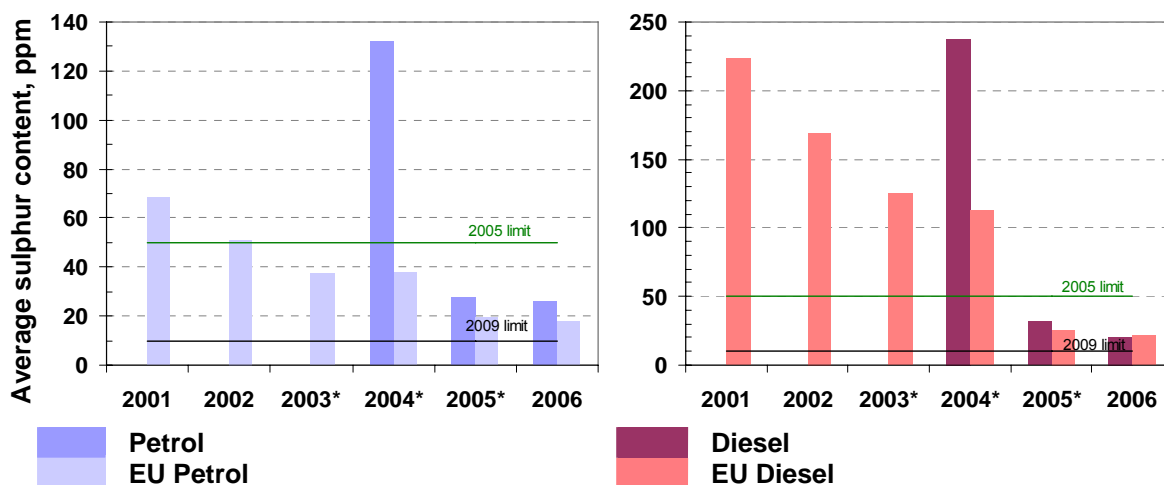


Figure 7.4: Temporal trends in national sales of low sulphur diesel (%)



**Figure 7.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 7.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The Czech Republic has used FQMS Statistical Model C. Given the size of the country it is recommended that the Czech Republic investigate whether Models A or B may be more appropriate.
- Sampling was conducted ‘primarily at refuelling stations’. The Czech Republic should ideally indicate the number of samples taken at refuelling stations to demonstrate compliance with EN14274.
- Sulphur free fuels were not widely available in 2006 – they were supplied to market but were not separately marketed at refuelling stations.
- A much lower number of exceedances of limit values were reported compared to previous years, though the numbers were still significant compared to other Member States. Czech Republic has reported on its sanctions to those filling stations where samples exceeded specifications (penalty, sales suspension or closure of the filling station) and current criminal investigations into gross breaches. Good progress is being made, but there is still some work to be done in ensuring reliable fuel quality at refuelling stations across the country.

## 8 Denmark

### 8.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
3	RON 91	<10 ppm	RON 92	3
6	RON 95	<10 ppm	RON 95	6
12	RON 98	<10 ppm	RON 98	12
15	Diesel	<10 ppm	Sulphur-free diesel	15

#### 8.1.1 Sales

Figure 8.1: National fuel sales volume proportions by fuel type (%)

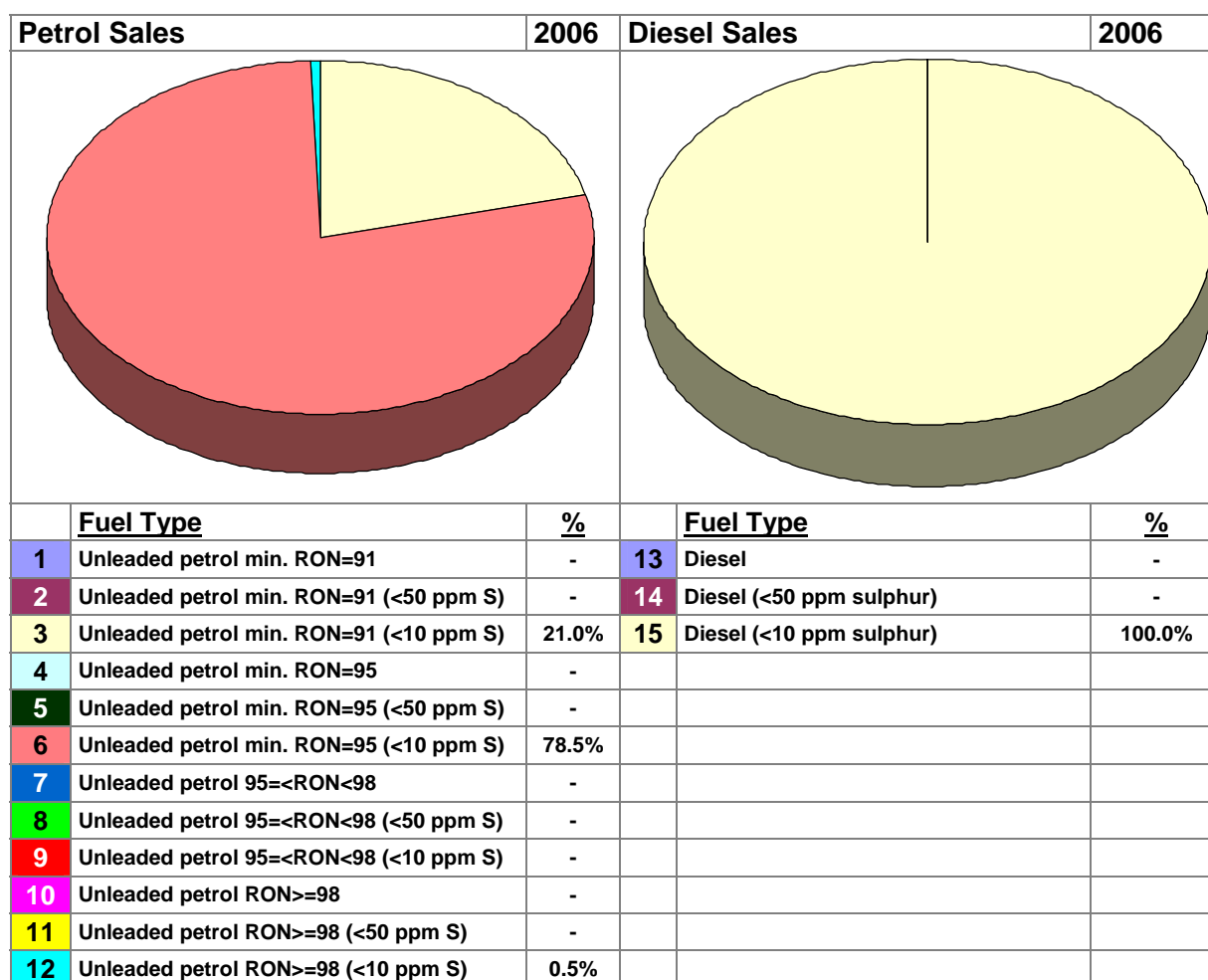


Figure 8.1 above shows that all petrol and diesel fuels sold in Denmark in 2006 were sulphur-free (<10 ppm), as in 2005. The majority of petrol sales (78.5%) were RON 95

grades (78% in 2005), 21% of sales were at the lowest RON 91 petrol fuel grade (21.1% in 2005), and the remainder (0.5%) was RON>98.

### 8.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In order to promote the availability of sulphur free petrol and diesel, a tax incentive of 0,04 DKK per litre (approx. 0,5 Euro cents per litre) petrol and 0,02 DKK per litre (approx. 0,25 Euro cents per litre) diesel was introduced on 1st January 2005. Due to the alternative of distributing two different grades of petrol and diesel, the incentive has led to a 100% conversion to sulphur free petrol and diesel in Danish petrol stations. The incentive will cease when sulphur free fuels become mandatory from 2009.

**Are sulphur-free grades clearly labelled differently / marketed separately?** N/A

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001 with a substantial drop in 2005 with full market conversion to <10ppm fuels, see Table 8.1.

**Additional information:** A fiscal incentive has been in place to promote auto diesel with sulphur content below 50 ppm since June 1999, superseded in 2005 with an incentive for 10ppm fuel.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 8.1: Annual trend in average sulphur content in petrol and diesel fuels

DK	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	47	40	19	23	3	3	18
<b>Diesel</b>	51	48	28	35	8	8	22

## 8.2 Fuel Quality Monitoring 2006

### 8.2.1 Description of system

**Responsible organisation(s):** Danish Environmental Protection Agency, sampling and analysis by SGS Sweden (according to EN 14274 and EN 14275 specifications).

**Format of Fuel Quality Monitoring System (FQMS):** National System, with reduced sampling compared to EN 14274.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Refuelling retail sites. Random selection of sites, half from east of Storebaelt and the other half west of Storebaelt, covering all companies on the Danish market.

**Time/frequency of sampling:** Half in summertime (July, August), half in wintertime (May, October, November).

**Specification of test methods:** As specified in Directive 98/70/EC

**Collection of sales data:** No information provided.

**Other details:** The Danish Fuel Quality Monitoring Programme is described in the Danish Statutory Order no. 884 of 3 November 2003 which was sent to the Commission in November 2003 when notifying the implementation of Directive 2003/17. Compared to the procedure described in EN 14274 the number of samples is reduced. The reasoning behind Danish programme is as follows:

- More than 99% of the fuels used for road transport in Denmark are distributed from the two Danish refineries or from terminals owned by members of the Danish Petroleum Industry Association (OFR), which have to meet the Association's Exchange Specifications. These specifications are in accordance with DS/EN 228 for petrol and DS/EN 590 for diesel and the current Danish Statutory Order regarding the quality of petrol and diesel fuel.
- More than 99% of the fuels used for road transport in Denmark are delivered from terminals, which are certified in accordance with ISO 9000 or equivalent quality-management systems.
- More than 99% of the fuels used for road transport in Denmark are distributed from terminals where "Certificates of Quality" exist for every import/batch approved according to DS/EN 228 for petrol or DS/EN 590 for diesel and the current Danish Statutory Order regarding the quality of petrol and diesel.

A reduced number of samples is taken for the parameters that are estimated to have minor influence on the environment (RON, MON, oxygen and oxygenates) and for lead, which has not been present in petrol in Denmark for more than 10 years.

## 8.2.2 Sampling and reporting

Denmark was essentially compliant with the sampling and reporting requirements in 2006, however the numbers of samples of all grades seem low, and in particular of RON 91 considering it comprises over 20% of sales. Also, results for the summer and winter periods should be reported separately. The following Table 8.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 8.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	21.0%	3	4	-	No	All of 18	
6	RON 95 <10 ppm S	6	78.5%	15	14	-	No	All of 18	
12	RON 98 <10 ppm S	12	0.5%	2	2	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	10	10	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>10</b>	<b>10</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 8.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol-RON 92**

- Detail:* One sample exceeded the limit value for vapour pressure (70kPa), with a value of 72.2kPa.
- Statistical significance:* The tolerance limit for statistical significance for the vapour pressure test method (71.9 kPa) was exceeded and therefore the sample was non-compliant with the Directive.
- Member State's notes:* According to the fuel companies responsible, the reason for the exceedances of the vapour pressure of petrol is assumed to be too large an amount of winter quality petrol remaining in the tanks when the summer quality petrol was delivered to the petrol stations. The companies have declared to the Danish EPA that they will tighten up their procedures in order to avoid that it should occur again. Further, the Danish EPA will pay special attention to the summer vapour pressure during the 2007 fuel monitoring programme.

### **Petrol-RON 95**

All samples tested were in compliance with limit values.

### **Petrol-RON 98**

- Detail:* One sample exceeded the limit value for vapour pressure (70kPa), with a value of 72.4kPa.
- Statistical significance:* The tolerance limit for statistical significance for the vapour pressure test method (71.9 kPa) was exceeded and therefore the sample was non-compliant with the Directive.
- Member State's notes:* As above.

### **Diesel**

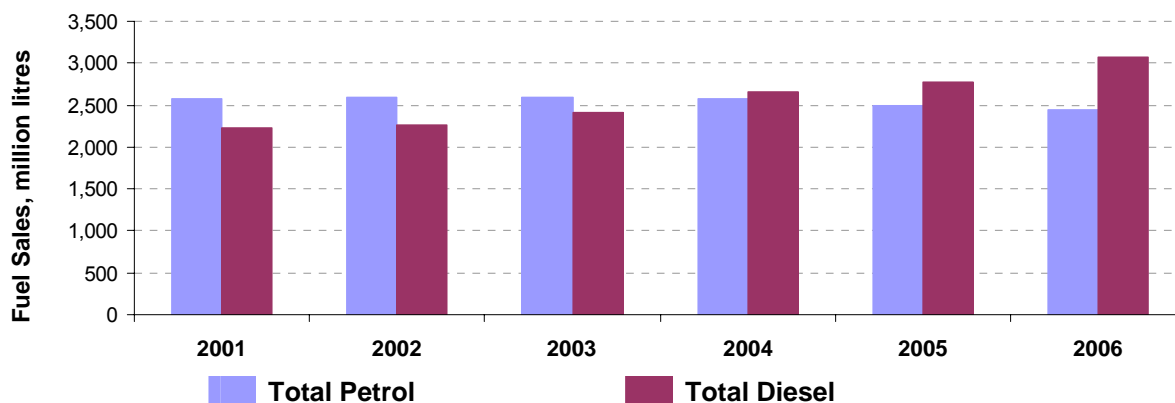
- Detail:* The limit values for cetane number (minimum 51.0) and distillation at 95% point (360°C) were not complied with by samples with a minimum cetane number of 50.9 and a maximum distillation value of 360.8°C.
- Statistical significance:* The tolerance limits for cetane number (48.5) and distillation (min. 365.9°C) were not exceeded and therefore the samples were compliant with the Directive.
- Member State's notes:*

**Additional information:** In addition to the above non-compliances with the Directive was an exceedance of the <10ppm sulphur content limit for diesel fuels marketed as sulphur-free, with sulphur content of 11ppm.

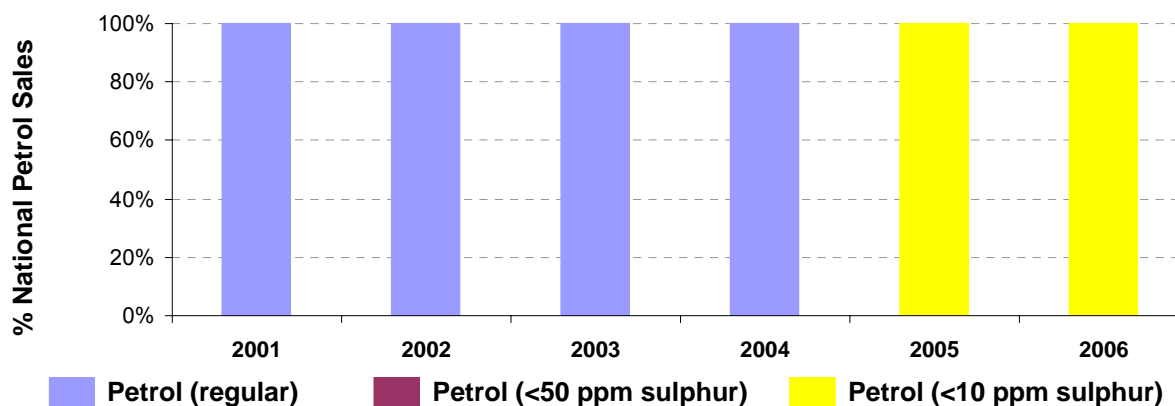
## **8.3 Temporal trends**

The following Figure 8.2 to Figure 8.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. There was a small decrease in the sales of petrol (-5%) but a 38% increase in the sales of diesel since 2001. The sales share of RON 91, RON 95 and RON 98 petrol has remained fairly stable. All petrol and diesel fuels marketed in 2005 and 2006 were sulphur-free (<10ppm).

**Figure 8.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 8.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 8.4 Temporal trends in national sales of low sulphur diesel (%)**

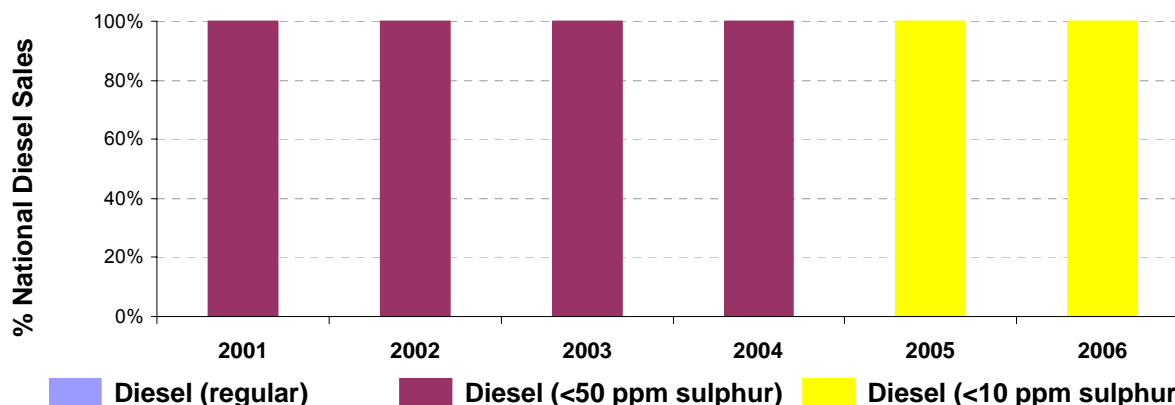
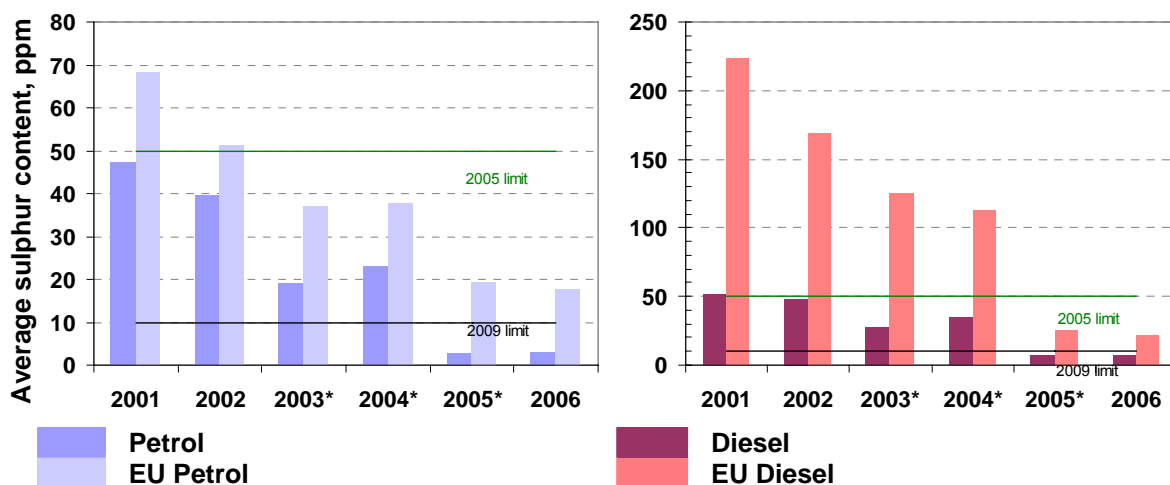


Figure 8.5 shows the trend in average sulphur content of petrol and diesel fuels in Denmark compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased since 2001 with a substantial drop in 2005 with full market conversion to <10ppm fuels. The average sulphur contents were well below the 2005 limit, EU average and forthcoming 2009 limit.

**Figure 8.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 8.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement<sup>18</sup>

- Although Denmark has provided a number of reasons for taking a reduced number of samples for analysis compared with the European Standard EN14274, it has not demonstrated that the national FQMS is statistically equivalent to the standard. In particular the numbers of samples of RON 91 appear quite low considering it comprises over 20% of sales. It is recommended that a greater number of samples are taken and analysed in future years.
- Results for the summer and winter periods should ideally be reported separately, as there are different fuel quality requirements in summer and winter as well as requirements to take a minimum number of samples in each period.

<sup>18</sup> Denmark have provided the following additional information relating to 2007 monitoring and reporting:

- In the 2007 fuel quality monitoring programme, the numbers of samples of RON 91 have been increased from 7 to 9 out of 20 samples of petrol to better reflect the market share of RON 91.
- In the report for the 2007 fuel quality programme, results for summer and winter periods will be reported separately.
- Denmark will investigate the question of statistical equivalence with the European Standard EN 14274 and report on this in the report for the 2007 fuel quality programme.
- Denmark will consider the possibility of increasing the number of samples taken in future years, but it will probably not be possible to increase the number of samples already from 2008.



## 9 Estonia

### 9.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
3	RON 91	<10 ppm	väävli- ja pliivaba bensiin (RON 91)	6
6	RON 95	<50 ppm	väävli- ja pliivaba bensiin (95EURO)	6
12	RON 98	<10 ppm	väävli- ja pliivaba bensiin (98EURO)	12
14	Diesel	<50 ppm	diislikütus	14
15	Diesel	<10 ppm	väävlivaba diislikütus	14

Separate results were provided for the sulphur contents of the low sulphur and sulphur free diesel grades.

#### 9.1.1 Sales

Figure 9.1: National fuel sales volume proportions by fuel type (%)

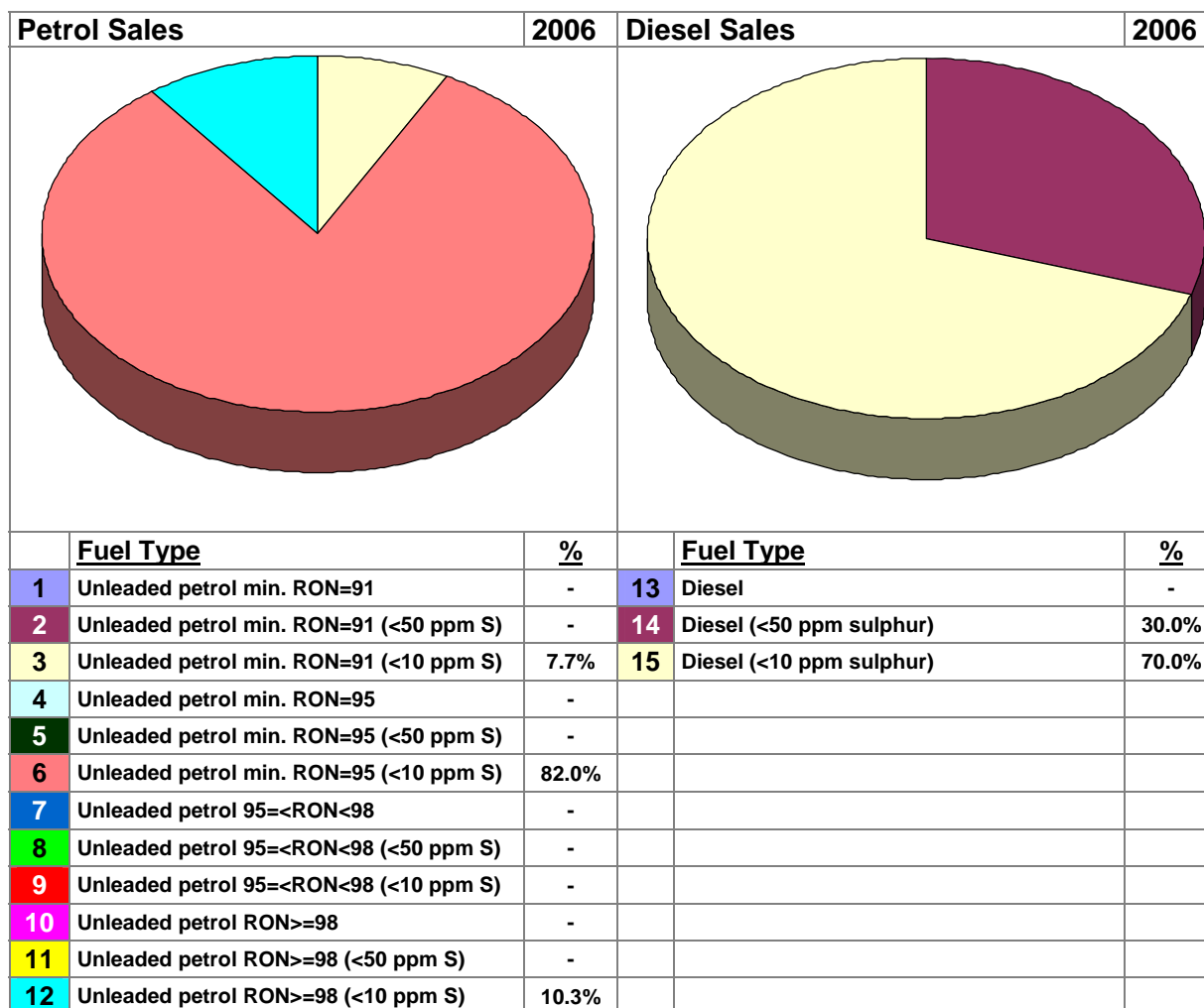


Figure 9.1 shows that sulphur-free fuel grades available in 2006 comprised 100% of petrol sales and 70% diesel sales (41% and 66% respectively in 2005). The predominant petrol RON grade was RON 95 (82% up from 75% in 2005 and same as in 2004), with 10% (13% in 2004) of petrol sales of RON 98 and only 7.7% RON 91 (up from 5% in 2005 and 2004).

### 9.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** All petrol grades sold in Estonia 2006 are sulphur free. Due to small size of the country the filling stations are well spread according to the demand over the territory. There are no large refuelling stations or highway/motorway stations in Estonia.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** Table 9.1 shows the average content of fuel sold in relation to the EU25 average. The sulphur content has dropped substantially since 2004.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 9.1: Annual trend in average sulphur content in petrol and diesel fuels

EE	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>				57	20	6	18
<i>Diesel</i>				188	25	11	22

## 9.2 Fuel Quality Monitoring 2006

### 9.2.1 Description of system

**Responsible organisation(s):** Estonian Environmental Research Centre (EERC) is managing the FQMS and reporting the results. The monitoring followed the European Standard EN 14274. The sample-taking followed the European Standard EN 14275. Analyses were done in the laboratory of EERC and the applied methods had accreditation.

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions) – in terms of application of Directive limit values for vapour pressure. However, according to Estonian standard EVS-EN 228:2004 (and EVS-EN 590:2004) Annex NA p. 5.6.2 the summer period in Estonia is between 1 May - 30 September and winter period 1 December - 29 February.

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Samples were taken most months across the winter and summer periods.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** No information provided.

**Other details:** No information provided.

## 9.2.2 Sampling and reporting

Estonia was almost completely compliant with the sampling and reporting requirements in 2006, however samples for the RON 91 and 95 grades of petrol were not reported separately. The following Table 9.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 9.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	6	7.7%	0	0				
6	RON 95 <10 ppm S	6	82.0%	78	87	108	Yes	All of 18	
12	RON 98 <10 ppm S	12	10.3%	70	65	100	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>148</b>	<b>152</b>	<b>208</b>			
14	Diesel <50 ppm S	14	30.0%	50	50	200	Yes	All of 5	
15	Diesel <10 ppm S	14	70.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>200</b>			

**Notes:** S = Summer; W = Winter

## 9.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol 95EURO**

**Detail:** Oxygen content and ethers with or more than 5 carbon atoms limit values (maximum 2.7 % m/m and 15 % v/v respectively) were exceeded by samples with 2.9% m/m and 15.6 v/v respectively.

RON and MON limit values (minimum 95 and 85 respectively) were exceeded by 3 and 2 samples respectively with 93.7 and 84.2. Also, full year vapour pressure limit value (maximum 70 kPa) was exceeded by 5 samples with 89.1 kPa.

**Statistical significance:** The tolerance limits for statistical significance for RON and MON (94.6 and 84.5) were exceeded and, therefore, the samples were not compliant with the Directive. Similarly, vapour pressure tolerance limit (71.9 kPa) was exceeded and, therefore, the samples were not compliant with the Directive.

**Member State's notes:** Authorities were informed and an investigation was initiated.

#### **Petrol 98EURO**

**Detail:** Aromatics, oxygen content and ethers with or more than 5 carbon atoms limit values (maximum 35 % v/v, 2.7 % m/m and 15 % v/v

respectively) were exceeded by samples with 35.7 % v/v, 2.8% m/m and 15.2 v/v respectively.

Vapour pressure limit value (maximum 70 kPa) was exceeded by some samples with a maximum of 89. Also, distillation at 100° C limit value (minimum 46 % v/v) was exceeded by 1 sample with 43 % v/v.

**Statistical significance:** The tolerance limits for statistical significance for vapour pressure (71.9 kPa) and distillation at 100° C (43.6 % v/v) were exceeded and, therefore, the samples were not compliant with the Directive.

No sampling information for vapour pressure was reported.

**Member State's notes:** Authorities were informed and an investigation was initiated.

### Diesel

**Detail:** Cetane limit value (minimum 51) was exceeded by 1 sample with 47.1.

**Statistical significance:** The tolerance limits for statistical significance for cetane (48.5) was exceeded and the sample was therefore not compliant with the Directive.

**Member State's notes:** Authorities were informed and an investigation was initiated.

**Additional information:** In addition to the above non-compliances with the Directive were exceedances of the <10ppm sulphur content limit for petrol fuels marketed as sulphur-free, with a sulphur content of respectively 18.7 ppm (Petrol 95EURO, four exceedances) and 24.7 ppm (Petrol 98EURO, four exceedances), as well as two exceedances of the <10ppm sulphur content limit for diesel fuel marketed as sulphur-free, with a sulphur content of 35.3.

## 9.3 Temporal trends

The following Figure 9.2 to Figure 9.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since the first year of reporting for the new EU Member States in 2004, sales of petrol increased by 18%, however sales of diesel in Estonia have decreased by 13% (both are up on 2005 sales). The reason for this decrease is not clear. Since 2004, 100% of the petrol fuel sales have become sulphur-free, with the figure for diesel 70%. This trend is confirmed from the sampling and analysis results, with a significant reduction in the average sulphur content of these fuels since 2004 shown in Figure 9.5, with values below the EU average and the 2009 limit value for both petrol and diesel in 2006.

**Figure 9.2: Temporal trends in national sales of petrol and diesel (million litres)**

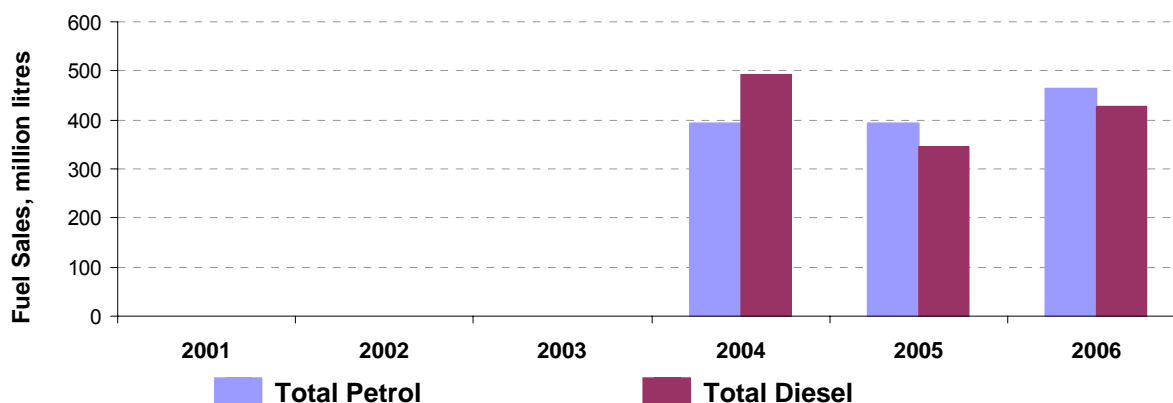


Figure 9.3: Temporal trends in national sales of low sulphur petrol (%)

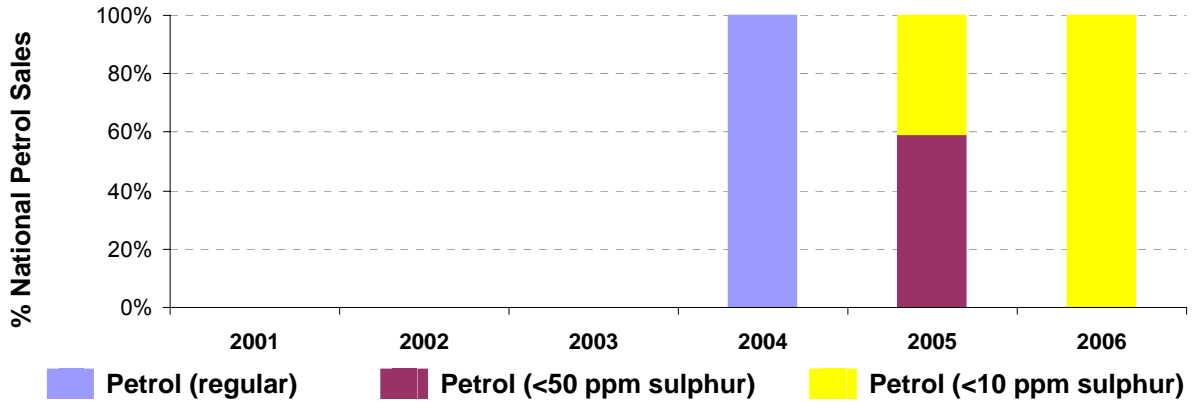


Figure 9.4: Temporal trends in national sales of low sulphur diesel (%)

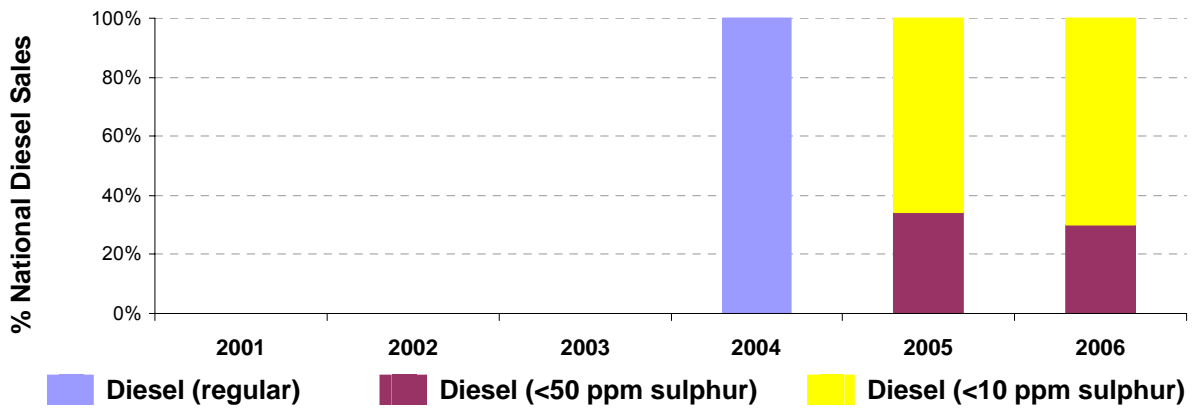
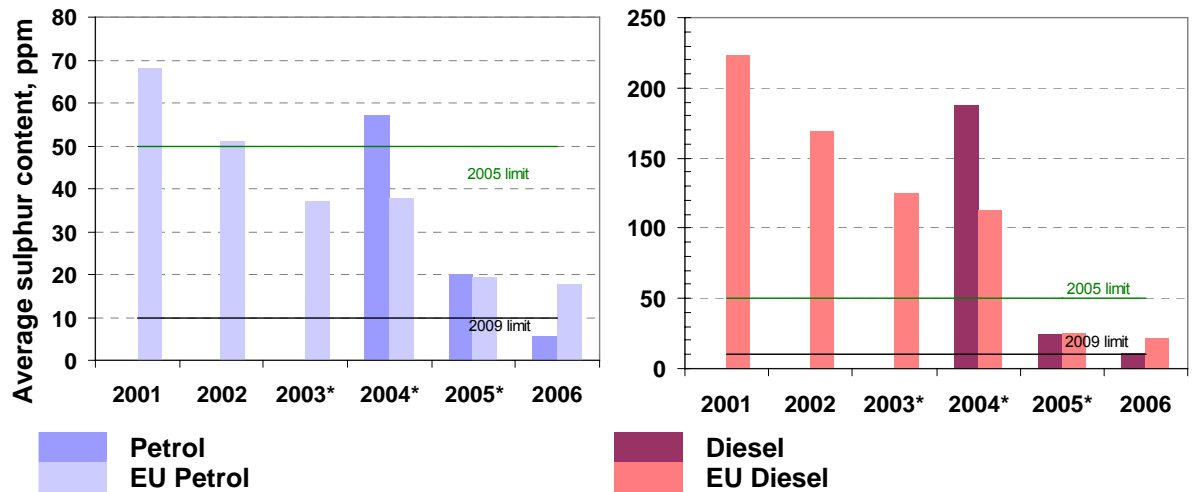


Figure 9.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 9.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

Key Areas for Improvement
<ul style="list-style-type: none"><li>• Estonia is not fully compliant with reporting requirements as it did not present results of sample analyses separately for all different petrol RON grades.</li></ul>

## 10 Finland

### 10.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
6	RON 95	<10 ppm	Unleaded, sulphur free petrol RON 95	6
12	RON 98	<10 ppm	Unleaded, sulphur free petrol RON 98	12
15	Diesel	<10 ppm	Sulphur-free diesel	15

#### 10.1.1 Sales

Figure 10.1: National fuel sales volume proportions by fuel type (%)

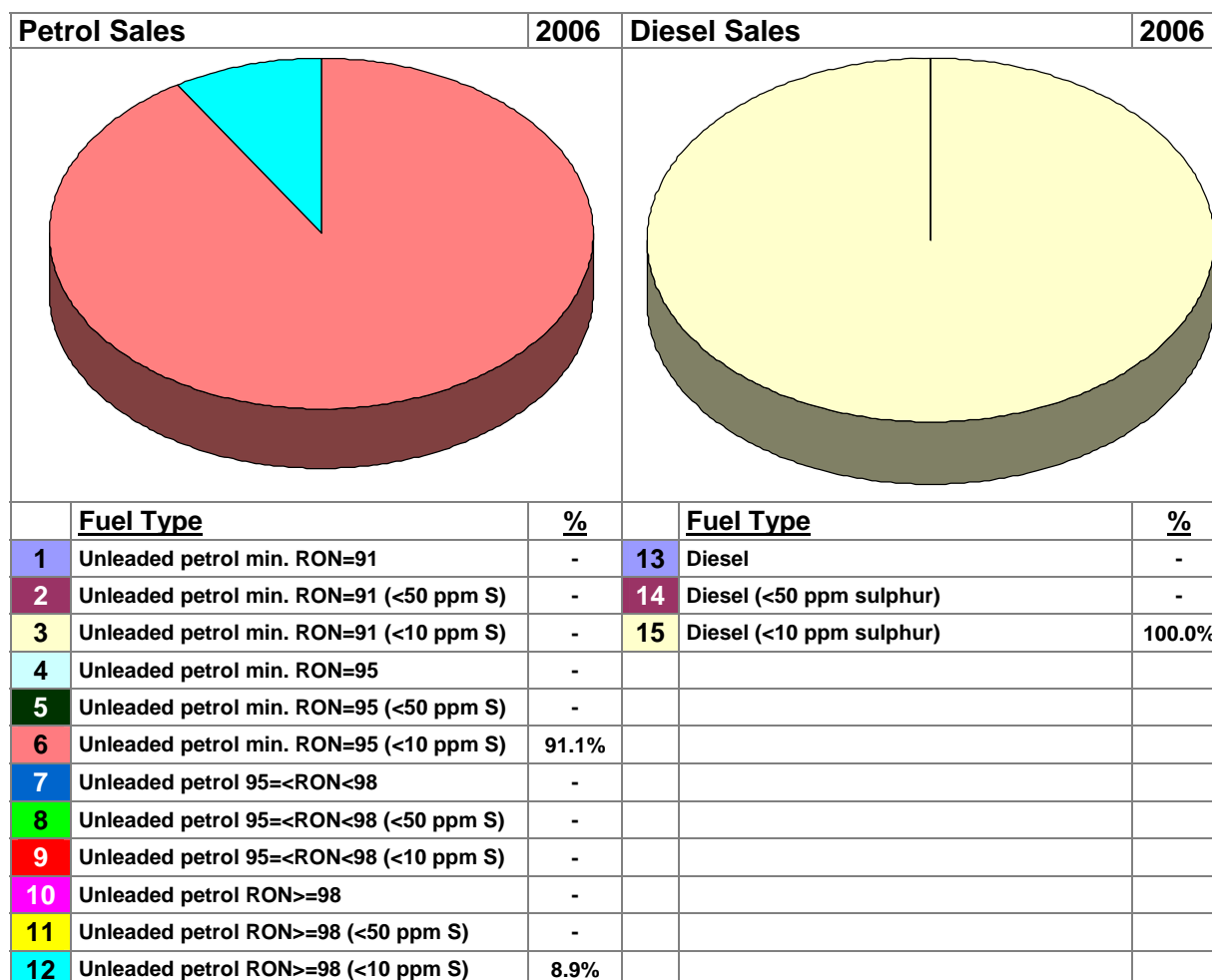


Figure 10.1 shows that all petrol and diesel fuels sold in Finland in 2006 were sulphur-free (<10 ppm). Of petrol sales, 91.1% were of RON 95 classification (89% in 2005), with the remainder being of RON>98. RON 99 octane petrol was also sold in 2006 but as this constituted less than 2% of the market it was excluded from the above sales figures and fuel quality monitoring.

## 10.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In order to have fiscal incentive for suppliers to move sulphur free fuels the excise duty of fuels were changed. Sulphur free (max. 10 mg/kg) petrol and diesel fuels have had lower duty than others from the 1st of September 2004. Due to the change in excise duty fuel suppliers have switched to the sulphur free qualities voluntarily and from that date all petrol and diesel on the market has been sulphur-free. Mandatory EU legislation that came into force on the 1st January 2005 had – in fact – no further effect on the sulphur levels. The sulphur content of samples taken in all regions were below 10 mg/kg in 2006. The mean value of sulphur content of these samples was 6,9 mg/kg for diesel, 6,8 mg/kg for RON 95 petrol and 5,3 mg/kg for RON 98 petrol.

**Are sulphur-free grades clearly labelled differently / marketed separately?** All fuel sold is sulphur-free. Sulphur-free qualities have to be marked.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Only sulphur-free fuels are sold. Separate reporting is not necessary.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 10.1. The sulphur content of samples taken in all regions was below 10 ppm in 2006.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 10.1: Annual trend in average sulphur content in petrol and diesel fuels

FI	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	84	53	23	11	8	7	18
<b>Diesel</b>	34	24	14	7	6	7	22

## 10.2 Fuel Quality Monitoring 2006

### 10.2.1 Description of system

**Responsible organisation(s):** The Customs Authority annually draws up a sample-taking schedule that is then approved by the Ministry of the Environment. The Customs' National District Organisation takes care of taking liquid fuel samples according to the sampling plan. The analysis of samples is carried out by the Customs Laboratory.

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model A, with three macro regions.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Samples were taken in retail sites with the exception that octane (total 39 petrol samples) and cetane (48 diesel samples) were analysed from the samples taken from fuel refineries and terminals. These samples were taken in all macro regions and at different times.



**Time/frequency of sampling:** Each month throughout the year, except April.

**Specification of test methods:** The methods were according to the Directive specifications, with the exception of the lead method. The sensitivity of the lead method was considerably better than the limiting value specified in the quality requirements.

**Collection of sales data:** National sales data were taken from the statistics compiled and published by Finnish Oil and Gas Federation.

**Other details:**

The sampling aims to comply, when applicable, with the requirements of standard EN 14275:2004. Sampling was done in the whole country according to the sampling plan following the guidelines of a standard EN 14274:2004 model A. Country was divided to three macro-regions with about the same sales volume and variability factor. Altogether 84 petrol and 51 diesel samples were taken from macro region 1. The corresponding figures for macro region 2 are 97 and 53. For macro region 3 the figures are 81 and 54. These figures include also samples taken from the refineries and terminals.

## 10.2.2 Sampling and reporting

Finland was mostly compliant with the sampling and reporting requirements in 2006. Samples were taken at retail sites according to EN14275 Model A requirements (total of 50 samples for each fuel grade in each summer and winter period). Additional samples were taken from refineries and terminals. These additional samples (39 petrol and 48 diesel) we used for octane and Cetane analysis, which were not routinely performed for retail site samples. The following Table 10.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 10.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
6	RON 95 <10 ppm S	6	91.1%	53	61	100	Yes	All of 18	(1)
12	RON 98 <10 ppm S	12	8.9%	51	58	9	Yes	All of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>104</b>	<b>119</b>	<b>109</b>	<b>Yes</b>	<b>All of 18</b>	<b>(1)</b>
15	Diesel <10 ppm S	15	100.0%	51	59	100	Yes	All of 5	(2)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>51</b>	<b>59</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	<b>(2)</b>

**Notes:** S = Summer; W = Winter

- (1) Octane number was analysed from additional samples taken from refineries and terminals (39 samples)
- (2) Cetane number was analysed from additional samples taken from refineries and terminals (48 samples)

## 10.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

*(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).*

#### Petrol-RON 95

**Detail:** One sample exceeded the maximum limit value for aromatics (35.0 %v/v), with 36.7%(v/v). Another sample exceeded the ethers limit value of 15.0 % (v/v), with 15.6% (v/v).

**Statistical significance:** These samples were within the statistical significance tolerance limits (37.2% v/v for aromatics and 15.6 % v/v for ethers), and were therefore compliant with the Directive.

*Member State's notes:*

### **Petrol-RON 98**

*Detail:* One sample exceeded the maximum limit value for aromatics (35.0 %v/v), with 38.5%(v/v), another exceeded the summer vapour pressure limit (70.0 kPa) with 71.8 kPa, and the ethers limit value of 15.0 % (v/v) was exceeded by a sample with 15.3 % (v/v).

*Statistical significance:* The statistical significance tolerance limit (95% confidence) for aromatics (37.2% v/v) was exceeded; therefore the sample was in breach of the Directive.

Other samples were within the tolerance limits (71.9 kPa for vapour pressure and 15.6 % v/v for ethers) and were thus compliant with the Directive.

*Member State's notes:* The expanded relative uncertainty of measurement used in Finnish Customs Laboratory is + - 10 % at the confidence level of 95 %. The true value of aromatics content in this sample (34.6 – 42.4 % (v/v)) may thus also be below limiting value 35.0 % (v/v) or maximum tolerance limit 37.2 % (v/v).

### **Diesel**

*Detail:* In three samples, the cetane numbers 46.7, 47.0 and 50.7 were below the minimum limit value of 51.0.

*Statistical significance:* The two samples with cetane numbers of 46.7 and 47.0 were outside the minimum tolerance limit of 48.5 and thus were not compliant with the Directive, while the third sample with a cetane number of 50.7 was within the minimum tolerance limit.

*Member State's notes:* Samples for cetane analysis were taken from refineries/terminals. According to the owner of products the fuel concerned has been mixed with other diesel oils in order to raise the cetane number and to meet the quality criteria in the final product. This procedure is in line with Article 87 of the Environmental Protection Law (2000/86).

**Additional information:** In addition to the above non-compliances with the Directive was an exceedance of the <10ppm sulphur content limit for diesel fuels marketed as sulphur-free, with a sulphur content of 11.2ppm. This value was within the tolerance limit for the sulphur test (11.6 ppm) and was therefore compliant with the Directive.

## **10.3 Temporal trends**

The following Figure 10.2 to Figure 10.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Small increases occurred in the sales of petrol and greater for diesel between 2001 and 2006 (3% for petrol and 14% for diesel), although petrol sales have slightly decreased by 0.7% compared to 2005 sales, while diesel sales have risen by 3.2%. Since 2005 all marketed fuels are sulphur-free (<10ppm).

Figure 10.2: Temporal trends in national sales of petrol and diesel (million litres)

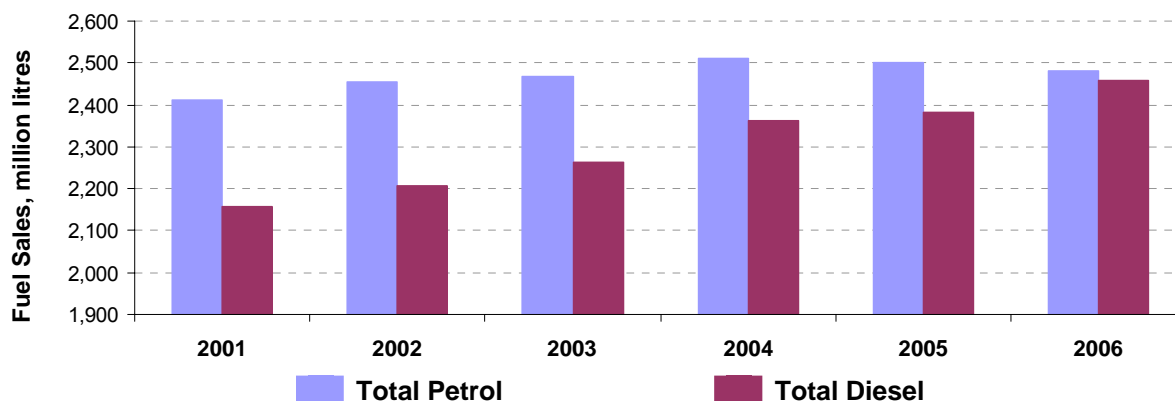


Figure 10.3: Temporal trends in national sales of low sulphur petrol (%)

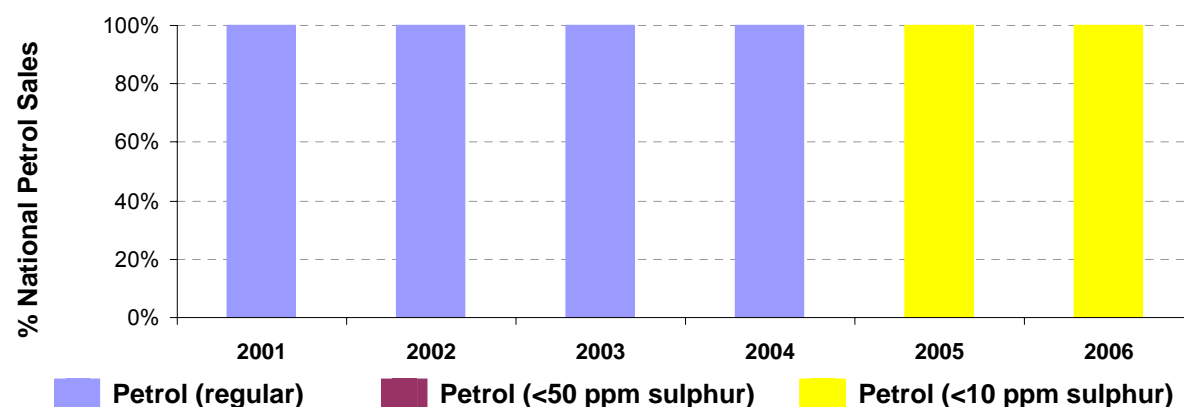


Figure 10.4 Temporal trends in national sales of low sulphur diesel (%)

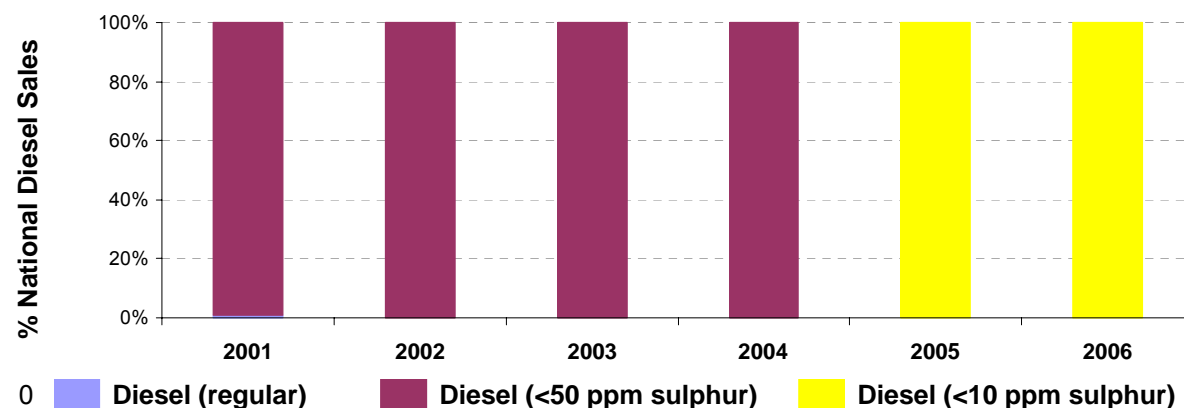
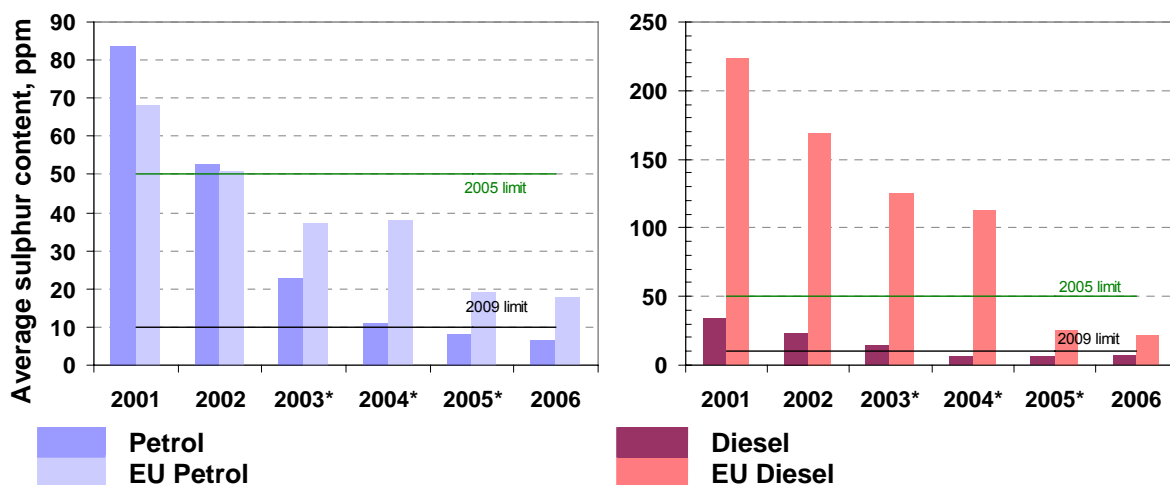


Figure 10.5 shows the trend in average sulphur content of petrol and diesel fuels in Finland compared with the EU average (derived from sample analysis results and relative sales). The reduction in average sulphur content of both petrol and diesel fuels since 2001 continued in 2005 with full market conversion to <10ppm fuels. The average sulphur contents were well below the 2005 limit, EU average and forthcoming 2009 limit in 2005 and 2006.

**Figure 10.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 10.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- A limited number of samples were taken, at terminals and refineries, for the analysis of octane and cetane number. Compliance with EN14274 requires analysis for all parameters to be carried out on samples to be taken from refuelling stations. It was not clear from the report the proportion of the samples that were from refuelling stations to compare against these requirements.
- No samples of 99 octane fuel were taken.

# 11 France

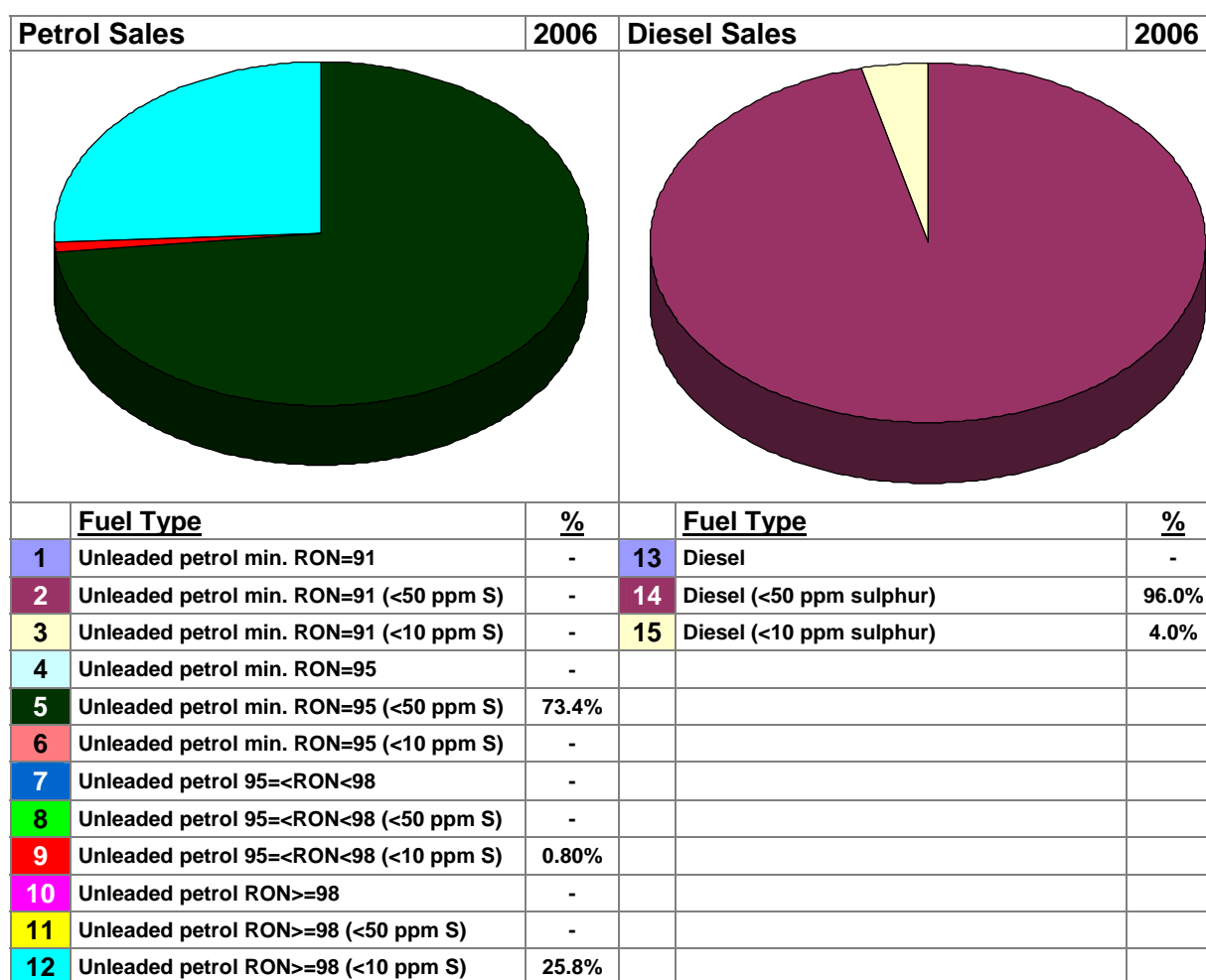
## 11.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Super 95 RON	5
9	95<RON<98	<10 ppm	Super 98 RON ARS	12
12	RON 98	<10 ppm	Super 98 RON	12
14	Diesel	<50 ppm	Gazole 50ppm	14
15	Diesel	<10 ppm	Gazole 10ppm	15

### 11.1.1 Sales

Figure 11.1: National fuel sales volume proportions by fuel type (%)



Since 2001 France has switched entirely to low sulphur fuels, with <10ppm petrol of RON 98 grade accounting for 26.6% of sales in 2006 (of which 0.8% was lead replacement fuel – ARS, Soupape Anti Recession). Small quantities of <10ppm diesel (4%) were also sold for the first time in 2006.

## 11.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were available in significant quantities for petrol and diesel across France in 2006.

**Are sulphur-free grades clearly labelled differently / marketed separately?** The sulphur-free fuels (<10 ppm sulphur) are labelled at refuelling stations. For petrol, all RON 98 fuel was <10ppm, with the RON 95 grade available only as <50 ppm grade.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes.

**Average sulphur content of all petrol and diesel sold:** Table 11.1 shows the average content of fuel sold in 2001 to 2006 in relation to the EU25 average. Data was unavailable for 2003-2005 as France submitted no report in these years.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 11.1: Annual trend in average sulphur content in petrol and diesel fuels

FR	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006*	2006
<i>Petrol</i>	93	103	No data	No data	No data	18	18
<i>Diesel</i>	295	308	No data	No data	No data	37	22

## 11.2 Fuel Quality Monitoring 2006

### 11.2.1 Description of system

**Responsible organisation(s):** Direction des Ressources Energétiques et Minérales. (Directorate of Energy Resources and Minerals).

**Format of Fuel Quality Monitoring System (FQMS):** National System.

**Country Size:** Large (more than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** The sampling took place in the Winter period (only in November and December).

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** Gathered and published by the CPDP (Comité Professionnel du Pétrole).

## 11.2.2 Sampling and reporting

France was not compliant with the sampling and reporting requirements in 2006. Sampling was only carried out for the winter period and only in November and December. France has also not taken sufficient samples to comply with the requirements of the European standard for a large country using statistical model B, which is 200 samples taken per fuel grade in each of the summer and winter periods. The following Table 11.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 11.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	73.4%	0	87	400	Yes	All of 18	
9	95<RON<98 <10 ppm S	12	0.8%	0	0				
12	RON 98 <10 ppm S	12	25.8%	0	88	404	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>0</b>	<b>175</b>	<b>804</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	96.0%	0	115	400	Yes	All of 5	
15	Diesel <10 ppm S	15	4.0%	0	7	16	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>0</b>	<b>122</b>	<b>416</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 11.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 95 Petrol**

*Detail:* In one sample the RON, MON values were below the minimum limit values of 95 and 85 respectively, with values of 94.7 and 84.2.  
One sample exceeded the olefins value of 18%v/v with 19.7 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the MON test method is 84.5 and for olefins the limit is 19.5%v/v, therefore the MON and olefin samples were non-compliant with the Directive. The tolerance limit for RON was not exceeded, so this sample was compliant.

*Member State's notes:*

#### **RON 98 Petrol**

*Detail:* One sample exceeded the aromatics value of 35%v/v with 36.1 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the aromatics test method used is 36.0%v/v and therefore the sample was non-compliant with the Directive.

*Member State's notes:*

**Diesel**

*Detail:* The sulphur content (regular grade) limit value of 50 mg/kg was exceeded by one sample with a value of 55.8 mg/kg.

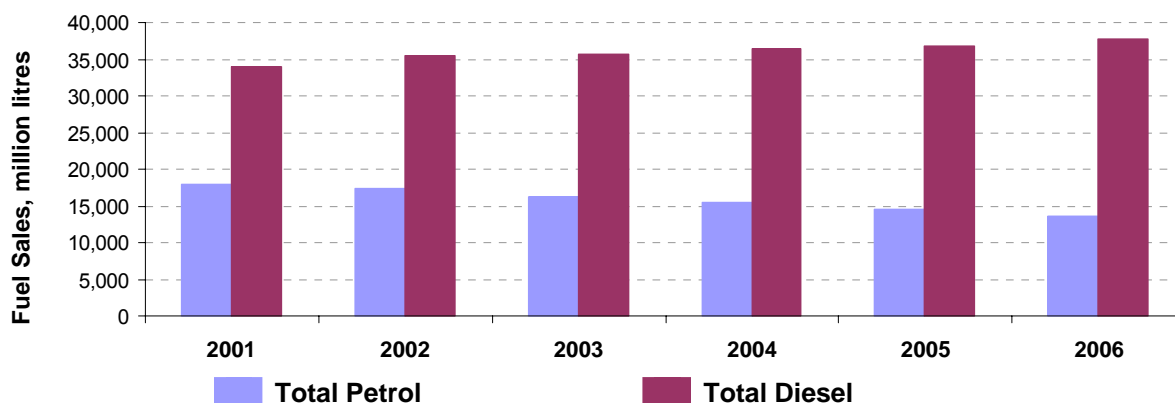
*Statistical significance:* The tolerance limit for statistical significance for the sulphur content testing method used EN ISO 20846 is 54.0 mg/kg, therefore the sample was non-compliant with the Directive.

*Member State's notes:*

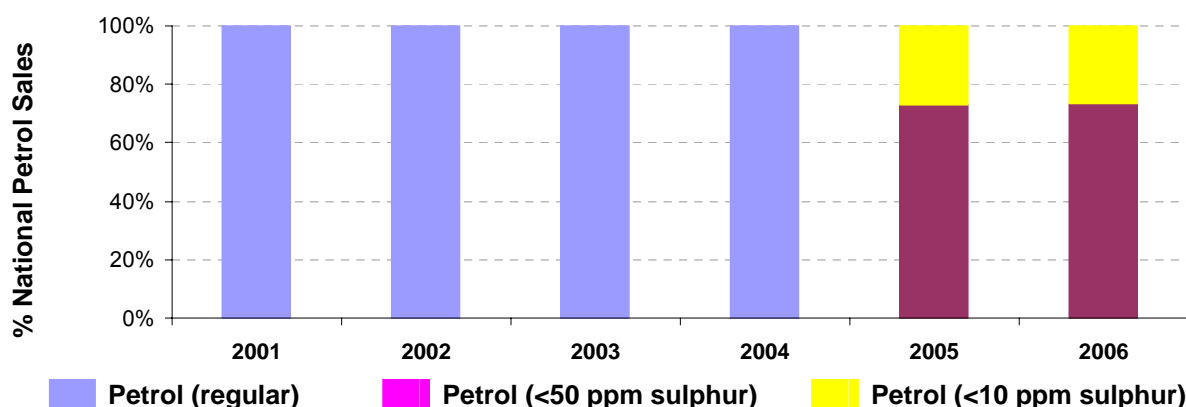
### 11.3 Temporal trends

The following Figure 11.2 to Figure 11.5 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. France has supplied sales data for the years 2003-2005, where no reports were previously submitted. Petrol sales have decreased by 24% since 2001, whilst diesel sales have increased by 11%. Low sulphur petrol and diesel, and sulphur free petrol were introduced into the market from 2005. Sulphur free diesel was available from 2006.

**Figure 11.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 11.3: Temporal trends in national sales of low sulphur petrol (%)**





**Figure 11.4: Temporal trends in national sales of low sulphur diesel (%)**

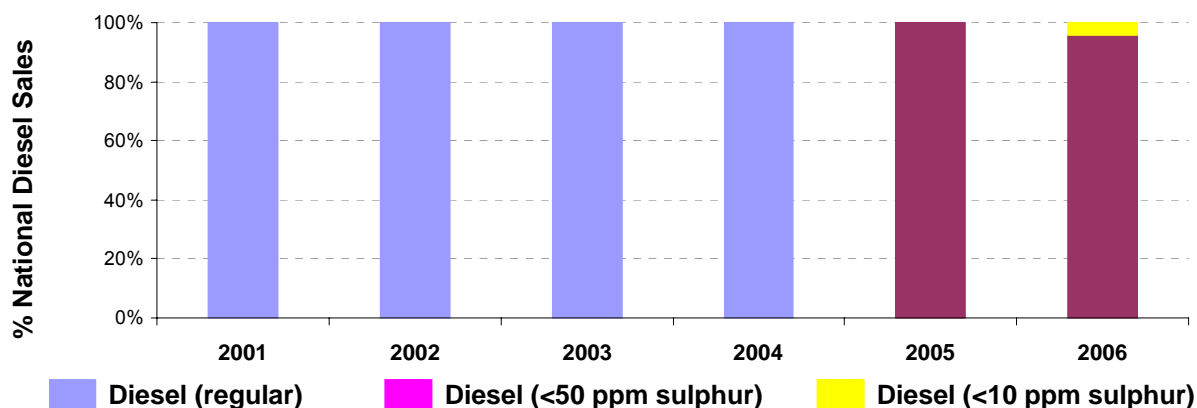
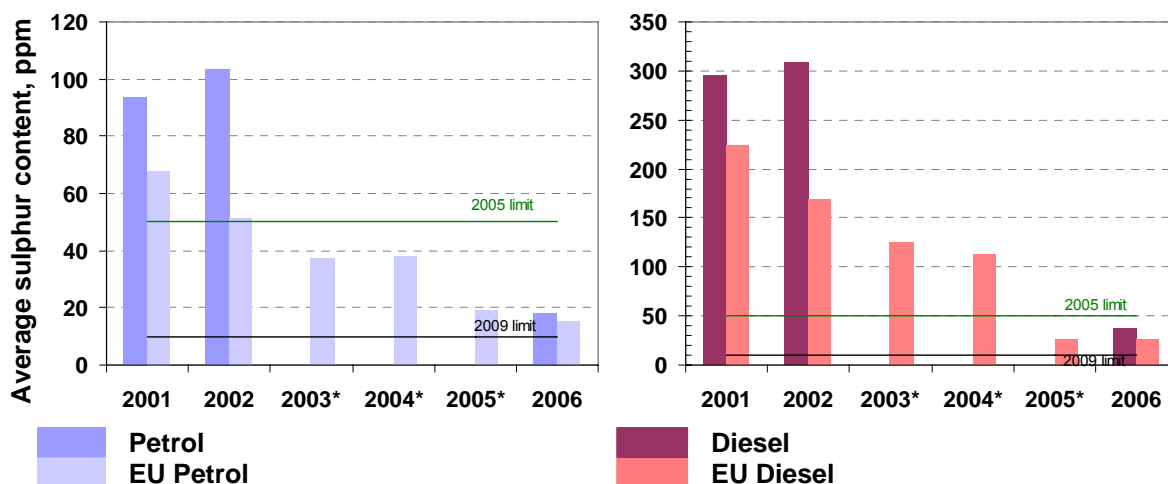


Figure 11.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was below the 2005 limit (<50 ppm) but above the EU average in 2006. Data was unavailable for 2003-2005 as France submitted no report in these years.

**Figure 11.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 11.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The report for France for 2006 (the first since the one for 2002) has provided all of the information required under the Directive, although the monitoring system has only been fully active and taking samples since November 2006.
- France has carried out 297 sample analyses in 2006 (175 petrol, 122 diesel), however this far below what would be required by the European Standard specification. For the grades of fuel available in France this would require around 1200 samples total for the statistical model B that is being followed. Required summer sampling is also absent. France has indicated that the monitoring system was fully operational for 2007, so a compliant report is anticipated in the future.

## 12 Germany

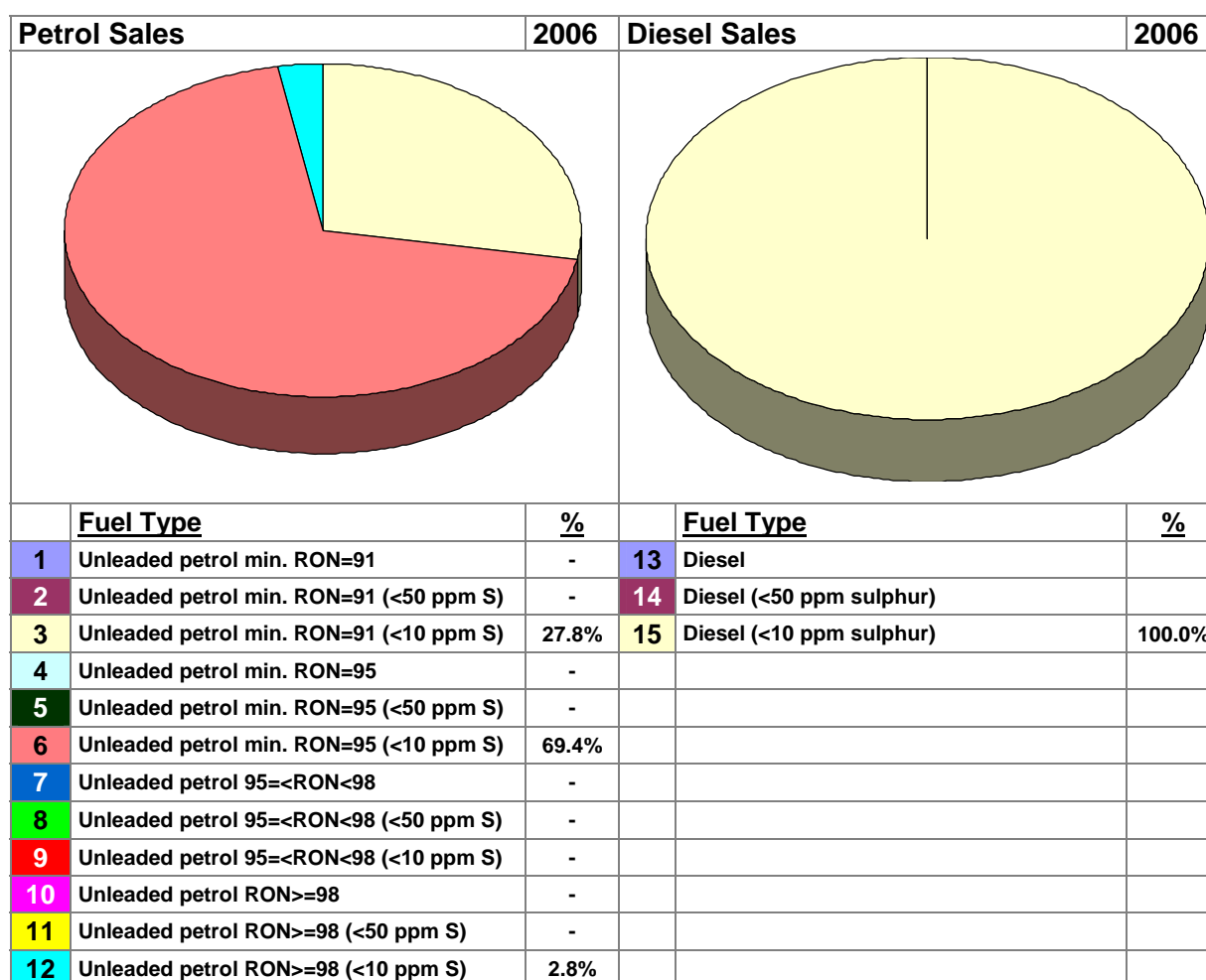
### 12.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2005 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
3	RON 91	<10 ppm	Normalbenzin	3
6	RON 95	<10 ppm	Superbenzine	6
12	RON 98	<10 ppm	Super Plus	12
15	Diesel	<10 ppm	Diesekraftstoff	15

#### 12.1.1 Sales

Figure 12.1: National fuel sales volume proportions by fuel type (%)



The German market switched entirely to sulphur free fuels at the beginning of 2003. The share of the three petrol grades was almost the same as in 2004: whilst most of the fuel sold was RON 95 quality (69.4% compared to 55% in 2001), and almost 28% of fuel sold was still RON 91, with RON 98 making up the remainder (2.8%). All diesel fuel sold is sulphur-free.

## 12.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** The German market converted entirely to sulphur free fuels at the beginning of 2003.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes - only sulphur-free grades available.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased significantly since 2001. See Table 12.1.

**Additional information:** Germany has been promoting the sale of sulphur free fuels since 1 January 2003 via tax incentives.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 12.1: Annual trend in average sulphur content in petrol and diesel fuels

DE	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>	54	23	7	7	6	6	18
<i>Diesel</i>	249	31	8	7	7	8	22

## 12.2 Fuel Quality Monitoring 2006

### 12.2.1 Description of system

**Responsible organisation(s):** Ministry for the Environment, Nature Protection and Safety for Nuclear Reactors (*Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU*)

**Format of Fuel Quality Monitoring System (FQMS):** National System.

**Country Size:** Large (more than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal).

**Location(s) of sampling:** Refuelling stations.

**Time/frequency of sampling:** Monthly across the year.

**Specification of test methods:** According to the test method specified in Directive 98/70/EC.

**Collection of sales data:** The fuel sales volumes are collected and published, from oil data, by the Federal Office of Economics and Export Control (BAFA)

**Other details:** With regard to specification non-compliances, according to German Law the first stage is to determine, by deviations from the standard, the person responsible. Deviations from the standard will be punished if a responsible person can be clearly established and any deceptions or attempts at deception can be proven. Such infringements will be punished with fines, otherwise a tighter monitoring of the delivery papers and fuel sold will take place.

## 12.2.2 Sampling and reporting

Germany was generally compliant with the sampling and reporting requirements in 2005, however it has not provided information on whether its national monitoring system is equivalent in statistical confidence with the requirements of EN 14274. Excepting summer vapour pressure, sample results were not provided separately for summer and winter periods. The following Table 12.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 12.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	27.8%	58	81	-	No	All of 18	
6	RON 95 <10 ppm S	6	69.4%	107	97	-	No	All of 18	
12	RON 98 <10 ppm S	12	2.8%	35	36	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>200</b>	<b>214</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	123	120	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>123</b>	<b>120</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 12.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 91**

**Detail:** The RON limit of 91 was exceeded with a value of 90.7 as well as the summer vapour pressure limit of 60 kPa with a value of 62.5 kPa. Also, the aromatics limit of 35 %(v/v) was exceeded with a value of 35.9 %(v/v).

**Statistical significance:** The tolerance limit for statistical significance for summer vapour pressure and aromatics test method are 61.8 kPa and 36 %(v/v) respectively. Therefore the samples were in non-compliance with the Directive.

**Member State's notes:**

#### **Petrol RON 95**

**Detail:** The RON and MON limits of 95 and 85 were exceeded with values of 94.4 and 82.5 respectively. The summer vapour pressure limit of 60 kPa was exceeded by one sample, with a value of 61.8 kPa.

The olefins limit of 18 %(v/v) was exceeded by with a value of 19 kPa %(v/v) as well as the aromatics limit of 35 %(v/v) with a value of 35.6 kPa %(v/v). Also, the other oxygenates limit of 10 %(v/v) was exceeded with a value of 13 %(v/v).

**Statistical significance:** The tolerance limits for statistical significance for RON and MON test method are 94.6 and 84.5 and therefore the samples were in

non-compliance with the Directive.

Also, the other oxygenates limit for statistical significance is 10.5% (v/v) and therefore the samples were in non-compliance with the Directive.

### **Petrol RON 98**

*Detail:*

The summer vapour pressure limit of 60 kPa was exceeded with a value of 62.3 kPa.

The distillation at 100 °C minimum limit of 46 %(v/v) was exceeded with a value of 45.7 kPa %(v/v) as well as the aromatics limit of 35 %(v/v) with a value of 42.4 kPa %(v/v). Also, the other oxygenates limit of 10 %(v/v) was exceeded with a value of 14.7 % (v/v).

*Statistical significance:*

The summer vapour pressure limit for statistical significance is 61.8% (v/v) and therefore the samples were in non-compliance with the Directive.

Also, the aromatics limit for statistical significance is 36 %(v/v) and, therefore, the samples were in non-compliance with the Directive, as well as the other oxygenates whose limit for statistical significance is 10.5% (v/v)

*Member State's notes:*

### **Diesel**

*Detail:*

The limit values for cetane (min. 51) and distillation at 95°C (max. 360°C) were exceeded by samples with values of 49.5 and 363.2 °C respectively.

*Statistical significance:*

The tolerance limit values for statistical significance for cetane (min. 48.5) and distillation at 95°C (max. 365.9°C) were not exceeded and therefore the samples were compliant with the Directive.

*Member State's notes:*

**Additional information:** In addition to the above non-compliances with the Directive, it is worth noting that all the four grades reported exceedances of the <10ppm sulphur content limit (for petrol and diesel fuels marketed as sulphur-free, with a sulphur content of 18.0 ppm (Normalbenzin, RON 91), 10.3 ppm (Superbenzine, RON 95 and Super Plus, RON 98) as well as 39 ppm (Dieselkraftstoff, < 10 ppm sulphur)).

## **12.3 Temporal trends**

The following Figure 12.2 to Figure 12.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2006, sales of petrol decreased by 18%, while sales of diesel increased by 11%. Since the beginning of 2003, all petrol and diesel grades have switched to sulphur free fuel.

Figure 12.2: Temporal trends in national sales of petrol and diesel (million litres)

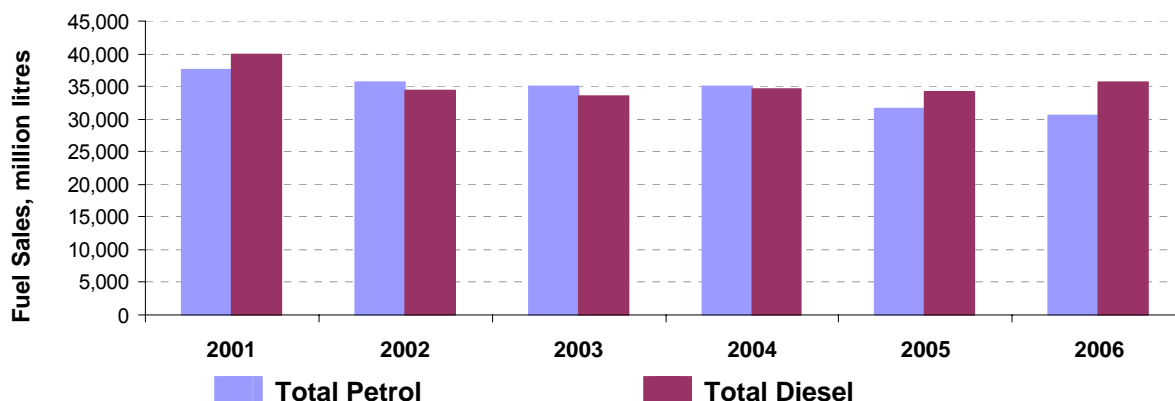


Figure 12.3: Temporal trends in national sales of low sulphur petrol (%)

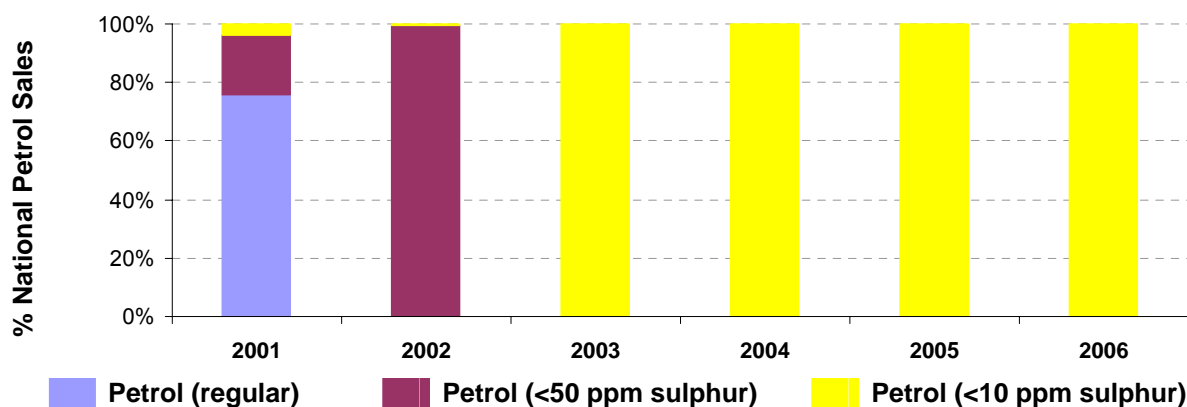


Figure 12.4: Temporal trends in national sales of low sulphur diesel (%)

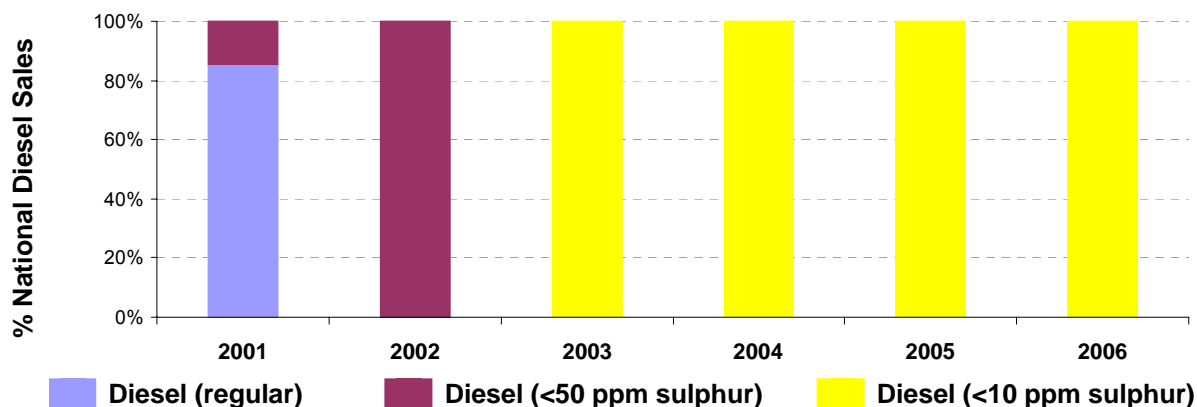
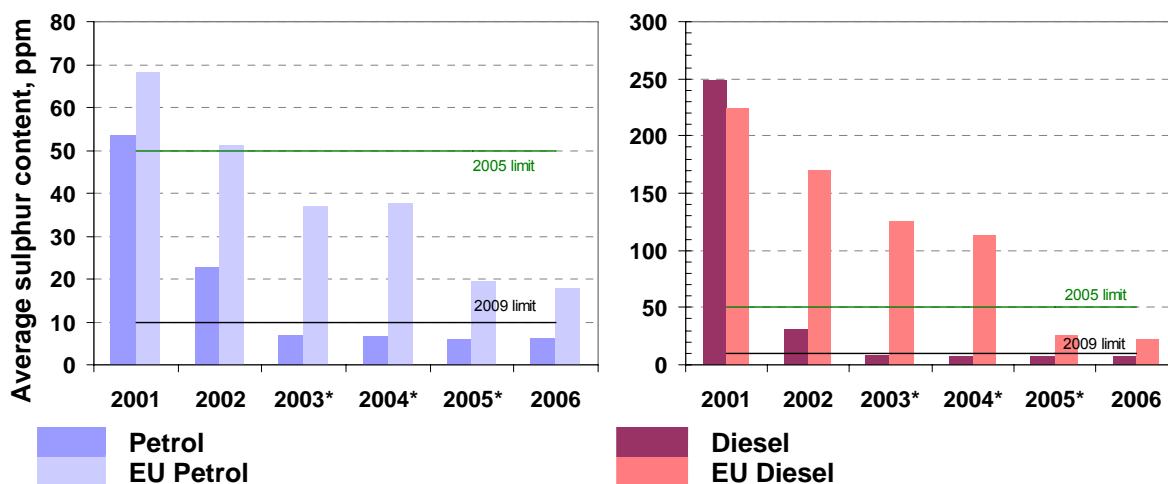


Figure 12.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels have decreased since 2001 with levels remaining at a similar level since full market conversion to <10ppm fuels at the beginning of 2003. The average sulphur content for both petrol and diesel were well below the 2005 limit and EU average and were also below the forthcoming 2009 limit.

**Figure 12.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 12.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The report submission was received almost seven months after the 30 June 2007 deadline.
- Germany has not provided information on whether their national monitoring system is equivalent in statistical confidence with the requirements of EN 14274.
- Summer and winter results should ideally be reported separately.
- Detail on numbers of non-compliances and action taken were not supplied in the report.

## 13 Greece

### 13.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Unleaded	5
8	95<RON<98	<50 ppm	LRP	8
11	RON 98	<50 ppm	Unleaded Super Plus	11
12	RON 98	<10 ppm	Unleaded Sulphur Free	11
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

#### 13.1.1 Sales

Figure 13.1: National fuel sales volume proportions by fuel type (%)

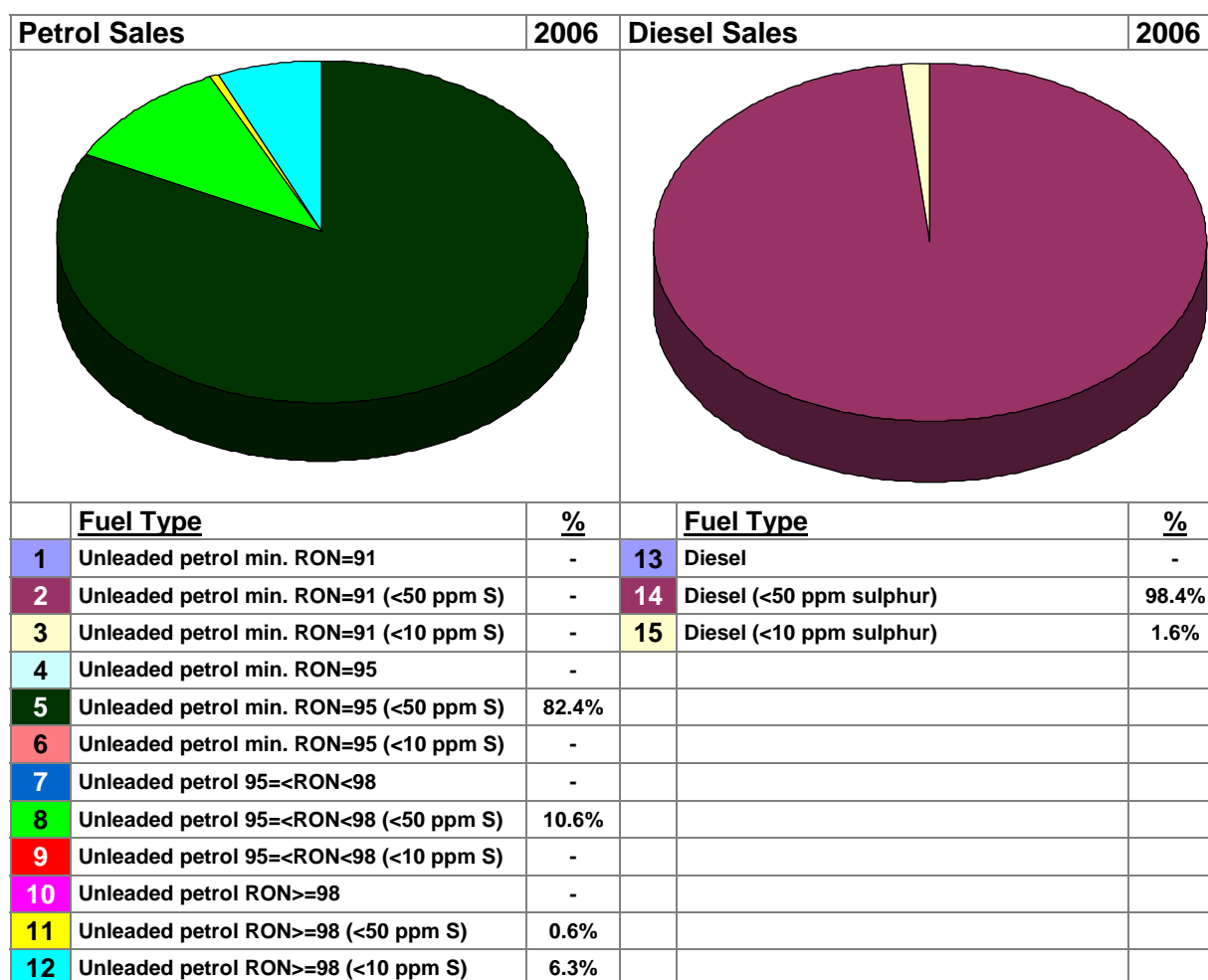


Figure 13.1 above shows that the majority of petrol sold in Greece in 2005 (82.4%) was RON 95 level (93% in 2001). Sulphur-free fuel sales were available for RON 98 petrol and diesel,



though total sales were low (only slightly up on the previous year). Sales of Lead Replacement Petrol (LRP) were reported under Unleaded petrol 95=<RON<98.

### 13.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** The newly introduced legislation concerning sulphur-free fuels obliges the disposal of sulphur-free petrol and diesel from 1st January 2005 “on a balanced geographic basis”, in regions where there are service stations. For the sulphur-free petrol and diesel, no tax reduction has been given. Refineries in Greece now produce all the unleaded petrol of 100 RON sulphur free. Due to the fact that the percentage of refuelling stations that sell this fuel grade of petrol is over 60%, a high availability market is assured. According to the Commission Recommendation of 12th January 2005 (2005/27/ec), there is no need to prove the availability of sulphur free petrol on an equal balanced geographical basis. With regard to sulphur free diesel, only one international petroleum company sells diesel sulphur free in its retail outlets. Of their total 1019 petrol stations only 44 sell sulphur free diesel. Greek refineries are able to produce this fuel grade but there is no demand from the fuel market.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of petrol and diesel has decreased significantly since 2001, see Table 13.1.

**Additional information:** The high average diesel sulphur content in 2002 may simply be an artefact due to the very high content of some of the samples taken due to contamination with heating or marine oil.

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 13.1: Annual trend in average sulphur content in petrol and diesel fuels

EL	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
Petrol	108	72	92	69	38	26	18
Diesel	281	500	290	283	38	34	22

## 13.2 Fuel Quality Monitoring 2006

### 13.2.1 Description of system

**Responsible organisation(s):** The official sampling authorities in Greece are Service of Special Controls (YPPE) of the Ministry of Economics and Finance, Inspection Teams for the Trading and Storage of Fuel (KEDAK) of the Ministry of Development, and Division of control of atmospheric pollution and noises (EARTH) of the Ministry of Environment. Samples are tested at the General State Chemical Laboratory (GSCL).

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model A

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** The samples are taken at the refineries, the storage tanks of the marketing companies. Sampling at petrol stations has not occurred for the year 2006.

**Time/frequency of sampling:** Monthly throughout the year

**Specification of test methods:** According to Directive 98/70/EC.

**Collection of sales data:** Not specified.

**Other details:** The monitoring system has been designed, but it was not apparently fully applied in 2006 again (as in 2004 and 2005). According to the Joint Ministerial Decision No 291/2004, the General Greek Chemical State Laboratory (GCSL) is responsible for controlling the quality of petrol and diesel fuels and reporting on the fuel quality monitoring system. Fuel samples are collected from GCSL chemists at the refineries. This report concerns the results of the samples that are taken at the refineries.

All the mandatory fuel parameters, according to directive 98/70/EC, are measured in the laboratories of the refineries. Each year more than 4000 samples are tested for adulteration and smuggling reasons by the GCSL laboratories. The national fuel quality system that is based on markers and sulphur content detects any adulteration of fuels. However, the applied monitoring system for smuggling reasons is different than that of the standard EN 14274, and as such it has not been counted in the present statistical analysis.

Greece's main goals are the following: In Athens, the department Earth of the Ministry of the Environment is going to undertake exclusively the collection of the samples taken at the petrol stations according to the standard EN 14274. The competent authority of the Ministry of Development is going to be responsible for reporting the sales of fuels. A new legislation concerning the collection of the samples in petrol stations will be in effect.

### 13.2.2 Sampling and reporting

Greece was not compliant with the sampling and reporting requirements in 2006 (as for 2005), as the report concerns the results of the samples that are taken at refineries only, and none from petrol stations as required by EN 14274. The following Table 13.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 13.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	82.4%	41	67	100	Yes	12 of 18	(1)
8	95<RON<98 <50 ppm S	8	10.6%	40	53	100	Yes	12 of 18	(1)
11	RON 98 <50 ppm S	11	0.6%	43	45	8	Yes	12 of 18	(1)
12	RON 98 <10 ppm S	11	6.3%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>124</b>	<b>165</b>	<b>208</b>			
14	Diesel <50 ppm S	14	98.4%	55	65	100	Yes	5 of 5	
15	Diesel <10 ppm S	14	1.6%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>55</b>	<b>65</b>	<b>100</b>			

**Notes:** S = Summer; W = Winter

- (1) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenates test methods. To do this the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear whether this has been carried out. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.
- (2) The FQMS has been designed, but it has not been fully applied for the year 2006 (as for 2004-2005). This report concerns the results of the samples that are taken at refineries.

### 13.2.3 Compliance with fuel quality limit values

#### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 95**

All samples tested were in compliance with limit values.

#### **LRP**

All samples tested were in compliance with limit values.

#### **Petrol RON 98**

All samples tested were in compliance with limit values.

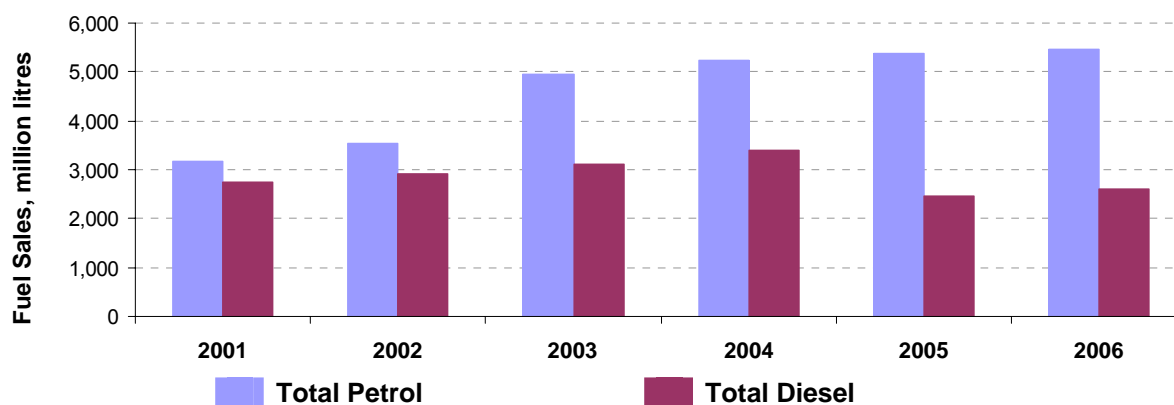
#### **Diesel**

All samples tested were in compliance with limit values.

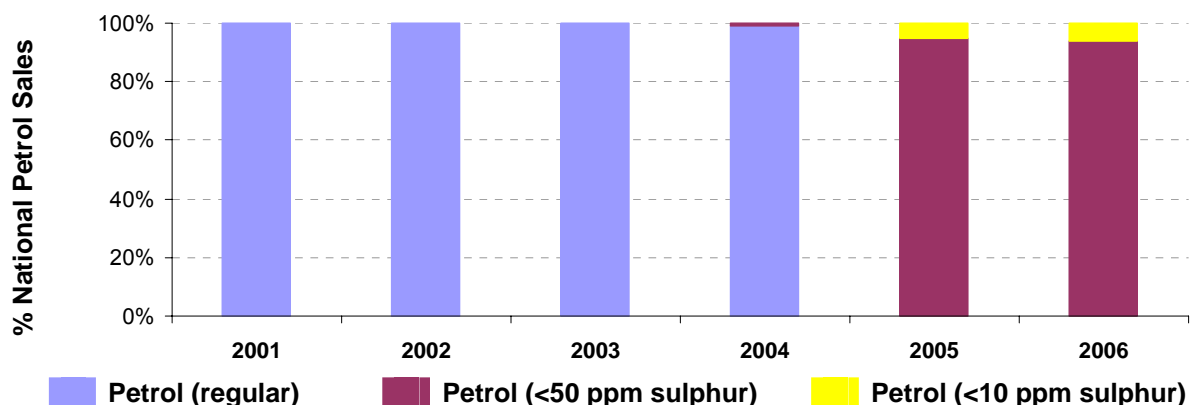
## 13.3 Temporal trends

The following Figure 13.2 to Figure 13.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol increased by 73% between 2001 and 2006 (up 40% between 2002 and 2003), with sales of diesel increasing to 2004 and then decreasing by 23% in 2004-2006 to a total decrease of 4% since 2001. The large petrol increase has been attributed by Greece to sales of Lead Replacement Petrol (LRP – reported under Unleaded petrol 95=<RON<98) being provided for the first time for 2003. LRP comprised almost 14% of total sales in 2005 and would explain the large increase in total sales since 2001 and 2002 (when LRP data was not available). Small quantities of sulphur-free RON 98 petrol (6.3%) and diesel (1.6%) were sold in 2006, up slightly on the previous year.

**Figure 13.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 13.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 13.4: Temporal trends in national sales of low sulphur diesel (%)**

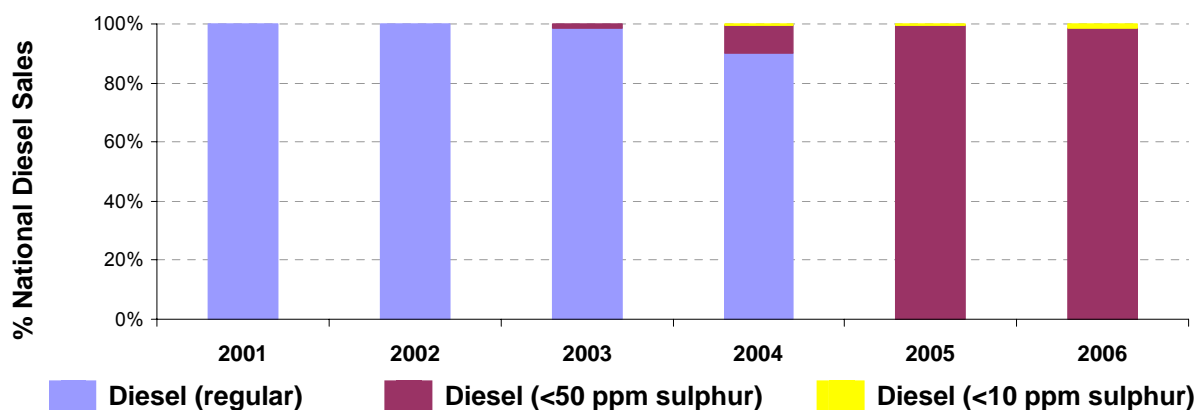
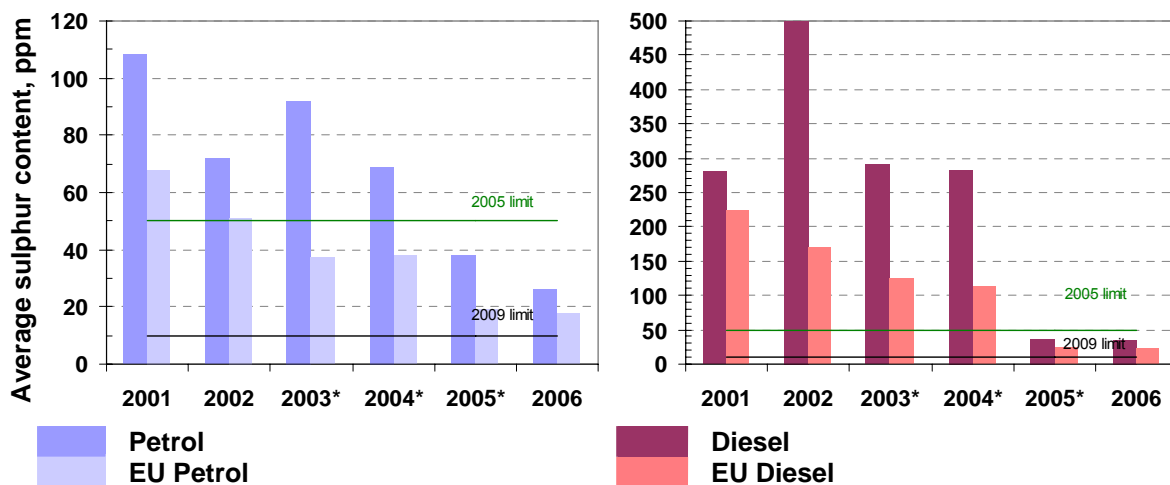


Figure 13.5 shows the trend in average sulphur content of petrol and diesel fuels in Greece compared with the EU average. The average sulphur content of both petrol and diesel fuels have decreased since 2001 with a substantial drop in 2005 as a result of the switch from 'regular' to low-sulphur and sulphur-free fuels. The average sulphur content for petrol and diesel in 2006 were below the 2005 limit but above the EU average and 2009 limit.

**Figure 13.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 13.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The full report submission was received after the 30 June deadline - 8 months late.
- Samples were only taken at refineries, whereas EN 14274 requires samples to be taken at refuelling stations.
- Greece was partially compliant with reporting requirements as it did not provide indications on results for six petrol oxygenate parameters.

# 14 Hungary

## 14.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
6	RON 95	<10 ppm	Premium unleaded, ESZ-95, sulphur-free	6
12	RON 98	<10 ppm	Super unleaded, ESZ-98, sulphur-free	12
15	Diesel	<10 ppm	Diesel fuel, sulphur-free	15

### 14.1.1 Sales

Figure 14.1: National fuel sales volume proportions by fuel type (%)

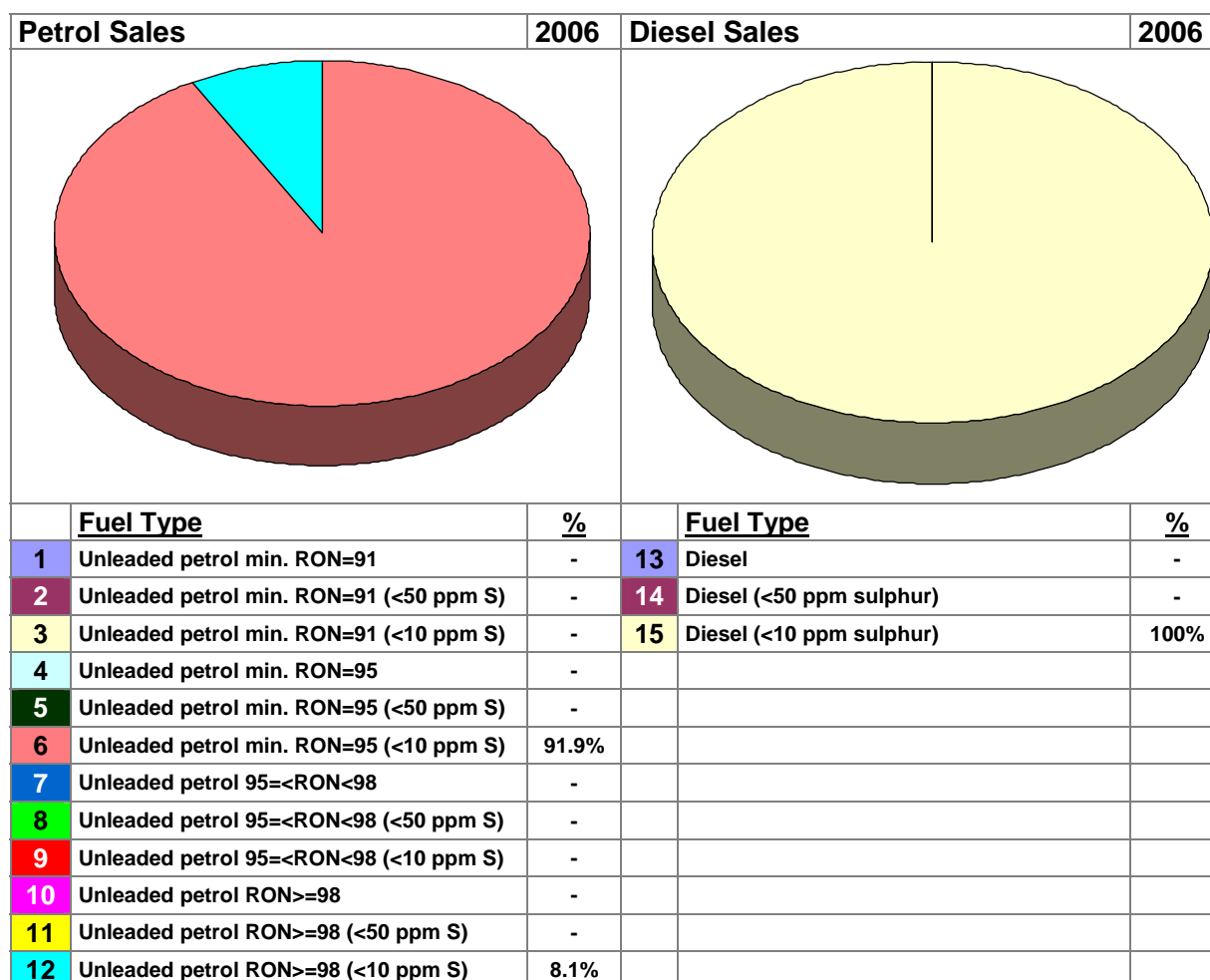


Figure 14.1 shows that in Hungary 2006 saw a complete shift to sulphur-free fuel grades, following the introduction of a small share of sulphur-free fuel grades in 2005 (0.2% petrol

and 2% diesel). The majority of petrol sold comprised RON 95 (91.9%), with the remainder being RON 98 (8.1%), similar to 2005 figures.

### 14.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Only sulphur-free fuels are sold at filling stations.

**Are sulphur-free grades clearly labelled differently / marketed separately?** N/A, all fuels sold were sulphur-free.

Although all fuels sold at filling stations were sulphur-free, only the premium grade fuels (namely Shell V-Po Racing, MOL EVO, OMV Super 100, Shell V-Po Diesel, MOL EVO Diesel, OMV Super Diesel) were labelled as "sulphur free" at refuelling stations.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** N/A, all fuels sold were sulphur-free.

**Average sulphur content of all petrol and diesel sold:** Table 14.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 14.1: Annual trend in average sulphur content in petrol and diesel fuels

HU	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>				13	9	4	18
<b>Diesel</b>				31	11	8	22

## 14.2 Fuel Quality Monitoring 2006

### 14.2.1 Description of system

**Responsible organisation(s):** ÁMEI Petroleum Products Quality Inspection Company

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Samples were taken most months across the winter and summer periods.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** According to data originated from the Energy Centre Hungary Non-Profit Company and Hungarian Petroleum Association (MÁSZ).

**Other details:** According to the changing of excise tax law on fuels at 1 July 2005 (i.e. the tax of sulphur free fuels is lower than low sulphur fuels) all fuel (gasoline and diesel too) marketed in Hungary was sulphur free in 2006. The premium grade fuels (namely Shell V-Po

Racing, MOL EVO, OMV Super 100, Shell V-Po Diesel, MOL EVO Diesel, OMV Super Diesel) were labelled as "sulphur free" at refuelling stations only but every fuel was marketed as sulphur free because the volume of excise tax and the type of fuel (namely sulphur free) was written on bill given in the shops.

### 14.2.2 Sampling and reporting

Hungary was essentially compliant with the sampling and reporting requirements in 2006. However for each of the fuel categories 12 (RON 98 <10 ppm S) and 15 (Diesel <10 ppm S), Hungary presented two separate results sheets for fuel not labelled sulphur-free versus labelled sulphur-free, when in fact they belong to the same category (all sulphur-free) and should be reported as such.

The following Table 14.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 14.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1)</sup>			
6	RON 95 <10 ppm S	6	91.9%	50	50	100	Yes	All of 18	
12	RON 98 <10 ppm S	12	8.1%	10	10	9	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>60</b>	<b>60</b>	<b>109</b>	<b>Yes</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	60	60	100	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>60</b>	<b>60</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

### 14.2.3 Compliance with fuel quality limit values

#### **Non-compliance with Directive 98/70/EC limit values**

*(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).*

#### **RON 95 Petrol**

**Detail:** Four samples were non-compliant with the summer vapour pressure limit of 60 kPa (77.9, 61.9, 62.5 and 60.4). Three samples exceeded the aromatics limit of 35.0 %v/v, with values of 36.4, 35.6 and 35.5.

**Statistical significance:** The tolerance limit for statistical significance for summer vapour pressure is 61.8 kPa, so three of the four samples were outside the tolerance limits and therefore non-compliant; the fourth sample (60.4) was compliant. The tolerance limit for aromatics is 37.2 %v/v and thus all three samples were compliant with the Directive.

*Member State's notes:*

#### **RON 98 Petrol**

**Detail:** Two samples were non-compliant with the summer vapour pressure of 60 kPa (64.5 and 66.6). Three samples exceeded the aromatics limit of 35.0 %v/v, with values of 37.3, 35.8 and 35.3.



**Statistical significance:** The tolerance limit for statistical significance for summer vapour pressure is 61.8 kPa, so both samples were outside the tolerance limits and therefore non-compliant. The sample with 37.3 %v/v aromatics content exceeded the tolerance limit of 37.2 %v/v and was therefore non-compliant with the Directive; the other two samples were compliant.

**Member State's notes:**

**Diesel**

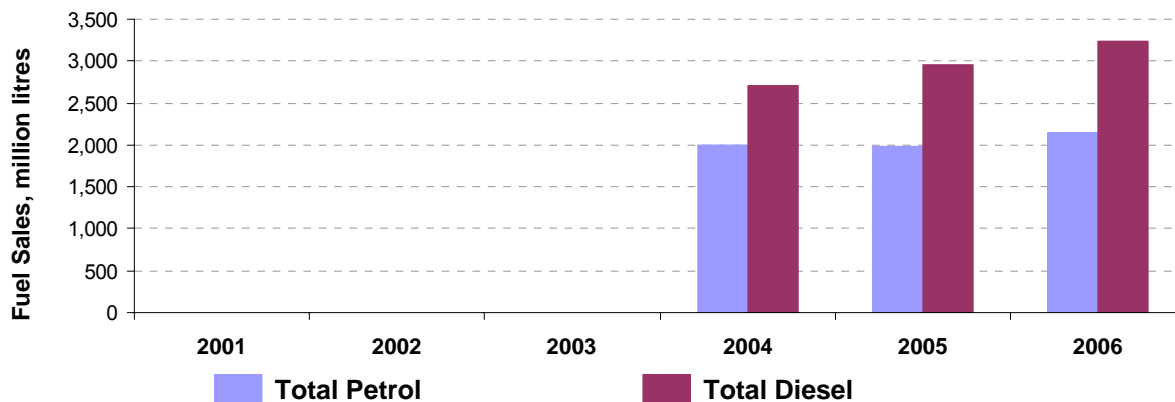
All samples tested were in compliance with limit values.

**Additional information:** In addition to the above non-compliances with the Directive was an exceedance of the <10ppm sulphur content limit for sulphur-free diesel fuels, with a sample value of 23.2 ppm. This fuel was marketed as sulphur-free even though it was not *labelled* as such, and thus received the preferential excise tax for sulphur-free fuels.

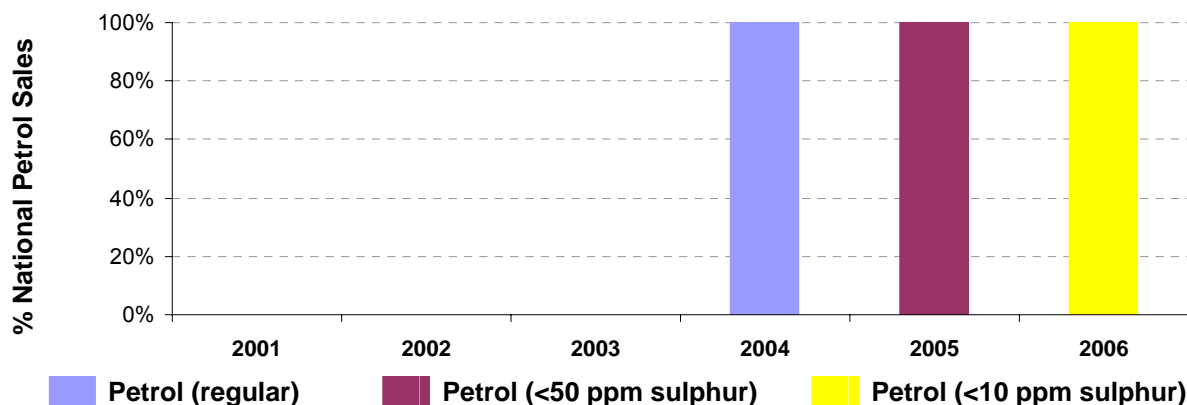
### 14.3 Temporal trends

The following Figure 14.2 to Figure 14.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. In Hungary petrol sales increased from 2004 to 2006 by 8% and diesel sales increased in the same period by 19%.

**Figure 14.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 14.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 14.4: Temporal trends in national sales of low sulphur diesel (%)**

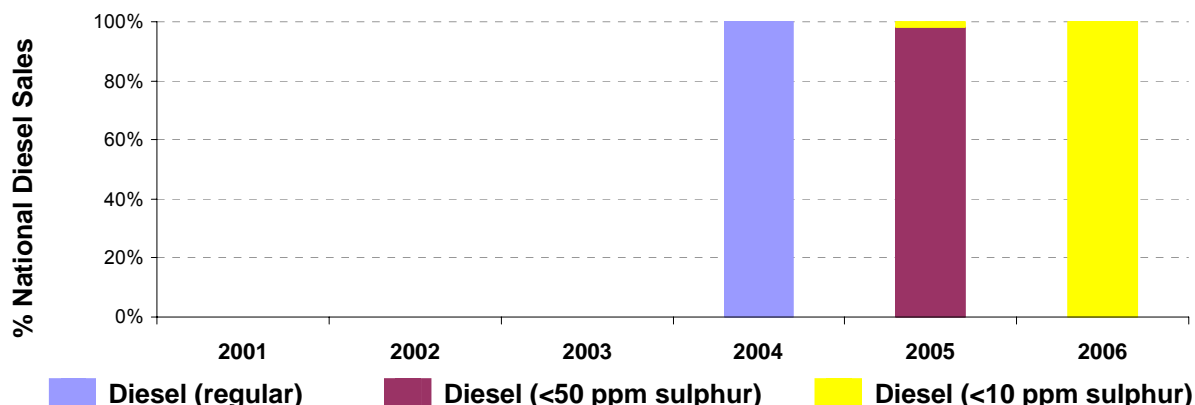
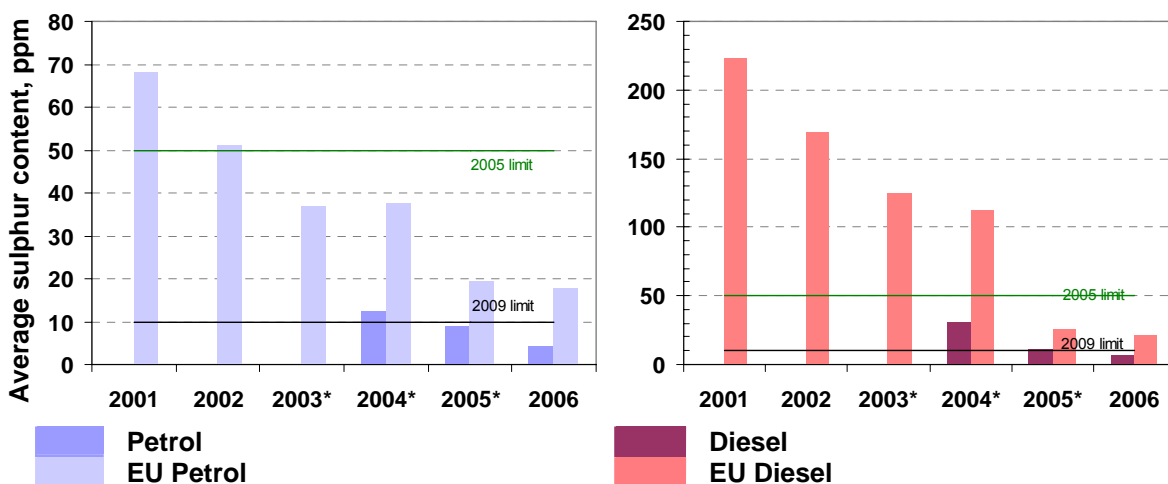


Figure 14.5 shows the trend in average sulphur content of petrol and diesel fuels in Hungary compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) and the EU average. In 2006 the average content was also below the forthcoming 2009 limit for both petrol and diesel.

**Figure 14.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 14.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Hungary reported all fuels sold in Hungary were sulphur-free, but appears to have provided separate analysis results for fuels that were specifically marketed as sulphur-free. For ease of interpretation, one set of sample results per fuel grade should be reported in future reports.
- Hungary has used FQMS Statistical Model C. Given the size of the country and the complexity of the fuel supply it is recommended that it investigates whether Models A or B may be more appropriate.

## 15 Ireland

### 15.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	95 Unleaded	5
6	RON 95	<10 ppm	95 Unleaded	5
14	Diesel	<50 ppm	Diesel fuel	14
15	Diesel	<10 ppm	Diesel fuel	14

#### 15.1.1 Sales

Figure 15.1: National fuel sales volume proportions by fuel type (%)

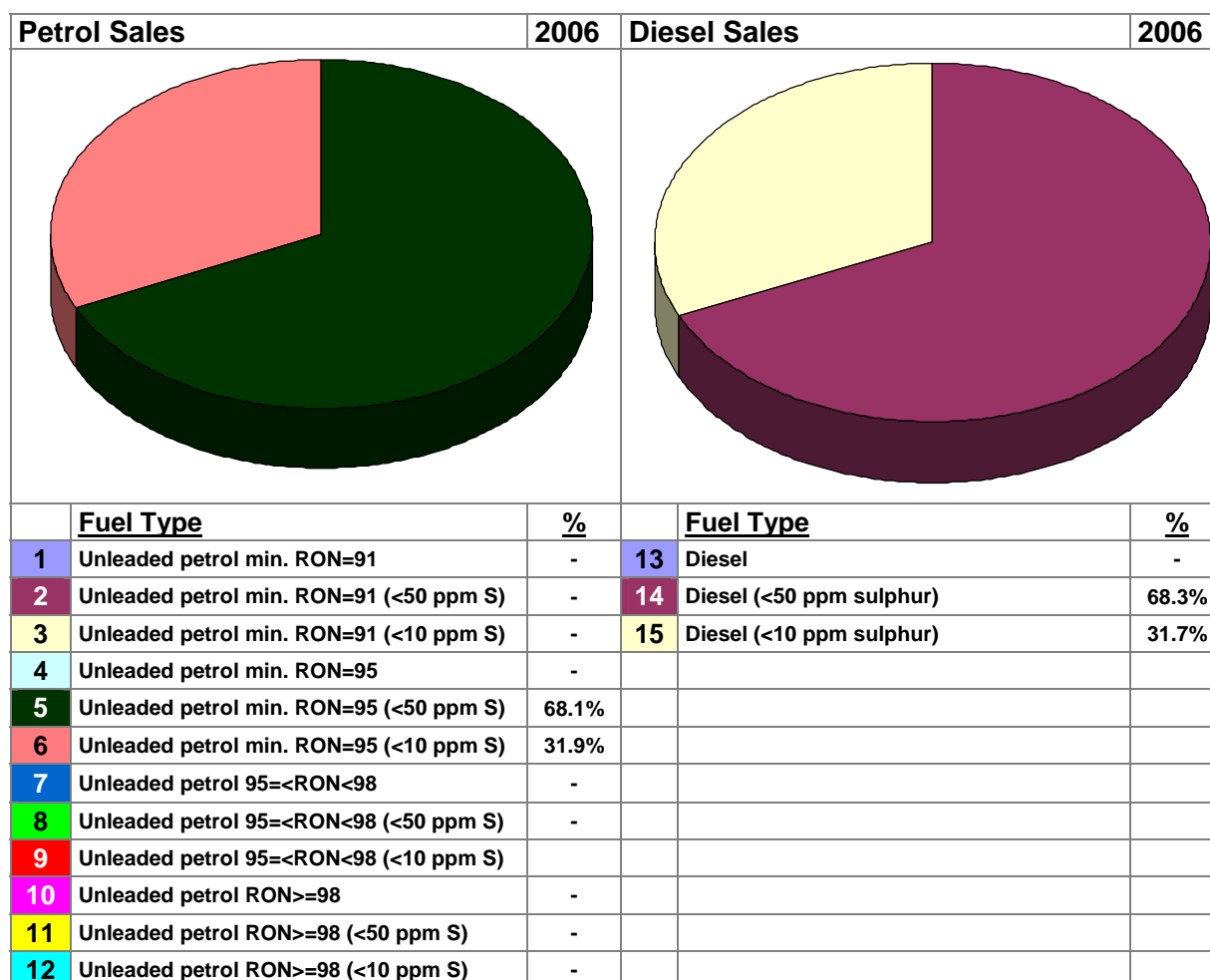


Figure 15.1 shows that 2006 petrol being available mostly at RON 95 grade (68.1%, compared to 71% in 2005 and 73% in 2004), but with almost 32% (29% in 2005) being sulphur free. Sulphur-free diesel was a new grade in 2005 and in 2006 comprised 31.7% of all diesel sales.

## 15.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Petrol produced by the refinery at Whitegate is sulphur free at less than 2 parts per million. The distribution of this material is by road to cover the Munster area and to sea fed terminals at Limerick, Galway and New Ross. In total this accounted for some 31.8% of national sales of petrol in 2006 and, geographically, covers Munster, parts of the midlands, western seaboard and south-eastern region. The eastern seaboard to the north of, and including, the Dublin region is not an area in which this product is marketed nor is it marketed in the north-west of the country. With regard to imports it is difficult to ascertain the tonnages of sulphur-free fuel on the market, as the product is still marketed at 50ppm and not 10ppm. However, since the UK is close to going to 10 ppm diesel it is likely that more of the material being imported is meeting that specification.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001, see Table 15.1.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 15.1: Annual trend in average sulphur content in petrol and diesel fuels

IE	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	83	57	52	43	20	17	18
<b>Diesel</b>	231	49	42	32	27	14	22

## 15.2 Fuel Quality Monitoring 2006

### 15.2.1 Description of system

**Responsible organisation(s):** Department of the Environment Heritage and Local Government

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Ireland has one national oil refinery located at Whitegate, County Cork. All product is transported (by road and by sea) ex tankage which is batched and fully tested by the refinery operator prior to release. A paper trail exists to trace any road tanker or ship's cargo back to a quality certificate for each manufactured batch. Samples of fuel products (petrol and diesel) are taken at the refinery and at the following oil terminals by the Office of the Revenue Commissioners at a frequency of once per quarter (Dublin, Cork, Galway, Limerick, Waterford, New Ross and Rosslare) and after each top-up (i.e. new receipt) at the national oil reserves located at Bantry. Samples are analysed by the State

Laboratory. Retail sites, road tankers, commercial vehicles etc. are sampled by the Office of the Revenue Commissioners to counter the evasion of excise duty.

In addition, individual oil companies test their products at home refinery and on receipt at terminals. A certificate of quality is available for inspection for each cargo/batch and product is tested again after discharge at terminals. Further quality spot checks are carried out at selected retail sites (between 2 – 4 times per annum, company dependant) to give quality traceability from refinery to end user.

In addition, the oil companies association (Irish Petroleum Industry Association) also arranged for its own independent sampling and testing of motor and gas oil. In 2006, such sampling and testing of motor and gas oil was undertaken for 23 forecourts and the Whitegate refinery in July and August 2006, and 23 forecourts and the Whitegate refinery in November 2006, the results of which are incorporated in this report.

**Time/frequency of sampling:** Monthly throughout the year, except December.

**Specification of test methods:** In accordance with the Directive.

**Collection of sales data:** Sourced from the Department of Communications Marine and National Resources

**Other details:**

## 15.2.2 Sampling and reporting

Ireland was mostly compliant with the sampling and reporting requirements in 2006, although it did not perform the required number of samples in the summer period. The following Table 15.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 15.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
5	RON 95 <50 ppm S	5	68.1%	41	77	100	Yes	All of 18	
6	RON 95 <10 ppm S	5	31.9%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>41</b>	<b>77</b>	<b>100</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	68.3%	36	59	100	Yes	All of 5	
15	Diesel <10 ppm S	14	31.7%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>36</b>	<b>59</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 15.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 95**

*Detail:*

One sample was non-compliant with the RON limit value of 95 (94.2), three were below the MON limit value of 85 (with 84.4, 83.5, 84.4), one sample with the summer vapour pressure limit value of 70 (with 73.5), one sample with the olefins limit value of 18 (with 21.4), one sample with the aromatics limit value of 35 (with 39),

and one sample with the sulphur limit value of 50ppm (56.2 ppm).

*Statistical significance:* The tolerance limits for these samples were outside the tolerance limits and therefore non-compliant.

*Member State's notes:* *RON:* Department wrote to company in June 2007.

*MON:* Department has written to the three companies involved in March, July and November 2006. In one case water contamination was suspected, and in the other two cases certificates of quality were produced showing compliance with standard.

*SVP:* Department wrote to company in November 2006. Company disputed test results, pointing to the time-lag between when the sample was taken, August 2006, when it was received in the lab (September 2006) and when it was finally tested (November 2006).

*Olefins:* Department wrote to company in July 2006 seeking an explanation. Company sent in the certificate of quality confirming compliance with standard.

*Aromatics:* Department has sought an explanation from the company.

*Sulphur:* Department wrote to company in June 2007.

**Diesel**

None.

### 15.3 Temporal trends

The following Figure 15.2 to Figure 15.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2006, petrol sales increased by 12% and diesel sales increased by 31%. In 2006 there was also a small (4%) increase in the sales of sulphur free petrol compared to 2005 while sulphur-free diesel sales increased by about 3%.

**Figure 15.2: Temporal trends in national sales of petrol and diesel (million litres)**

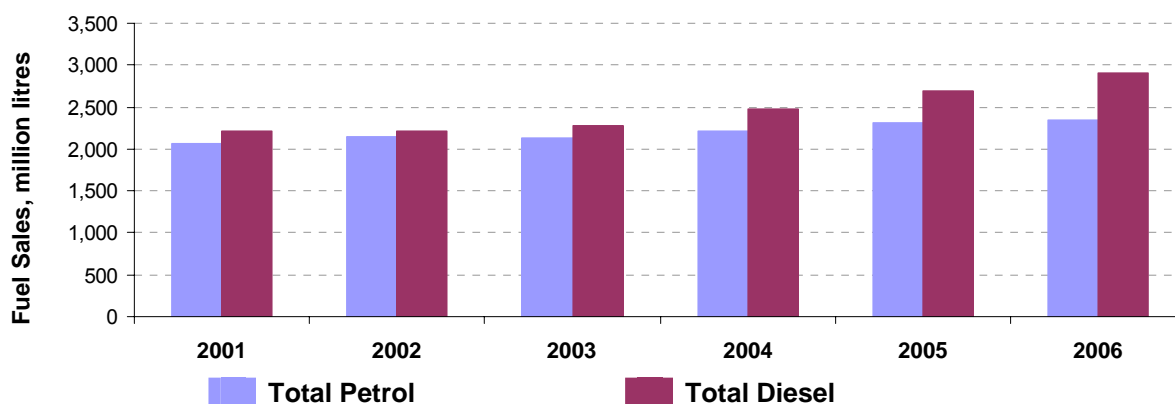


Figure 15.3: Temporal trends in national sales of low sulphur petrol (%)

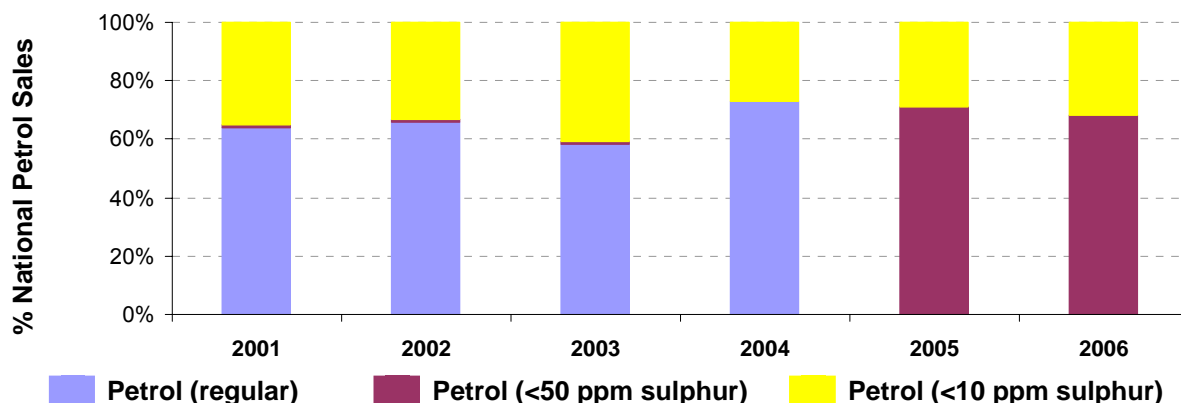


Figure 15.4: Temporal trends in national sales of low sulphur diesel (%)

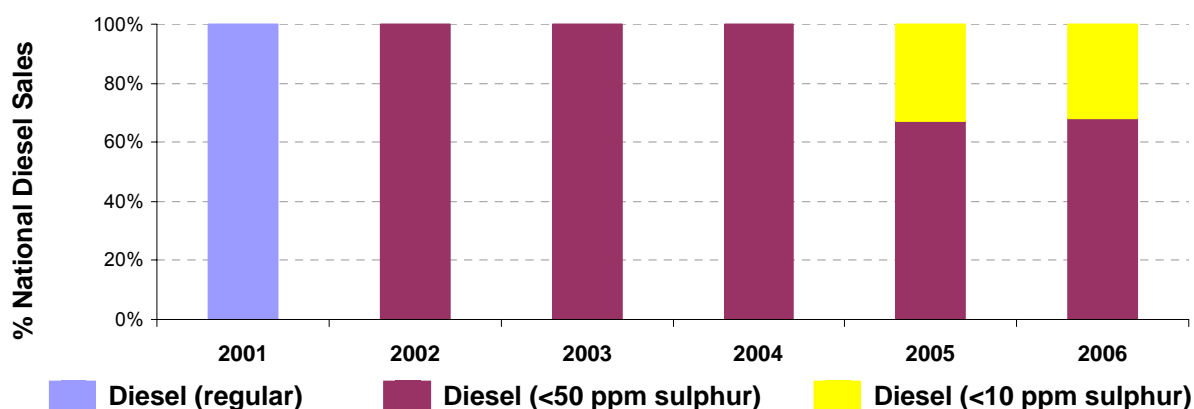
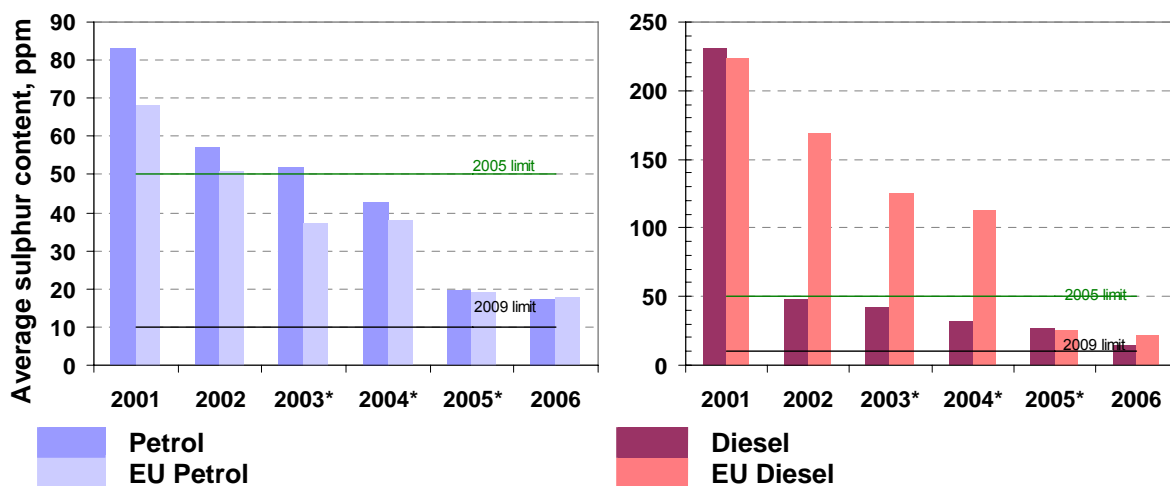


Figure 15.5 shows the trend in average sulphur content of petrol and diesel fuels in Ireland compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but slightly below the EU average for diesel.

Figure 15.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 15.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The report submission was received after the 30 June deadline – up to 1 month late.
- Sampling was conducted at refineries, depots and refuelling stations. Ireland should indicate whether the specific number of samples taken at refuelling stations matches the requirements of EN14274.
- In order to fully comply with the sampling requirements of FQMS Statistical Model C a minimum of 50 samples should be taken in each summer and winter period.
- Ireland has used FQMS Statistical Model C. Given the size of the country it is recommended that it investigates whether Models A or B may be more appropriate. Ireland have indicated preliminary assessments concluded that subdividing Ireland into sub-regions would not be particularly beneficial as the size of Ireland and relatively small number of fuel terminals means that a lot of product is crossing regional boundaries after leaving warehouse/refinery before retail sale. However, the model is set-up on the basis of retail station sampling rather than terminal locations so this may warrant further consideration.



## 16 Italy

### 16.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade ID	Reporting Category
5	RON 95	<50 ppm	Unleaded Petrol minimum RON = 95 ( $\leq$ 50 ppm sulphur)	5
6	RON 95	<10 ppm	Unleaded Petrol minimum RON = 95 & $\leq$ 10 ppm Sulphur	6
14	Diesel	<50 ppm	Diesel fuel ( $\leq$ 50 ppm sulphur)	14
15	Diesel	<10 ppm	Diesel fuel ( $\leq$ 10 ppm sulphur)	15

#### 16.1.1 Sales

Figure 16.1: National fuel sales volume proportions by fuel type (%)

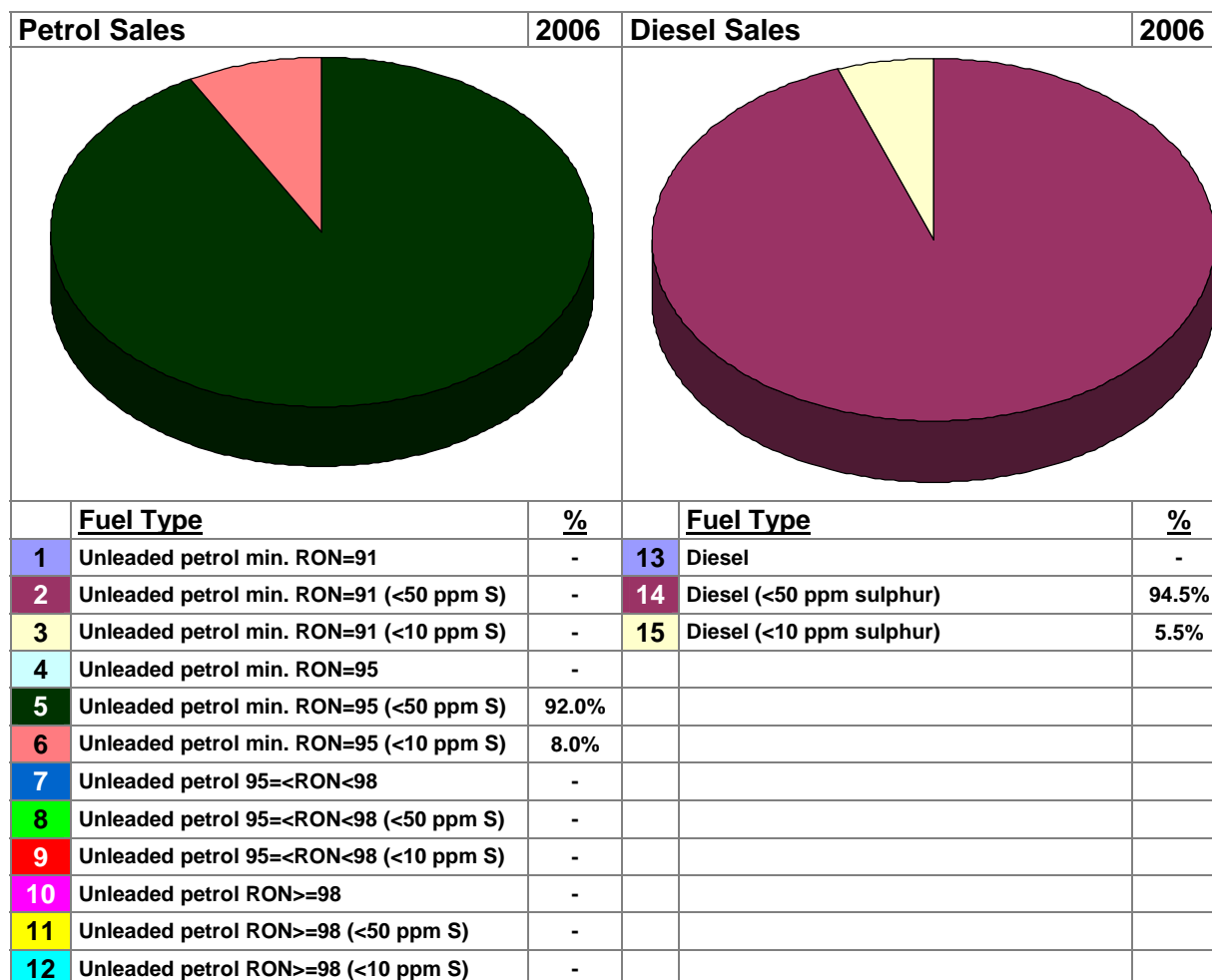


Figure 16.1 shows that all petrol sales were of RON 95 grade, with 92.0% low sulphur and 8% sulphur free (5.6% in 2005). Nearly 95% of diesel fuel sold was low sulphur with the remainder sulphur free.

“A limited quantity of petrol with minimum RON = 98 was sold in 2006 for market in trial, even if this does not correspond to any specific petrol grade defined at national level.”

### 16.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Italy has adopted for 2006 the following minimum criteria to ensure an appropriate geographical availability of sulphur free fuels:

National level

- 10% of all national refuelling stations are to supply sulphur free petrol;
- 10% of all national refuelling stations are to supply sulphur free diesel;
- 15% of all national refuelling stations on motorways are to supply sulphur free petrol;
- 15% of all national refuelling stations on motorways are to supply sulphur free diesel;
- 300 km maximum distance between refuelling stations with sulphur free petrol on motorway;
- 300 km maximum distance between refuelling stations with sulphur free diesel on motorway.

NUTS 3 regional areas

- 2% of all regional refuelling stations are to supply sulphur free petrol;
- 2% of all regional refuelling stations are to supply sulphur free diesel.

In order to ensure compliance with the minimum criteria, the owners of refuelling stations submitted to Ministry for the Environment and Territory a plan in which refuelling stations with sulphur free fuels are located (separate for petrol and diesel fuel). On the whole, these plans have met the above-mentioned criteria. Italy also established the penalties applicable to breaches of the provisions contained in the plans.

Italy presented tables for 2006 utilising a combination of options A, B and D of the Commission Recommendation and demonstrating the wide geographical availability of sulphur-free fuels.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Sulphur-free fuels were marked at refuelling stations and were marketed separately.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 16.1.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

**Table 16.1: Annual trend in average sulphur content in petrol and diesel fuels**

IT	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	61	51	53	53	25	20	18
<b>Diesel</b>	273	246	238	216	35	32	22

## 16.2 Fuel Quality Monitoring 2006

### 16.2.1 Description of system

**Responsible organisation(s):** APAT (National Environmental Protection Agency)

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model A, with five macro regions.

**Country Size:** Large (more than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Monthly throughout the year.

**Specification of test methods:** In accordance with the Directive.

**Collection of sales data:** Sales data are collected by Ministero delle Attività Produttive (Ministry of Industry) through an electronic questionnaire compiled by oil companies.

**Other details:** Italy established a fuel quality monitoring system, in accordance with the requirements of the European standard EN 14274:2003, by decree 3 February 2005. The monitoring system (sampling and measurements) was carried out by independent supervisory bodies on behalf of the main oil companies. The test methods required for fuel quality monitoring were performed by laboratories that regularly participate in one national inter-laboratory proficiency testing scheme and that are accredited according to EN ISO 17025 or certified according to ISO 9000 standards. The proficiency testing scheme include all test methods to be carried out by laboratory for the FQMS. The distribution of samples throughout the national territory was: 33% North-West, 12% North-East, 26% Centre, 15% South and 15% Islands. Compared to the total samples taken, the percentages of samples of sulphur free petrol and diesel fuel were 19 % and 26%, respectively.

### 16.2.2 Sampling and reporting

Italy was mostly compliant with the sampling and reporting requirements in 2006, however have not in some cases taken sufficient winter period samples (100) to fully comply with EN 14274. The following Table 16.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 16.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	92.0%	189	41	200	Yes	17 of 18	(1)
6	RON 95 <10 ppm S	6	8.0%	38	15	17	Yes	17 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>227</b>	<b>56</b>	<b>217</b>	<b>Yes</b>	<b>17 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	94.5%	204	79	200	Yes	5 of 5	
15	Diesel <10 ppm S	15	5.5%	73	24	11	Yes	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>277</b>	<b>103</b>	<b>211</b>	<b>Yes</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. Analysis for lead was not provided for <10ppm petrol fuel.

### 16.2.3 Compliance with fuel quality limit values

#### **Non-compliance with Directive 98/70/EC limit values**

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

##### **Petrol RON 95 low sulphur (<50ppm)**

*Detail:* Two samples were non-compliant with the RON limit value of 95 (94.1, 94.9) and MON limit value of 85 (83.9, 84.8). A further two samples exceeded the summer vapour pressure limit of 60 kPa (both 62.4).

*Statistical significance:* The tolerance limits for the test methods are 94.6 for RON, 84.5 for MON and 61.8 for summer vapour pressure. Therefore the sample with RON of 94.1 and MON of 83.9 was non-compliant with the Directive, as were the samples exceeding the vapour pressure limit. The other samples with RON of 94.9 and MON of 84.8 were within the zone of tolerance and were therefore compliant with the Directive.

*Member State's notes:* In order to ensure the compliance with the directive 2003/17/EC, Italy determined the penalties applicable to producers, importers and distributors of fuels that do not comply to the limits reported in the directive 2003/17/EC.

Furthermore, Italy established a monitoring system carried out by a competent national authority in the production and importing sites.

The results of these actions were positive: compared to 2005, the percentage of samples of fuel noncompliant with the Directive decreased.

##### **Petrol RON 95 sulphur free (<10ppm)**

*Detail:* One or more samples were non-compliant with the RON limit value of 95 (minimum 94.8), aromatics limit of 35%v/v (35.3), and sulphur limit of 10ppm (11.5).

One sample exceeded the summer vapour pressure limit of 60 kPa (64.1).

*Statistical significance:* The sample that exceeded the summer vapour pressure limit value also exceeded the tolerance limit of 61.8kPa, and was therefore non-compliant with the Directive. The other samples were within of the zone of tolerance for the test methods (94.6 for RON, 37.2 for aromatics and 11.8 for sulphur content).

*Member State's notes:* As above.

##### **Low sulphur diesel (<50ppm)**

*Detail:* In two samples, the cetane numbers of 49.9 and 49.5 were below the minimum limit value of 51. Several samples exceeded the limit values for distillation 95%-point (360°C) and sulphur content (50 ppm) with maximum values of 365.5 and 52.9 respectively.

*Statistical significance:* The tolerance limits for cetane (48.5), distillation (365.9°C) and sulphur content (54.7 ppm) were not exceeded and therefore all

samples were in compliance with the Directive.

Member State's notes:

**Sulphur free diesel (<10ppm)**

*Detail:* In two samples, the cetane numbers of 50.3 and 50 were below the minimum limit value of 51. Several samples exceeded the limit values for distillation 95%-point (360°C) and sulphur content (10 ppm) with maximum values of 363.8 and 11.2 respectively.

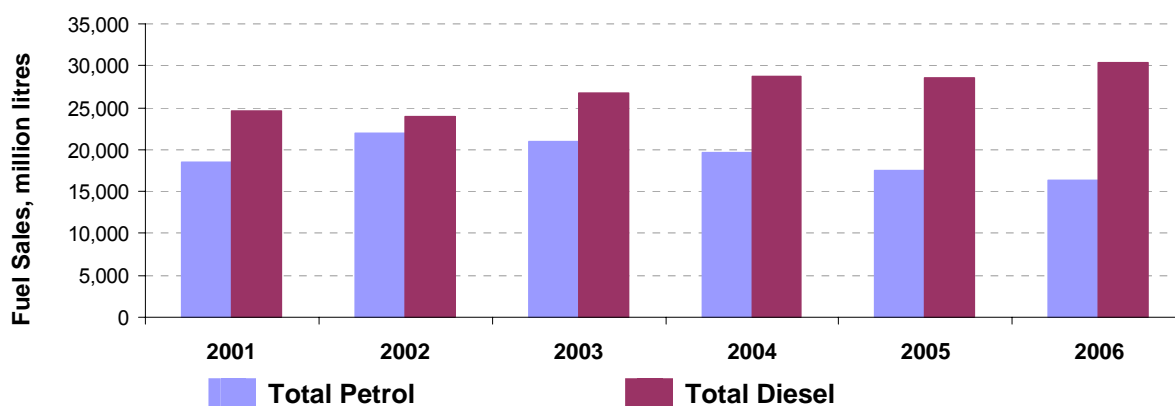
*Statistical significance:* The tolerance limits for cetane (48.5), distillation (365.9°C) and sulphur content (11.8 ppm) were not exceeded and therefore all samples were in compliance with the Directive.

Member State's notes:

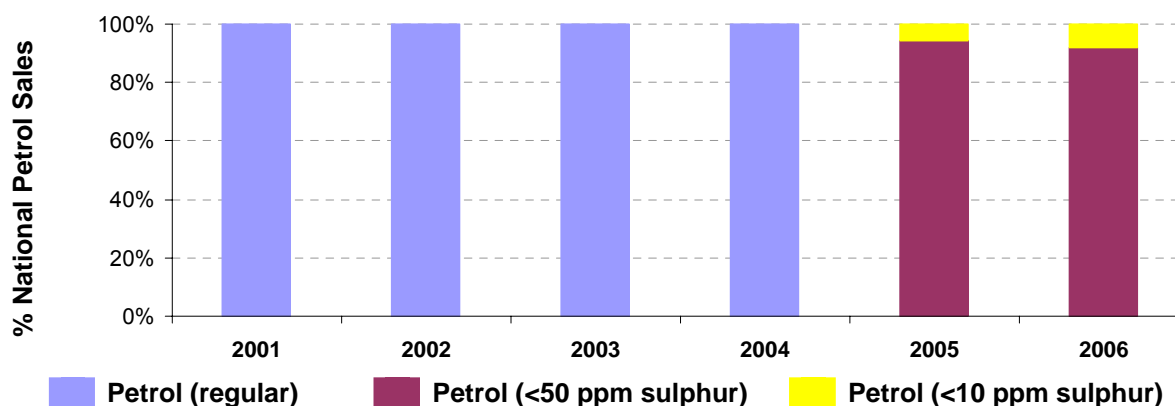
### 16.3 Temporal trends

The following Figure 16.2 to Figure 16.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol decreased by 11% between 2001 and 2005, while sales of diesel increased by 24%. There was a complete switch from 'regular' to low sulphur and sulphur free fuels at the beginning of 2005.

**Figure 16.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 16.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 16.4: Temporal trends in national sales of low sulphur diesel (%)**

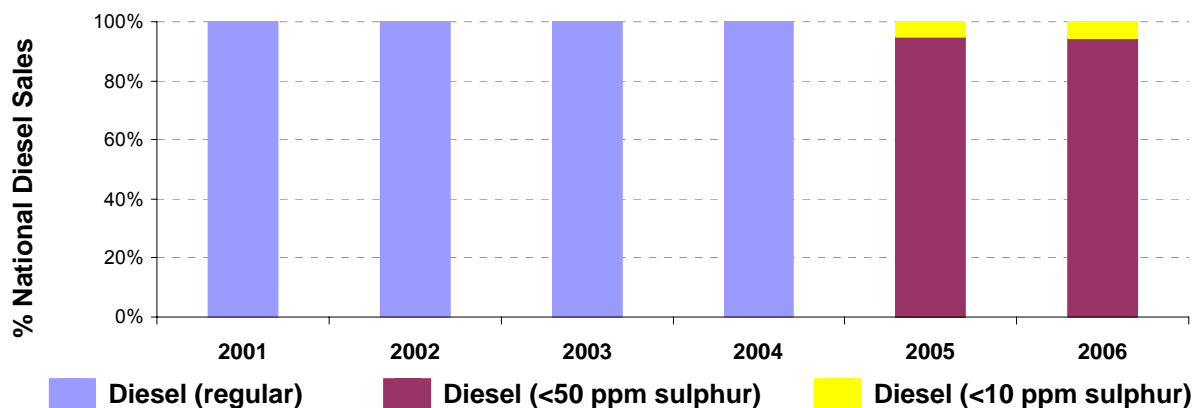
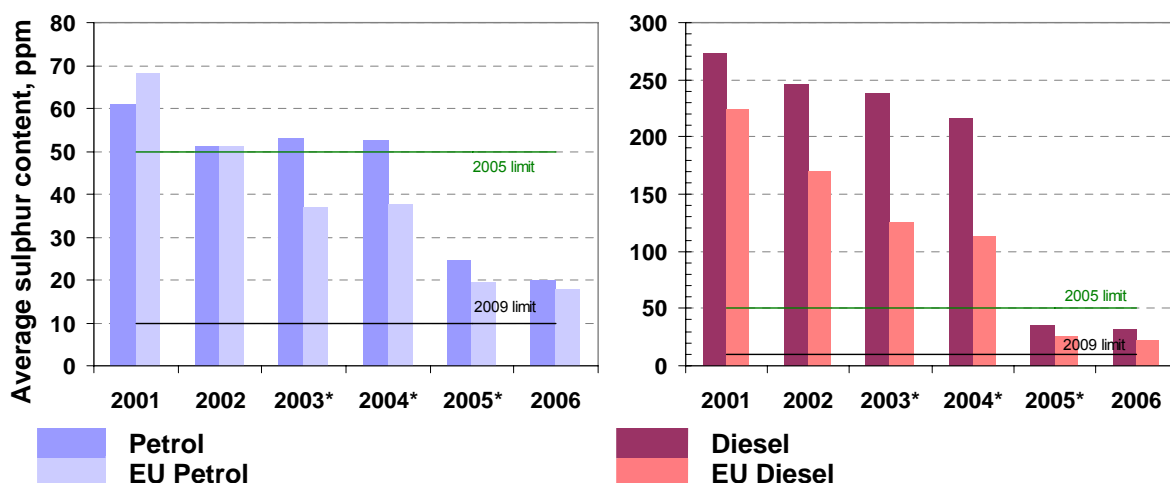


Figure 16.5 shows the trend in average sulphur content of petrol and diesel fuels in Italy compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average.

**Figure 16.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 16.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Italy has taken a sufficient number of samples in total for the year, however it has not met the minimum of 100 samples for the winter period separately for <50 ppm petrol and diesel.

## 17 Latvia

### 17.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	Petrol 92	2
5	RON 95	<50 ppm	Petrol 95	5
6	RON 95	<10 ppm	Petrol 95	5
11	RON 98	<50 ppm	Petrol 98	11
12	RON 98	<10 ppm	Petrol 98	11
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

#### 17.1.1 Sales

Figure 17.1: National fuel sales volume proportions by fuel type (%)

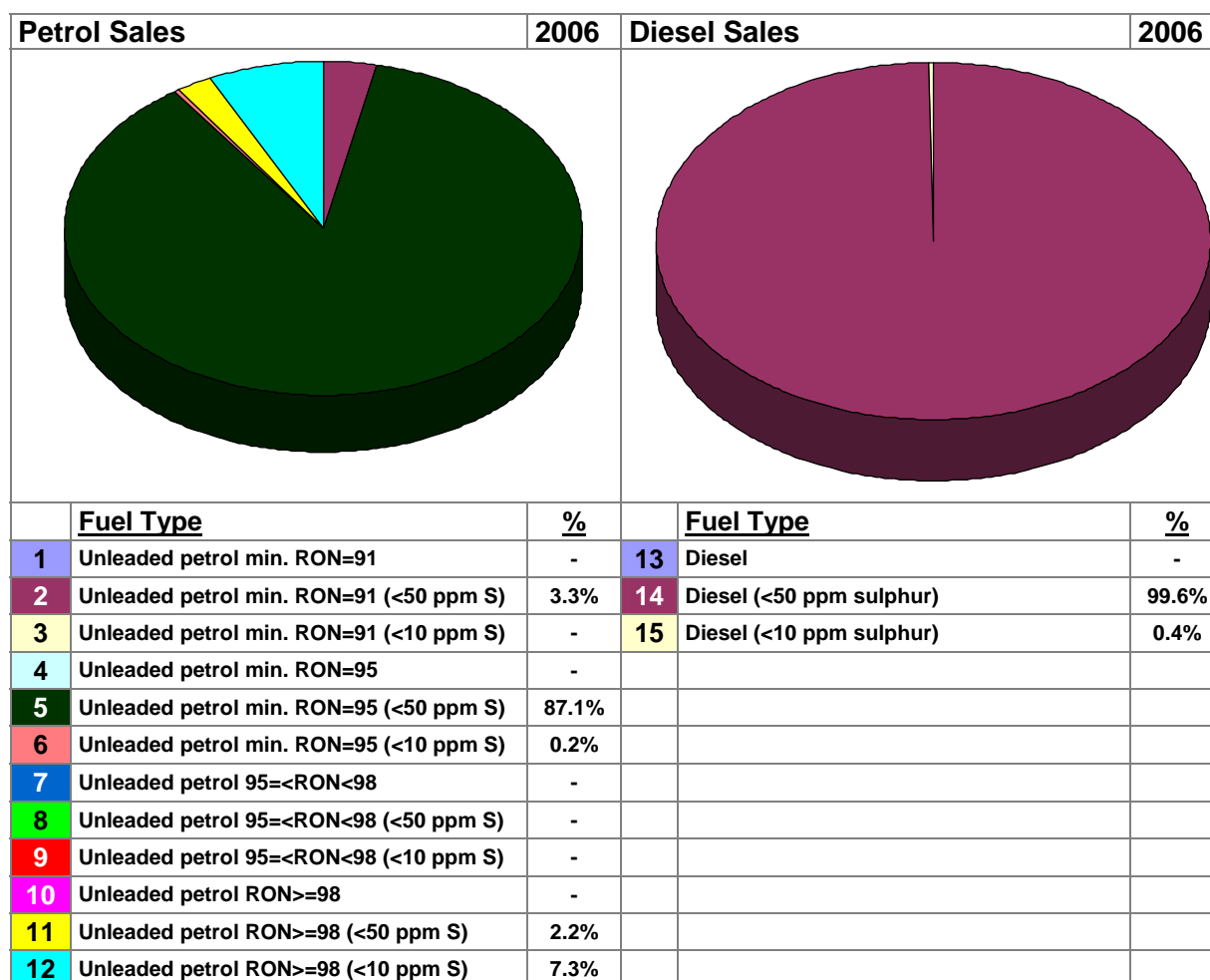


Figure 17.1 shows that in 2005 there were low sulphur and sulphur-free fuel grades available. RON 95 petrol comprised the vast majority of sales (87.3%, compared to 83.7% in 2004), with the remainder being RON 91 (5.1%) and RON 98 (11.4%). Sulphur-free diesel was for the first time available in 2005 with minimal sales (0.01%), which remained the same in 2006 (0.04%), with the majority being low (<50 ppm) sulphur diesel (93.6%). It is worth noting that diesel with a sulphur content <350ppm was also sold in Latvia in 2006, but this is not included in the above statistics as it was used for non-road purposes in the farming, forestry and fishing sectors, and hence does not fall within the scope of Directive 98/70/EC.

### 17.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Undertakings that own at least 30 filling stations shall ensure petrol and diesel fuel complying with the sulphur-free fuels is available in at least one filling station of these undertakings which are located near any of the main State roads for the service of transport flow.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No

**Average sulphur content of all petrol and diesel sold:** Table 17.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 17.1: Annual trend in average sulphur content in petrol and diesel fuels

LV	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>				66	25	11	18
<b>Diesel</b>				329	21	16	22

## 17.2 Fuel Quality Monitoring 2006

### 17.2.1 Description of system

**Responsible organisation(s):** Ministry of Economics, State Revenue Service.

**Format of Fuel Quality Monitoring System (FQMS):** National System.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Refuelling stations, terminals and refineries.

**Time/frequency of sampling:** Monthly throughout the year.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** In accordance with law and regulations State Revenue Service (SRS) is responsible for monitoring of fuel market.



**Other details:** In order to ensure effective monitoring of fuel quality SRS began to use mobile express laboratories of fuel quality testing in February 2004. With these express laboratories the fuel quality testing is made in all stages of fuel circulation, covering as numerous licensed entrepreneurs as possible. As only licensed entrepreneurs are allowed to trade with fuel, approximately 1500 samples are tested each year. The use of express laboratories has reduced the time spent between the moment of sample taking and receiving the conclusion of conformity assessment. This is important both in terms of consumer protection (so no inadequate fuel would be in circulation) and interests of entrepreneurs themselves (so any distraction of entrepreneurs' activity would be as short as possible).

## 17.2.2 Sampling and reporting

Latvia was essentially compliant with the sampling and reporting requirements in 2006, however it has not provided information on whether its national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 17.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 17.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported Under Category	% Sales	Samples			Separate S&W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	3.3%	72	201	-	Yes	All of 18	
5	RON 95 <50 ppm S	5	87.1%	218	512	-	Yes	All of 18	
6	RON 95 <10 ppm S	5	0.2%	0	0	-			
11	RON 98 <50 ppm S	11	2.2%	113	266	-	Yes	All of 18	
12	RON 98 <10 ppm S	11	7.3%	0	0	-			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>403</b>	<b>979</b>	-	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	99.6%	300	850	-	Yes	All of 5	
15	Diesel <10 ppm S	14	0.4%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>300</b>	<b>850</b>	-	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 17.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 91 Petrol**

All samples tested were in compliance with Directive limit values.

#### **RON 95 Petrol**

**Detail:** Several samples were beyond the limit values for MON, DVPE, aromatics, oxygen content and sulphur.

**Statistical significance:** One sample exceeded the tolerance limit for statistical significance for oxygen content (2.7%*m/m*), with 3.2%*m/m*. This sample was therefore non-compliant with the Directive.

**Member State's notes:** -

**RON 98 Petrol**

*Detail:* Two samples were beyond the limit values for DVPE (70kPa) and aromatics (35%v/v), with maximum values of 73.1kPa and 40.7%v/v respectively.

*Statistical significance:* The samples exceeded the tolerance limits for statistical significance for DVPE (71.9) and aromatics (36.0). These samples were therefore non-compliant with the Directive.

*Member State's notes:* -

**Diesel**

*Detail:* Cetane number and sulphur content limit values (of min. 51, max. 50 ppm) were not complied with by one and two samples respectively, with extremes of 47.9 and 83.5ppm for each parameter.

*Statistical significance:* The tolerance limits for statistical significance (48.5 for Cetane, 54.7ppm for sulphur) were exceeded. These samples were therefore non-compliant with the Directive.

*Member State's notes:* -

**17.3 Temporal trends**

The following Figure 17.2 to Figure 17.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Both petrol and diesel sales increased from 2004 to 2006 by 62.5% and 73.4% respectively.

**Figure 17.2: Temporal trends in national sales of petrol and diesel (million litres)**

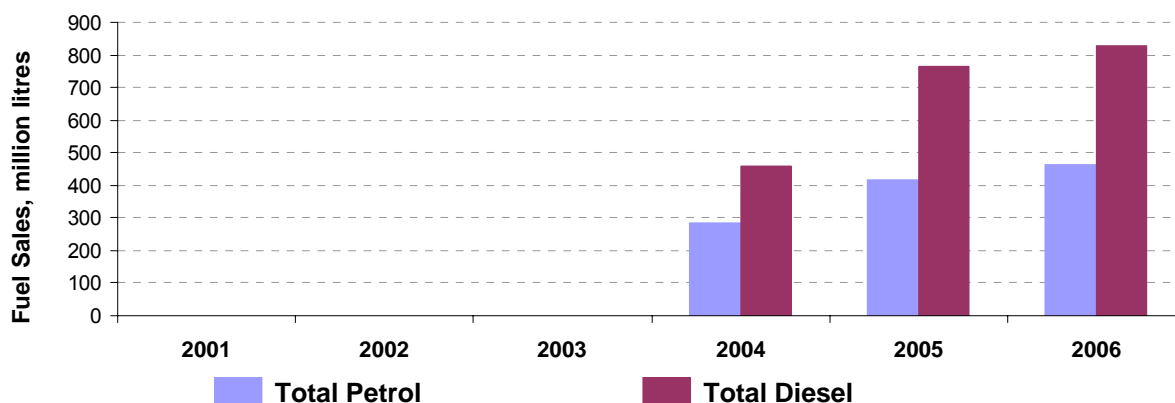


Figure 17.3: Temporal trends in national sales of low sulphur petrol (%)

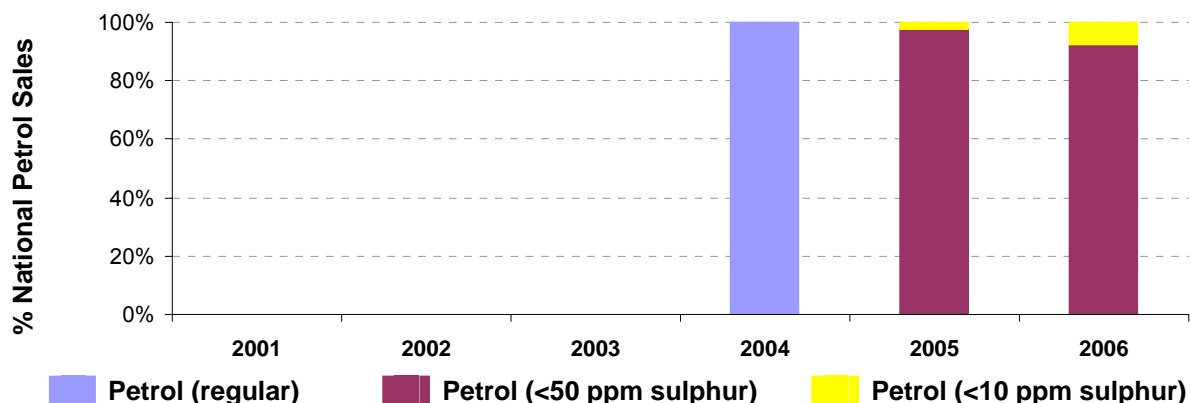


Figure 17.4: Temporal trends in national sales of low sulphur diesel (%)

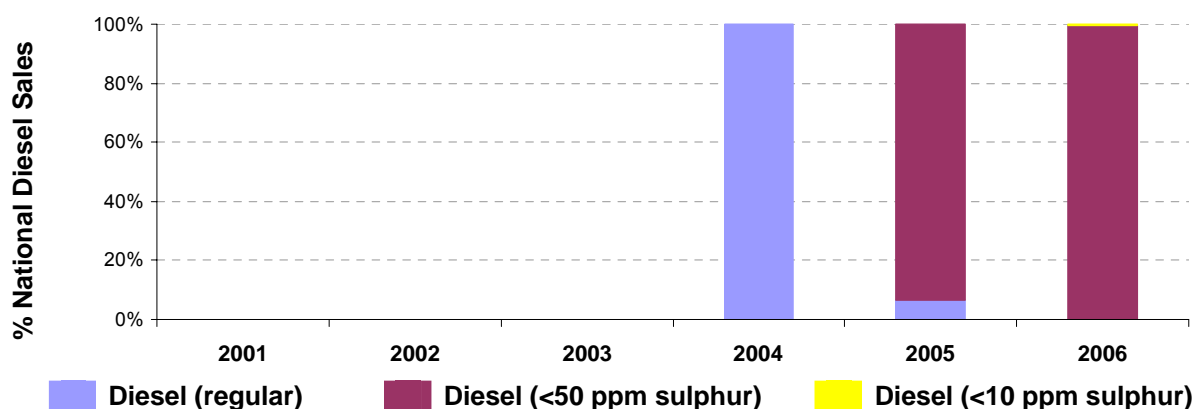
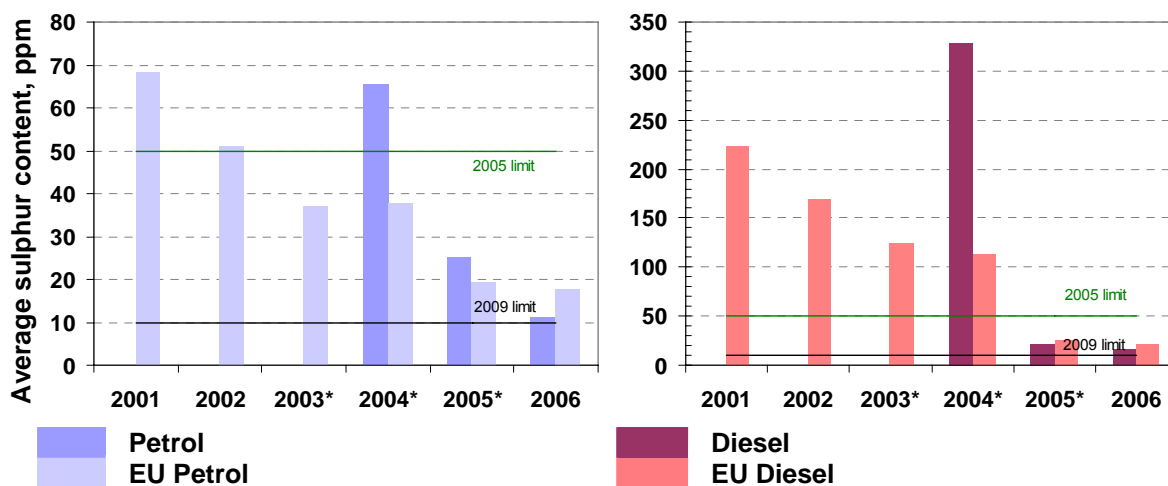


Figure 17.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average for petrol.

Figure 17.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 17.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Latvia was almost 1 month late in submitting its report
- Latvia has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard. A large number of samples were taken, but these were from refuelling stations, terminals and refineries and Latvia should therefore specify how many samples were taken from refuelling stations.
- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle.

## 18 Lithuania

### 18.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	A-92 (RON 92)	2
5	RON 95	<50 ppm	A-95 (RON 95)	5
6	RON 95	<10 ppm	A-95 (RON 95)	6
12	RON 98	<10 ppm	A-98 (RON 98)	12
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	15

#### 18.1.1 Sales

Figure 18.1: National fuel sales volume proportions by fuel type (%)

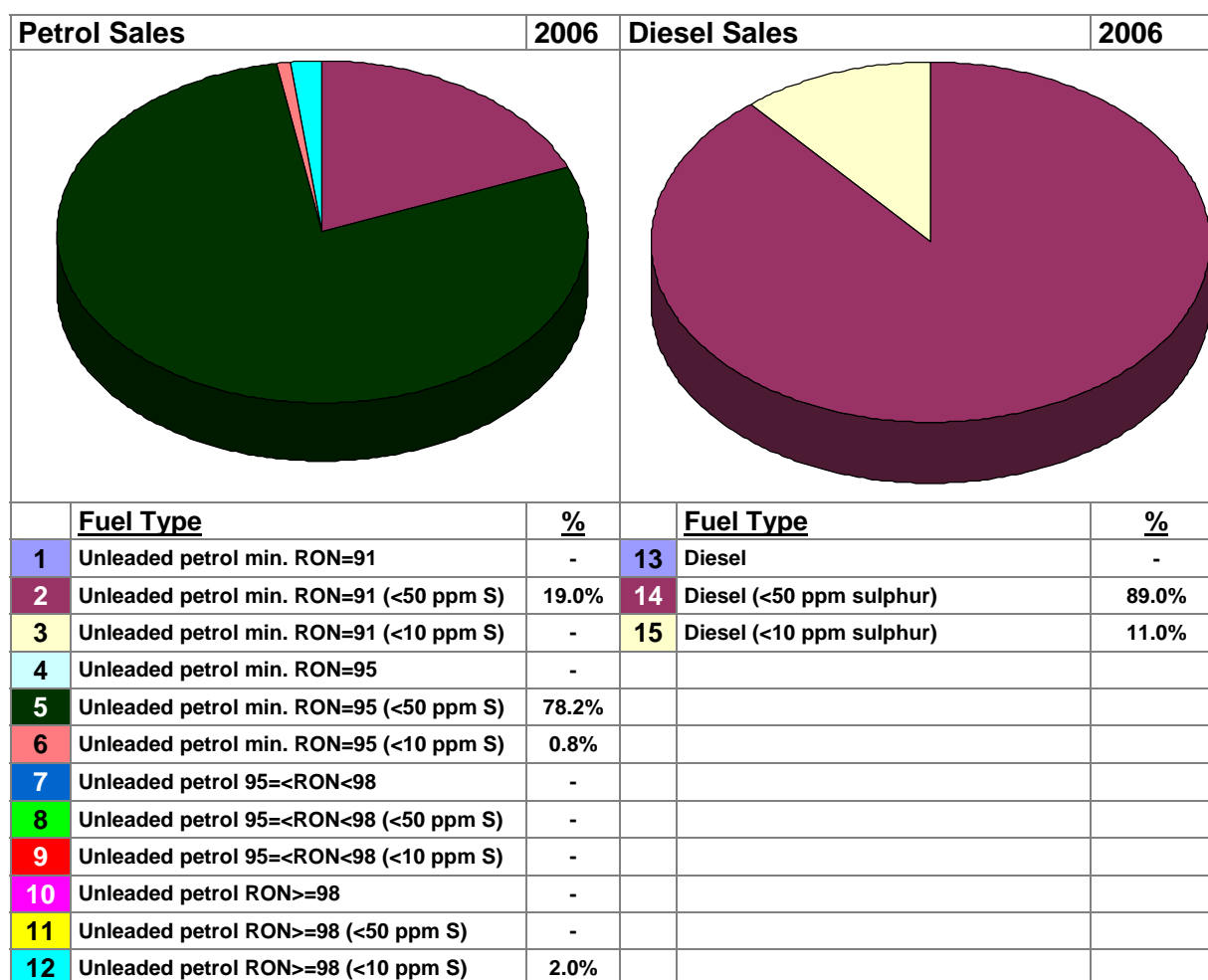


Figure 18.1 shows that the majority of fuel sold in 2006 was RON 95 grade (80%), with RON 91 and RON 98 fuels comprising of 19% and 2% respectively. Only small amounts of sulphur-free petrol (2%) and sulphur-free diesel (11%) were sold.

### 18.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur-free petrol and diesel is marketed all over the national territory in around 20 refuelling stations.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** Table 18.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 18.1: Annual trend in average sulphur content in petrol and diesel fuels

LT	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>				39	21	24	18
<i>Diesel</i>				104	29	25	22

## 18.2 Fuel Quality Monitoring 2006

### 18.2.1 Description of system

**Responsible organisation(s):** State Non Food Products Inspectorate under the Ministry of Economy is responsible for fuel quality sampling and analysis. The Ministry of Environment is responsible for reporting under the Directive 98/70/EC.

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September, although the national limit for vapour pressure is 70kPa implying a period of 1st June to 31st August (arctic or severe weather conditions).

**Location(s) of sampling:** Sampling is carried out at terminals, refuelling stations and end user storage tanks. Monitoring programme covers all of Lithuania's territory.

**Time/frequency of sampling:** Samples are taken monthly across the year. All mandatory petrol and diesel parameters are being measured. Other petrol parameters measured: density at 15°C, % evaporated at 70°C, final boiling point, distillation residue, vapour lock index. Other diesel parameters measured: distillation % recovered at 250°C/ at 350°C, cold filter plugging point (CFPP), cloud point, viscosity at 40°C, flash point.

**Specification of test methods:** in compliance with Directive 98/70/EC.

**Collection of sales data:** No information provided.

## 18.2.2 Sampling and reporting

Lithuania did not take a sufficient number of samples for each fuel grade in each summer and winter period, but was compliant with other aspects of reporting in 2006. The following Table 18.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 18.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	19.0%	52	51	100	Yes	All of 18	(1)
5	RON 95 <50 ppm S	5	78.2%	44	35	100	Yes	All of 18	(1)
6	RON 95 <10 ppm S	6	0.8%	7	16	1	Yes	All of 18	(1)
12	RON 98 <10 ppm S	12	2.0%	6	7	3	Yes	All of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>109</b>	<b>109</b>	<b>204</b>	<b>Yes</b>	<b>All of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	89.0%	52	37	100	Yes	All of 5	(2)
15	Diesel <10 ppm S	15	11.0%	0	14	100	Yes	All of 5	(2)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>52</b>	<b>51</b>	<b>200</b>	<b>Yes</b>	<b>All of 5</b>	<b>(2)</b>

**Notes:** S = Summer; W = Winter

- (1) Numbers of non-compliant samples not provided
- (2) Numbers of non-compliant samples not provided

## 18.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 92 Petrol**

All samples tested were in compliance with limit values.

#### **RON 95 Petrol <50ppm**

*Detail:* RON value of 94.5 was below the minimum limit value of 95 for some samples.

*Statistical significance:* The sample(s) were beyond the tolerance limit for the test method (94.6) and were therefore non-compliant with the Directive.

*Member State's notes:* -

#### **RON 95 Petrol <10ppm**

All samples tested were in compliance with limit values.

#### **RON 98 Petrol**

*Detail:* The value of Distillation at 100° C was below the minimum limit value of 46%(v/v), with 44%(v/v) for some samples.

*Statistical significance:* The sample was within the tolerance limit for the test method used (43.6%v/v) and was therefore compliant with the Directive.

*Member State's notes:* -

**Diesel <50 ppm**

*Detail:* Cetane number of 48 was below the minimum limit value of 51 for some samples.

*Statistical significance:* The sample(s) were beyond the tolerance limits for the test method (48.5) and were therefore non-compliant with the Directive.

*Member State’s notes:* -

**Diesel <10 ppm**

*Detail:* Cetane number of 49 was below the minimum limit value of 51 for some samples.

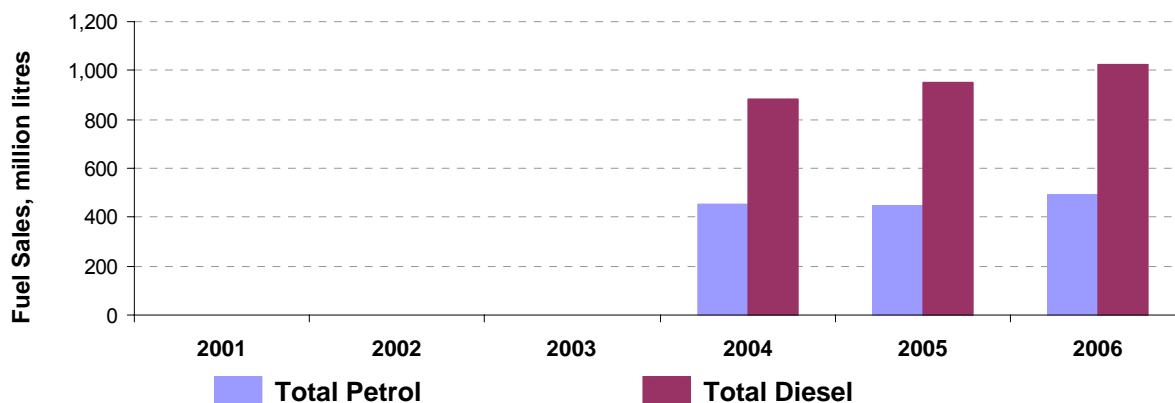
*Statistical significance:* The sample(s) were within the tolerance limit for the test method (48.5) and were therefore compliant with the Directive.

*Member State’s notes:* -

### 18.3 Temporal trends

The following Figure 18.2 to Figure 18.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Both petrol and diesel sales increased from 2004 to 2006 by 8.8% and 16.5% respectively. The sales of sulphur free diesel reduced by 29% in the same period (possibly due to increasing demand from other countries for the fuel).

**Figure 18.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 18.3: Temporal trends in national sales of low sulphur petrol (%)**

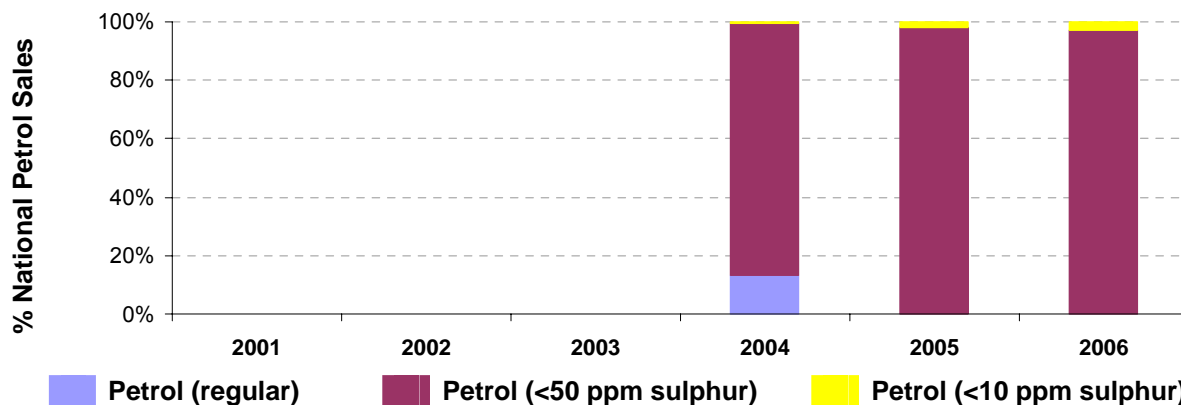




Figure 18.4: Temporal trends in national sales of low sulphur diesel (%)

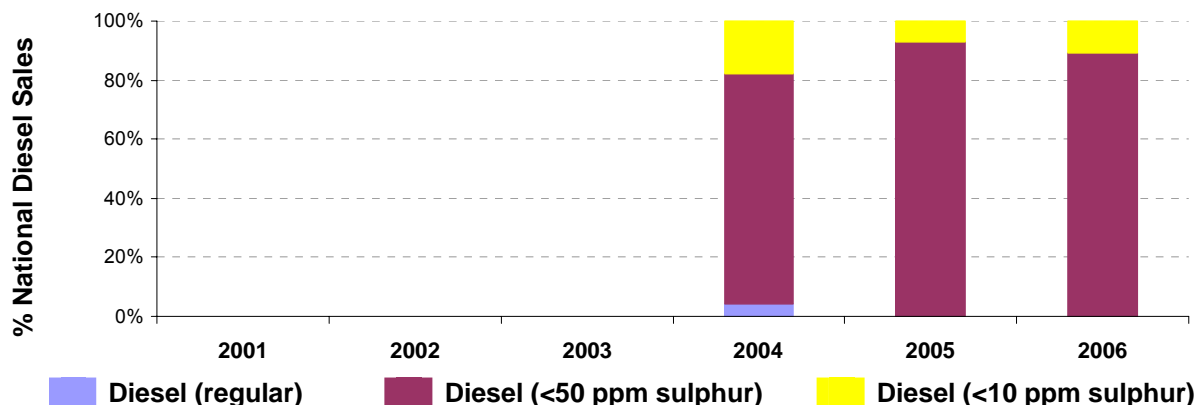
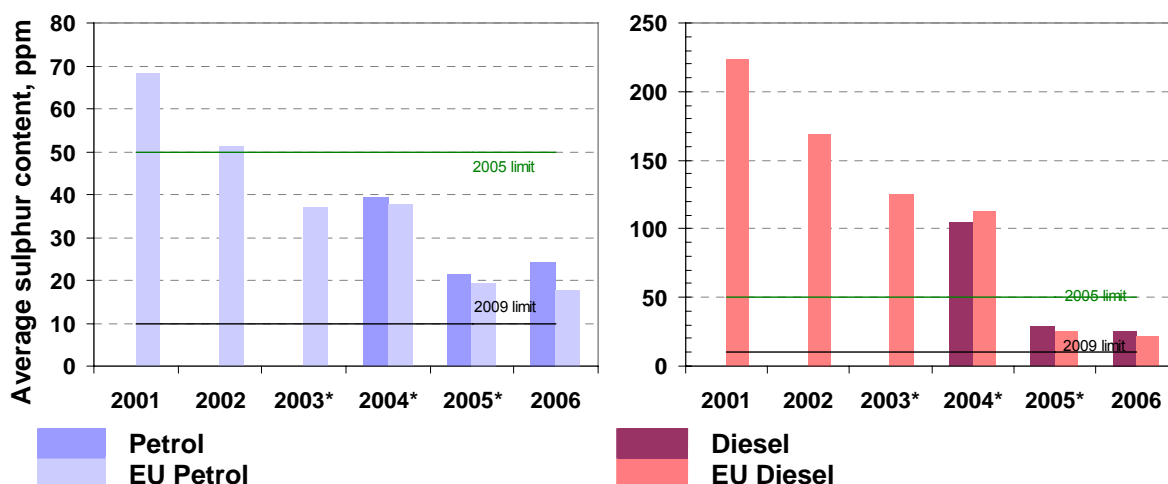


Figure 18.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average.

Figure 18.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 18.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Lithuania is not taking sufficient samples to comply fully with Statistical Model C for all fuels, in each summer and winter period.

## 19 Luxembourg

### 19.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2005 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Essence sans plomb	5
11	RON 98	<50 ppm	Super+ 50S	11
14	Diesel	<50 ppm	Diesel 50S	14

#### 19.1.1 Sales

Figure 19.1: National fuel sales volume proportions by fuel type (%)

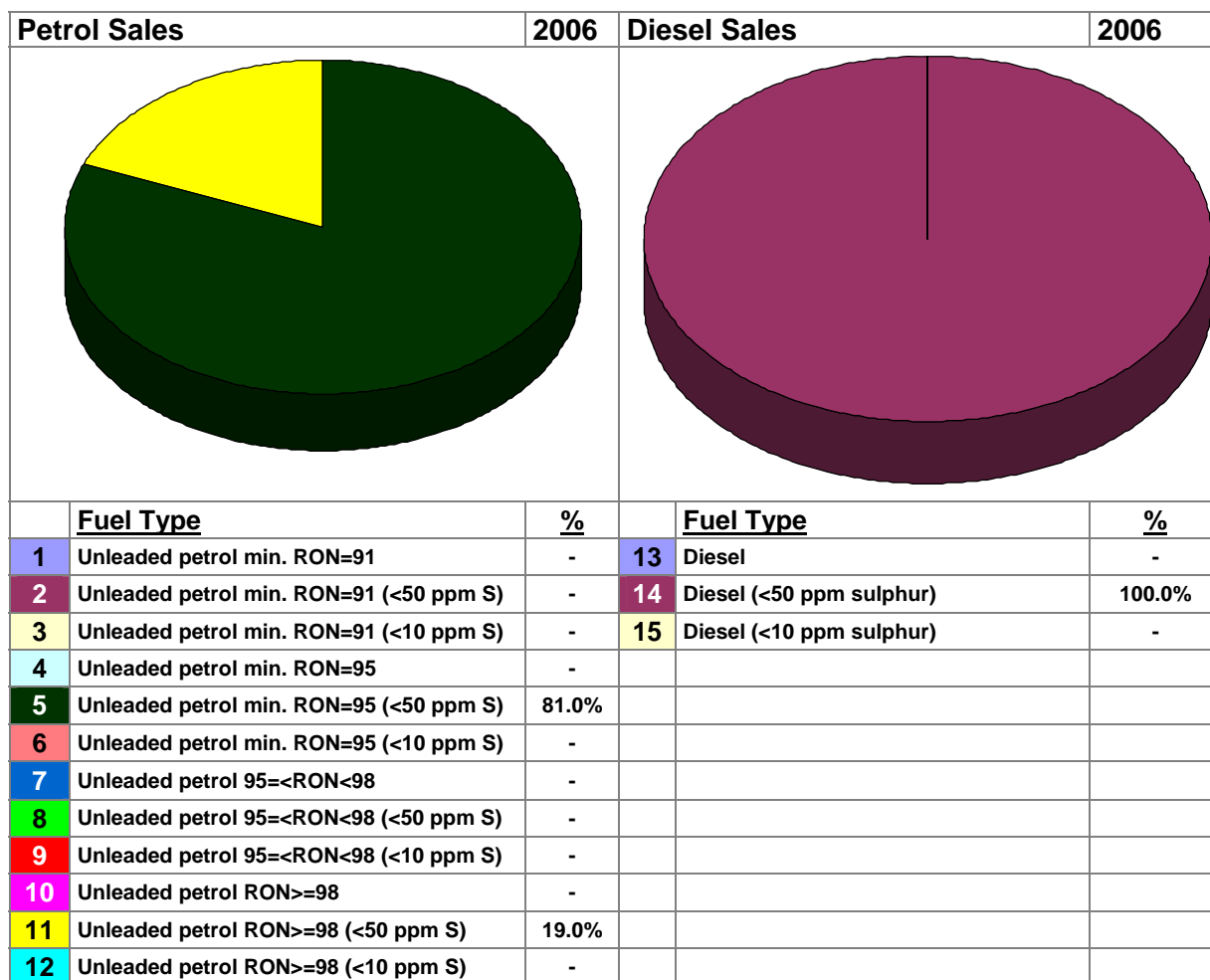


Figure 19.1 shows that the majority (81%) of Luxembourg's petrol sales in 2006 were of RON 95 grade (compared to 67% in 2001), with the remainder comprising of RON>98 <50 ppm sulphur (19%, compared to 20% in 2005). RON 91 (0.5% in 2005) was withdrawn from the market. Luxembourg completely switched to low sulphur diesel grades from 2002.

## 19.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** From the beginning of 2007, the sulphur content of all petrol and diesel sold in Luxembourg was less than 10 ppm due to market conversion / availability rather than any forcing legislation. In 2006 fuel sulphur content was still above 10ppm in some cases or at least not specifically marketed at that grade.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** N/A

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of petrol and diesel has fluctuated since 2001, see Table 19.1, however this may be as a result of the low number of samples taken (see 19.2).

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 19.1: Annual trend in average sulphur content in petrol and diesel fuels

LU	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	18	38	44	31	11	5.7	18
<b>Diesel</b>	252	33	42	45	32	9.3	22

## 19.2 Fuel Quality Monitoring 2006

### 19.2.1 Description of system

**Responsible organisation(s):** Luxembourg Environment Agency (*Administration de l'Environnement*).

**Format of Fuel Quality Monitoring System (FQMS):** National System.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal).

**Location(s) of sampling:** The fuel importers are required twice a year to perform, or have performed by a body approved for this purpose, an analysis of fuel on the basis of analytical methods set forth in the European standards EN and EN 228:1999 590:1999. They must send to the the Luxembourg Environment Agency at the end of each semester a copy of the results of analyses and a survey of total volumes of gasoline and diesel fuel marketed in the territory of Luxembourg and, if appropriate, volumes of unleaded gasoline and diesel fuel marketed with a maximum sulphur content of 10 mg / kg.

**Time/frequency of sampling:** Data is sent to the Luxembourg Environment Agency every six months.

**Specification of test methods:** No information provided.

**Collection of sales data:** From the fuel importers and from the Office Commercial de Ravitaillement (*Ministère de l'Économie*).

**Other details:** None.

## 19.2.2 Sampling and reporting

Luxembourg was partially compliant with the sampling and reporting requirements in 2006, however sampling numbers were again low (lower than in 2005). The following Table 19.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 19.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	81.0%	2	1	-	No	11 of 18	(1)
11	RON 98 <50 ppm S	11	19.0%	1	2	-	No	11 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>No</b>	<b>11 of 18</b>	
14	Diesel <50 ppm S	14	100.0%	2	2	-	No	3 of 5	(2)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>No</b>	<b>3 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) No sample analyses were provided for all 7 oxygenates parameters
- (2) No sample analyses were provided for distillation 95% point and polycyclic aromatic hydrocarbons (PAH).
- (3) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 19.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 95 < 50 ppm**

*Detail:* All samples tested were in compliance with the limit values, although no sample analyses were provided for all 7 parameters of the oxygenates category.

On the other hand, sulphur content value reported (9.7 mg/kg) is lower than the limiting value of 50 mg/kg.

#### **Petrol RON 98 < 50 ppm**

*Detail:* All samples tested were in compliance with the limit values, although no sample analyses were provided for all 7 parameters of the oxygenates category.

Sulphur content value reported (6.3 mg/kg) is lower than the limiting value of 50 mg/kg

#### **Diesel < 50 ppm**

*Detail:* The cetane limit value (51) was exceeded by samples, with a value of 49.2. No sample analysis was provided for distillation 95% point and polycyclic aromatic hydrocarbons (PAH).

*Statistical significance:* The tolerance limit for statistical significance of cetane (min 48.5) was not exceeded and therefore the samples were compliant with the Directive.

### 19.3 Temporal trends

The following Figure 19.2 to Figure 19.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2006, total petrol sales decreased 20% and diesel sales rose by 69%. There was complete transfer of sales regular sulphur petrol to low-sulphur petrol (<50 ppm) in 2005.

Figure 19.2: Temporal trends in national sales of petrol and diesel (million litres)

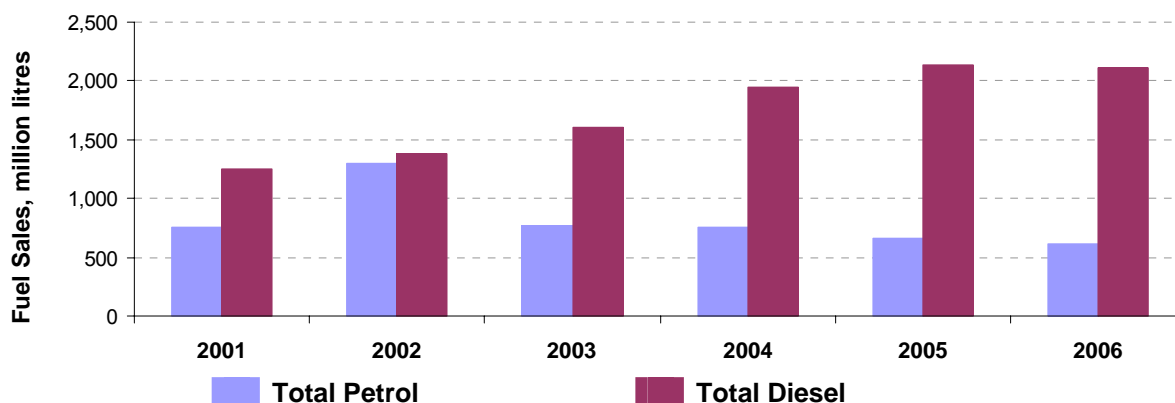


Figure 19.3: Temporal trends in national sales of low sulphur petrol (%)

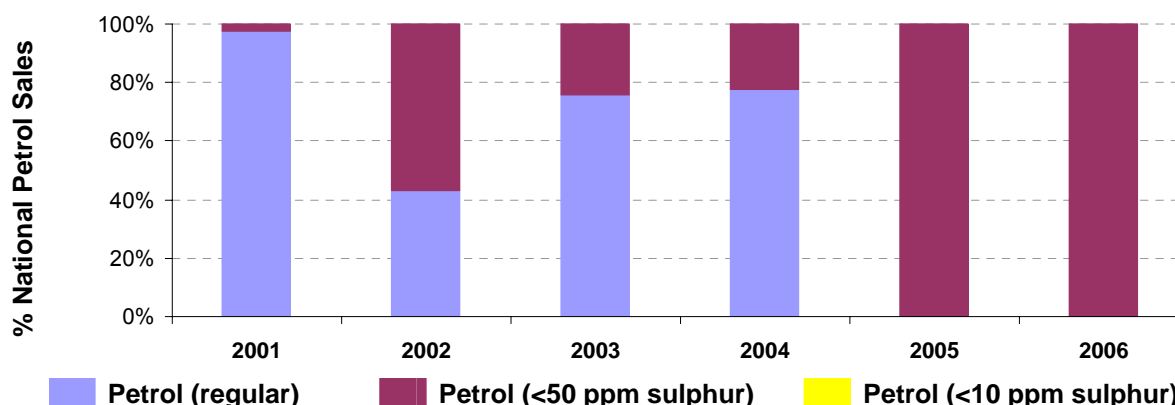


Figure 19.4: Temporal trends in national sales of low sulphur diesel (%)

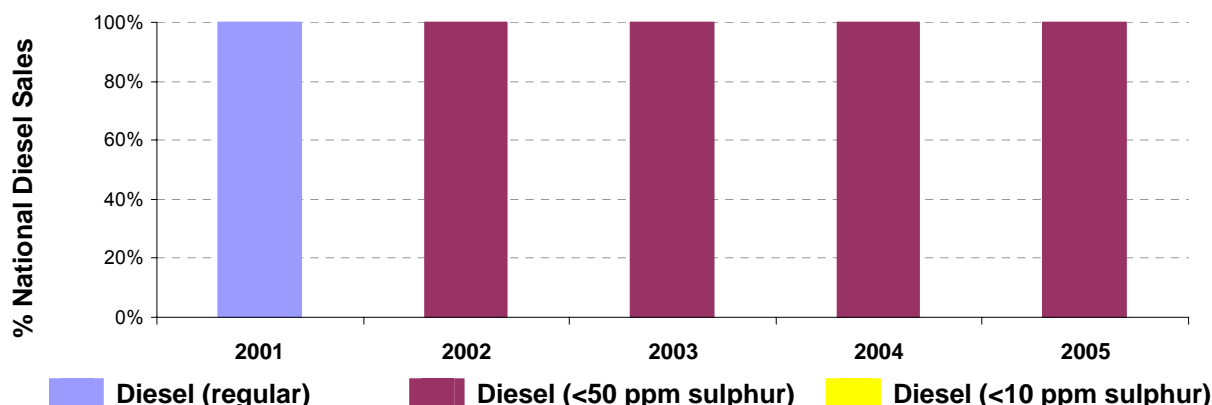
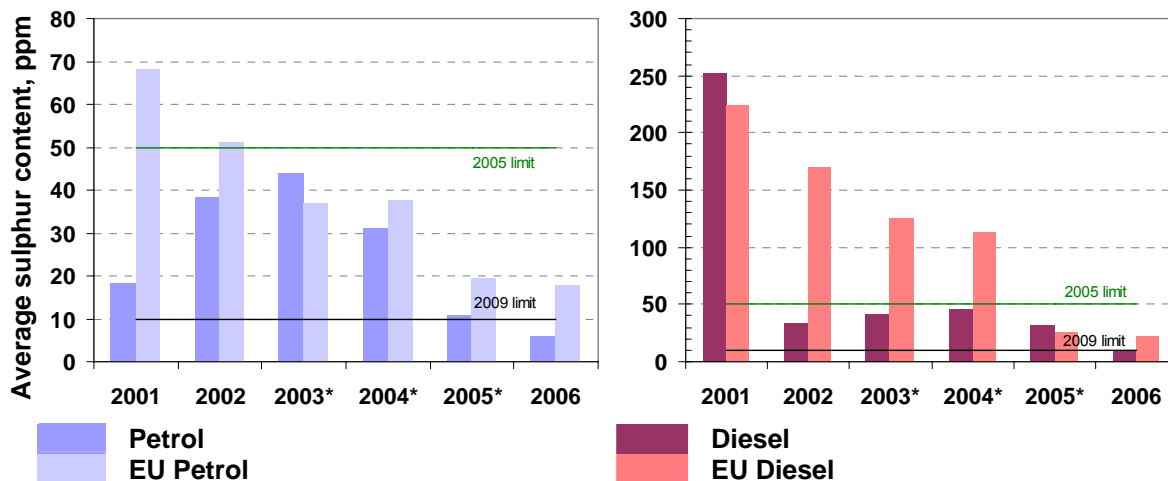


Figure 19.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). In 2005, with full market conversion to <50ppm fuels, the average sulphur content of petrol was a third of the 2004 values and significantly reduced for diesel. For petrol and diesel in 2006 the

average sulphur content was below the 2006 limit (50ppm), 2009 limit (10ppm) and the EU average.

**Figure 19.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 19.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The report submission was received after the 30 June deadline – almost 7 months late.
- No assessment of the geographical availability of sulphur-free fuels was provided, although it is stated that from January 2007 the sulphur content of all petrol and diesel sold in Luxembourg is less than 10 ppm.
- Luxembourg has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard.
- Few samples of the fuel grades were taken (6 for petrol and as little as 4 samples for diesel). The minimum number of samples to be taken according to statistical model C of EN14274 is 50 per fuel grade and in each of the summer and winter periods - i.e. 100 per fuel grade per year. This might be excessive for such a small country, but without information on the number of supply points/sources, it is difficult to justify a lower sampling rate. Even giving the benefit of the doubt the number of samples still seems very low.
- No sample analyses were provided for all 7 parameters of oxygenates category for both petrol grades reported, and for 2 parameters of the diesel grade.
- Luxembourg also appears to be only carrying out sampling at refineries and depots. Samples should be taken from refuelling stations.

## **20 Malta**

**Malta has provided no fuel quality monitoring report submission for 2006 monitoring.**

## 21 Netherlands

### 21.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Motorbenzine (RON = 95)	5
8	95<RON<98		Superplus loodvrij (lead-free) + Overig motorbenzene (95<RON<98)	5
11	RON 98	<50 ppm	Superplus met loodvanger (with lead replacement) (RON = 98)	5
14	Diesel	<50 ppm	Diesel < 50 ppm sulphur	14
15	Diesel	<10 ppm	Diesel < 10 ppm sulphur	14

#### 21.1.1 Sales

Figure 21.1: National fuel sales volume proportions by fuel type (%)

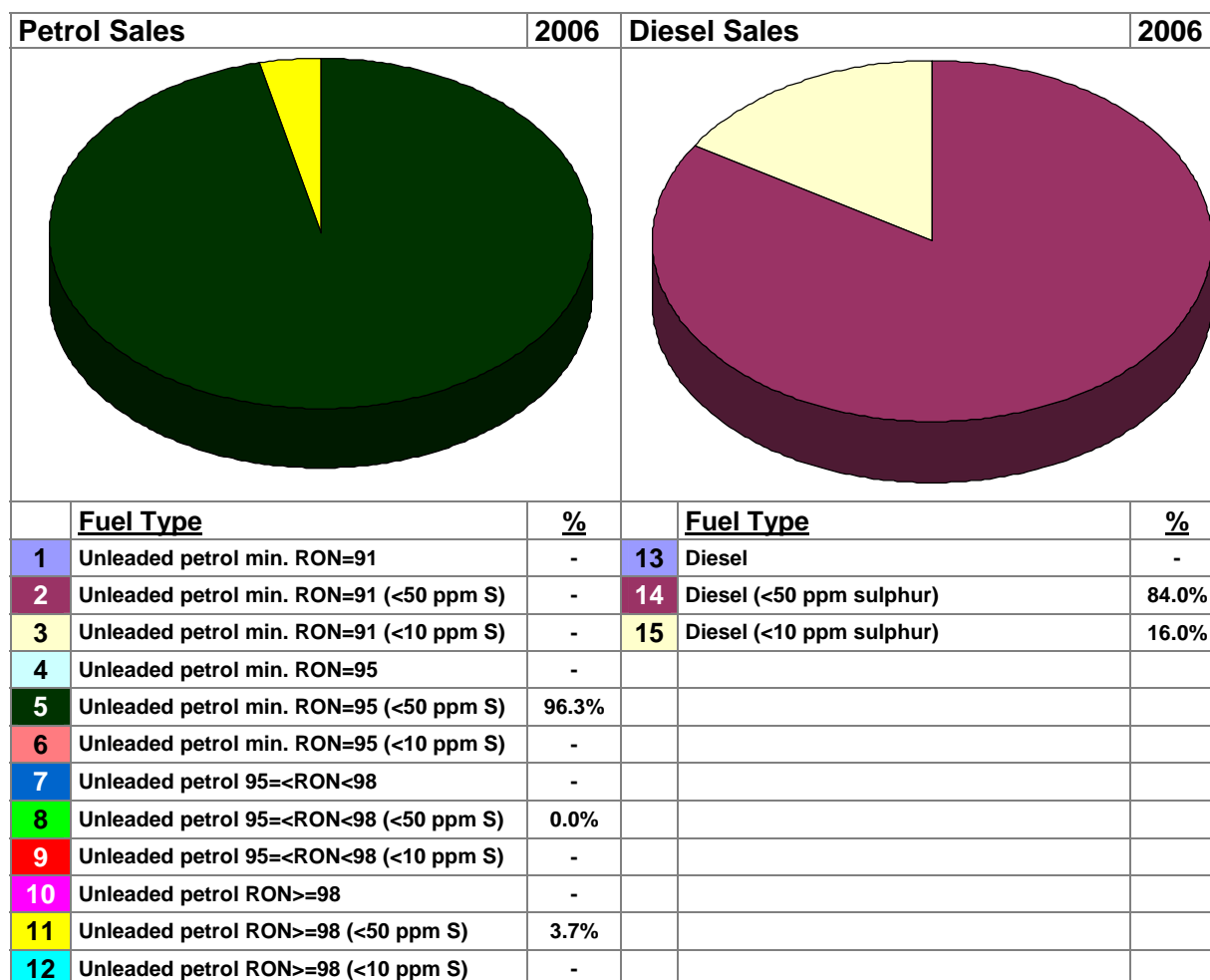




Figure 21.1 shows that 96.3% of petrol sold in The Netherlands in 2006 was of regular RON 95 grade. The RON>98 comprised the remaining sales, with very small sales of the newly available <10ppm grade (3.7%). No separate sulphur-free diesel grade was available in 2005, however due to fiscal incentives introduced at the start of 2005 the majority of fuel sold met this criterion. The Netherlands' 2006 submission defines 84% of diesel sales as <50ppm grade and 16% as 'other diesel'; the latter is assumed to be <10ppm grade.

## 21.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** The report states that sulphur free fuel was sold across the whole of the Netherlands in 2006, however no detail was provided in support of this statement.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No information provided.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 21.1. No separate sulphur-free diesel grade was available in 2005, however due to fiscal incentives introduced at the start of 2005 the majority of fuel sold met this criterion. The Netherlands' 2006 submission defines 84% of diesel sales as <50ppm grade and 16% as 'other diesel'; the latter is assumed to be <10ppm grade.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 21.1: Annual trend in average sulphur content in petrol and diesel fuels

NL	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>	51	60	26	29	19	22	18
<b>Diesel</b>	42	34	31	34	8	11	22

## 21.2 Fuel Quality Monitoring 2006

### 21.2.1 Description of system

**Responsible organisation(s):** Inspectorate for Environmental Health (VROM-Inspectorate)

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model A

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Sampling was carried out in September-December 2006.

**Specification of test methods:** As specified in Directive 98/70/EC

**Collection of sales data:** In the report the VROM-Inspectorate receives from the laboratory, the sales invoices are included.

**Other details:** The Netherlands has 12 provinces. It was decided that samples would be taken from petrol stations in each province that sell fuel originating from diverse petrol companies. Furthermore, the number of inhabitants in each province was studied and a petrol station visit strategy was prepared, which resulted in 100 test checks (to be done) in total, spread over the summer and winter periods. The Netherlands aimed to meet the European Standard EN 14274:2003 Statistical Model A (small country).

## 21.2.2 Sampling and reporting

The Netherlands was only partly compliant in 2006 with the sampling and reporting requirements as insufficient summer period samples were taken; RON98 fuel, for which no samples were taken for analysis and also summer and winter results were not reported separately. The following Table 21.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 21.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
5	RON 95 <50 ppm S	5	96.3%	40	60	105	No	All of 18	
8	95<RON<98 <50 ppm S	5	0.0%	0	0				
11	RON 98 <50 ppm S	5	3.7%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>40</b>	<b>60</b>	<b>105</b>			
14	Diesel <50 ppm S	14	84.0%	40	60	200	No	All of 5	
15	Diesel <10 ppm S	14	16.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>40</b>	<b>60</b>	<b>200</b>			

**Notes:** S = Summer; W = Winter

## 21.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol**

**Detail:** Three samples had values below RON value minimum limit value of 95, and two samples below the minimum value for MON of 85.

**Statistical significance:** All samples were within the tolerance limit for the test methods for RON (94.6) and MON (84.5) and were therefore compliant with the Directive.

**Member State's notes:** In the summer period it appeared that three RON samples and one MON sample lay outside the specifications. In view of the deviation limits in the analysis method no further action has been undertaken. In the winter period it appeared that one MON sample lay outside of the specifications. In view of the deviation limits in the analysis method no further action has been undertaken.

#### **Diesel**

None.

## 21.3 Temporal trends

The following Figure 21.2 to Figure 21.4 show the trend in total fuel sales and low sulphur fuel (<50 ppm) sales as a proportion of total sales. From 2001 to 2006 petrol sales decreased by 17% and diesel sales decreased by 2%. From 2003, low-sulphur diesel has comprised 100% of diesel sales.

Figure 21.2: Temporal trends in national sales of petrol and diesel (million litres)

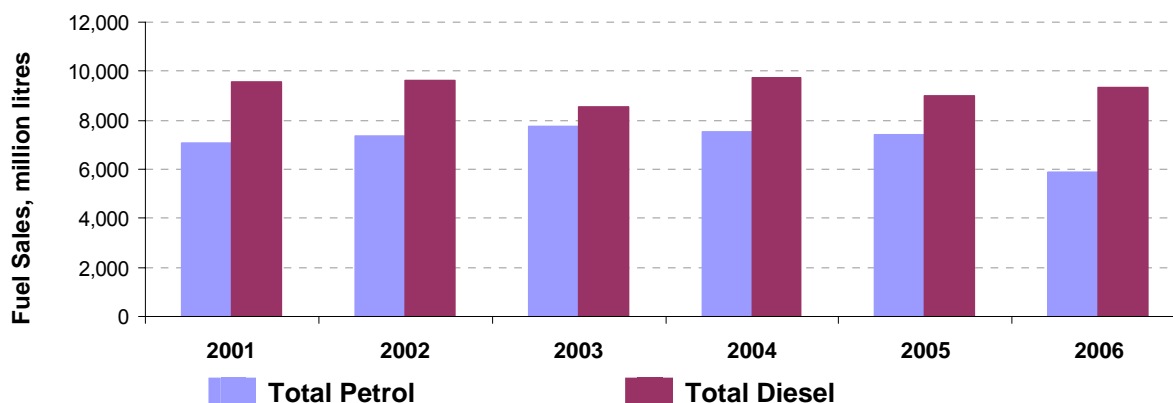


Figure 21.3: Temporal trends in national sales of low sulphur petrol (%)

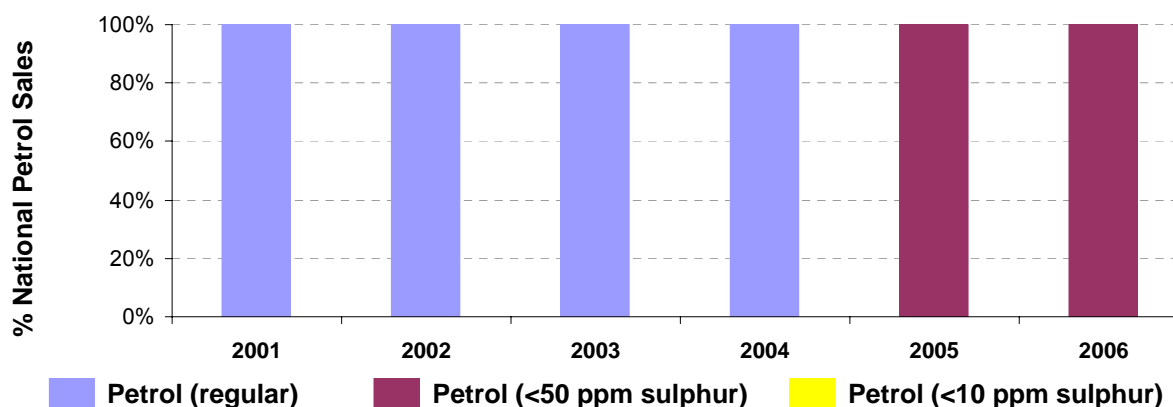


Figure 21.4: Temporal trends in national sales of low sulphur diesel (%)

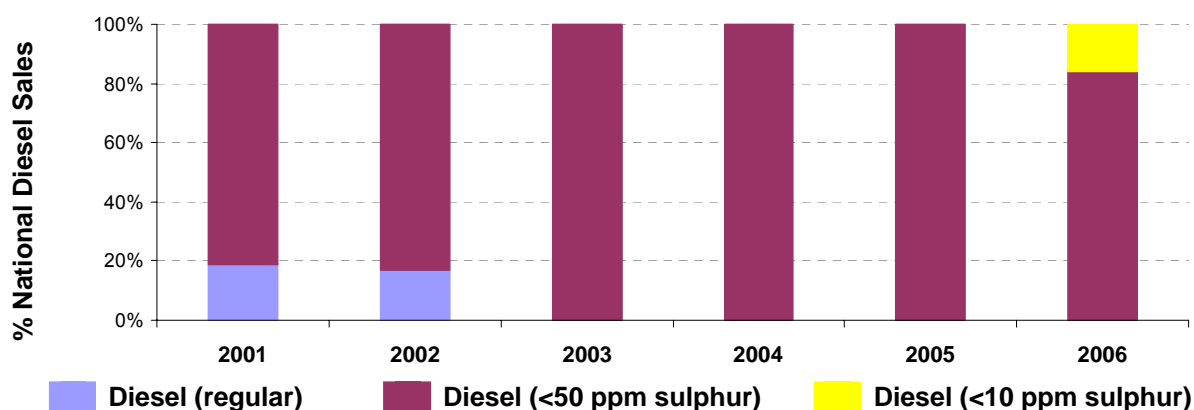
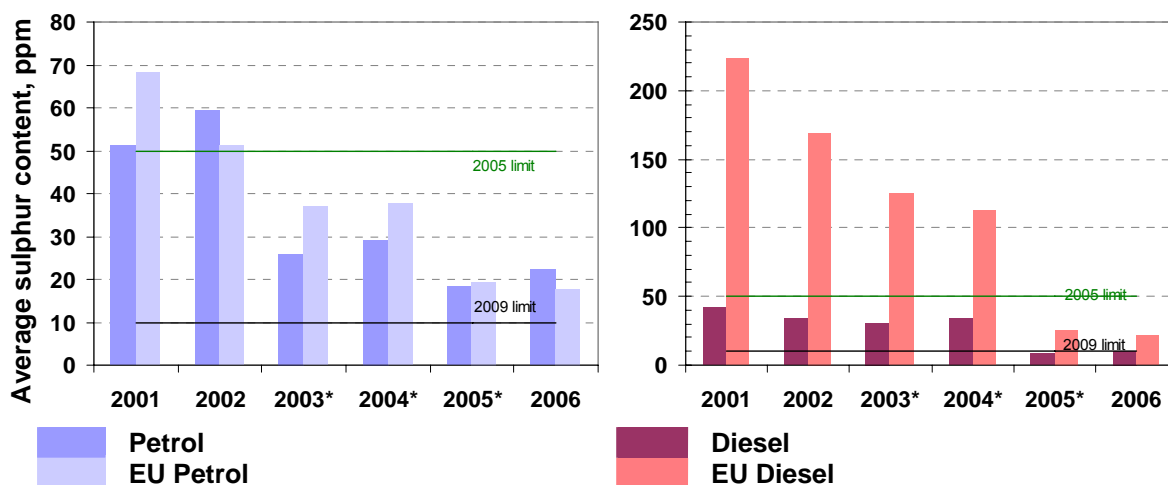


Figure 21.5 shows the trend in average sulphur content of petrol and diesel fuels in the Netherlands compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average for 2006 for petrol. The average sulphur content for diesel was just above the 2009 limit in 2006.

**Figure 21.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 21.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The Netherlands was partially compliant with sampling and reporting requirements:
  - no samples of RON98 fuel were taken;
  - summer and winter results should be reported separately
  - Insufficient summer samples were taken;
- The Netherlands has provided no detail on the assessment of the geographical availability of sulphur-free fuels in its territory, or their labelling, however it is clear that sulphur-free fuels are widely available.

## 22 Poland

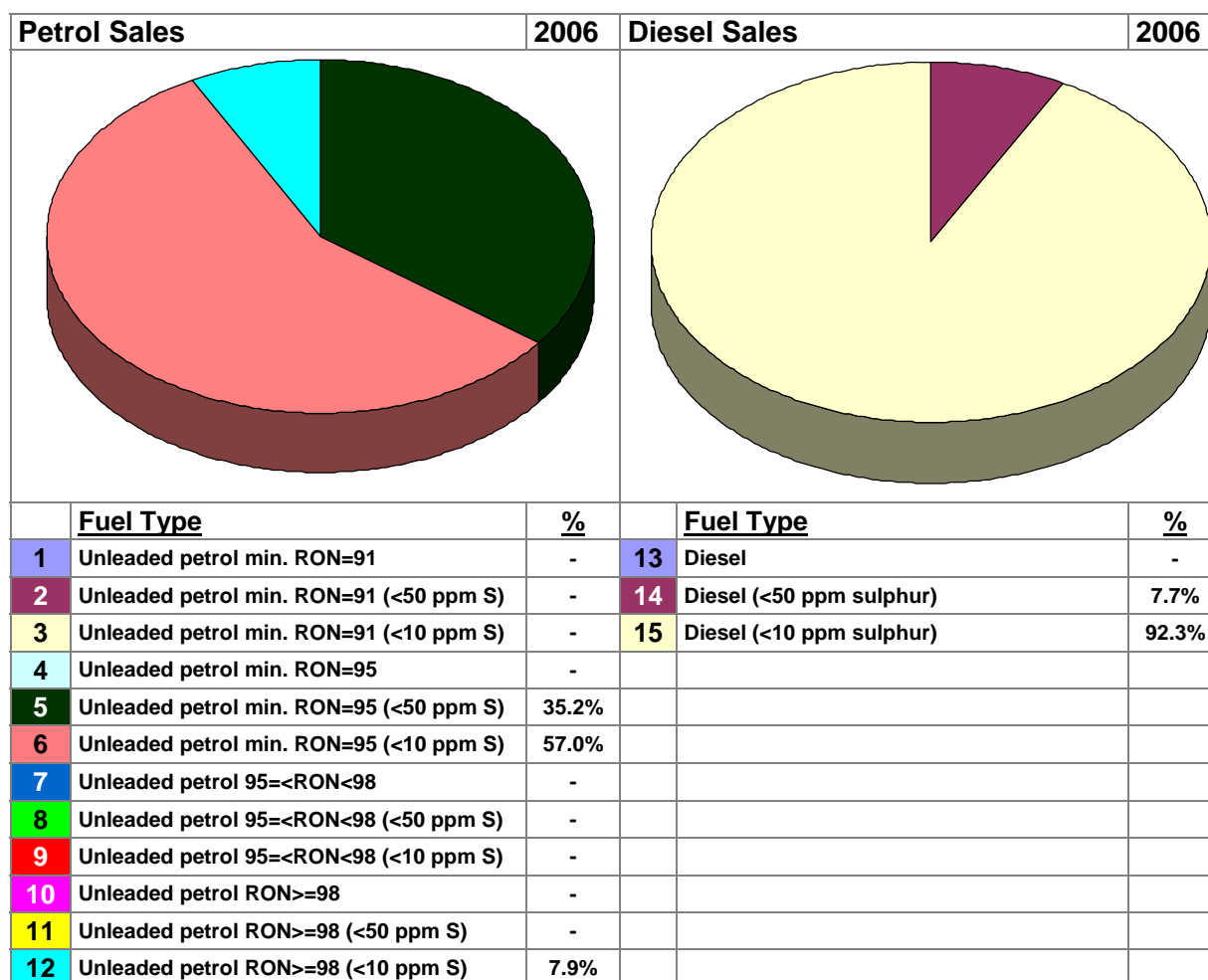
### 22.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Lead-free petrol 95, <50ppm sulphur	5
6	RON 95	<10 ppm	Lead-free petrol 95, <10ppm sulphur	5
12	RON 98	<10 ppm	Lead-free petrol 98, <10ppm sulphur	12
14	Diesel	<50 ppm	Diesel oil containing up to 50 mg/kg sulphur	14
15	Diesel	<10 ppm	Diesel oil containing up to 10 mg/kg sulphur	14

#### 22.1.1 Sales

Figure 22.1: National fuel sales volume proportions by fuel type (%)



Low sulphur and sulphur-free sulphur fuel grades were available for the first time in 2005. Figure 22.1 shows that the majority (92.1%) of petrol sold was of RON 95 grade (in 2005

there was a similar consumption of this fuel, 92.4%) of which 57% is sulphur free fuel (16.7% in 2005). The remainder (7.8% of total petrol sales) of which 7.3% is sulphur free RON 98 and 0.5% is sulphur low RON 98. On the other hand, the majority of diesel sales were of sulphur free fuel (92.3% compared to 84% in 2005). It should be noted that this year sales information includes all consumption, but in previous years it was only based on fuel from Polish refineries and did not include imports (which accounted for 14% of petrol and 28% diesel consumption nationally). Therefore it is difficult to directly compare 2005 to 2006 data.

### 22.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In 2006 the total domestic production of fuel containing up to 10 mg/kg sulphur was 8,307,000 tonnes, amongst them:

- Production of petrol containing up to 10 mg/kg sulphur was 2,258,000 tonnes.
- Production of diesel oils containing up to 10 mg/kg was 6,049,000 tonnes.

According to estimates by the Polish Oil Industry and Trading Organisation, in 2006 members of POPIHN imported from abroad and from the internal market 508,000 tonnes of petrol and 2,327,000 tonnes of diesel, of which 417,000 tonnes were low-sulphur petrol and 1,646,000 tonnes were low-sulphur diesel. Because current import tariffs do not distinguish between the sulphur contents of fuels, it is impossible to determine the proportion of low-sulphur-content petrol and diesel making up the remainder of import and internal market acquisitions. Because low-sulphur fuel is more costly to buy than high-sulphur fuel, it can be assumed that the remainder of the fuel (in the case of petrol, the difference between 602,000 and 508,000 tonnes, and in the case of diesel the difference between 2,377,000 tonnes and 2,327,000 tonnes) imported by non-POPiHN firms would be non-low sulphur fuels.

From the data relating to the import and internal acquisition of low-sulphur fuels it can be assumed that the share of petrol with a sulphur content below 10 mg/kg out of all the petrol consumed in the country in 2006 was about 65% of the total, while the share of diesel with a sulphur content below 10 mg/kg of the total consumed in the country was approximately 95%.

The low-sulphur fuel available in the outlets of the largest suppliers (PKN Orlen, Grupa Lotos S.A., Shell, BP, Statoil) are not marked in any way to show their sulphur content. However, low-sulphur petrol is often available under special names, such as : Verva, Ultimate or Suprema. Low-sulphur diesel is sold under the names Verva ON, Ultimate Diesel and SupraDiesel

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** Table 22.1 shows the average content of fuel sold in 2006 in relation to the EU25 average.

**Additional information:** -

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 22.1: Annual trend in average sulphur content in petrol and diesel fuels

PL	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>				60	27	20	18
<i>Diesel</i>				124	53	14	22

## 22.2 Fuel Quality Monitoring 2006

### 22.2.1 Description of system

**Responsible organisation(s):** The system for monitoring and controlling the quality of liquid fuels and liquid biofuels is administered by the President of the Office for Competition and Consumer Protection. The tasks associated with its administration are performed with the aid of the Trade Inspectorate, which inspects the quality of fuels. The analyses of fuel quality are carried out by laboratories accredited by the Polish Centre for Accreditation as authorised to test fuels using the methods stipulated in the regulations.

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model B.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Monthly throughout the year, except December and January.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** Ministry of Economic Affairs.

**Other details:**

### 22.2.2 Sampling and reporting

Poland was essentially compliant with the sampling and reporting requirements in 2006. Polish FQMS has been operating since 2004 according to EN 14274 Statistical Model B. The following Table 22.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

Table 22.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	35.2%	108	111	200	Yes	All of 18	
6	RON 95 <10 ppm S	5	57.0%						
12	RON 98 <10 ppm S	12	7.9%	138	135	16	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>246</b>	<b>246</b>	<b>216</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	7.7%	114	106	200	Yes	All of 5	
15	Diesel <10 ppm S	14	92.3%						
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>108</b>	<b>112</b>	<b>200</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

### 22.2.3 Compliance with fuel quality limit values

#### **Non-compliance with Directive 98/70/EC limit values**

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

##### **RON 95 Petrol**

**Detail:** The limit values for RON, MON, summer vapour pressure, distillation at 100°C, distillation at 150°C, aromatics, oxygen content, ethanol and sulphur content (of 95, 85, 60 kPa, 46.0%v/v, 75.0 %v/v, 35.0%v/v, 2.7%*m/m*, 5%v/v and 50 ppm) were exceeded. Values, by parameter, reached extremes of 93.8, 84, 69.0 kPa, 41.3%v/v, 74.9%v/v, 37.0%v/v, 3.5% *m/m*, 5.1%v/v and 110ppm.

**Statistical significance:** The test method tolerance limits for statistical significance for the following parameters were exceeded: RON, MON, summer vapour pressure, distillation at 100°C, oxygen content and sulphur content. In total, four samples of RON 95 were non-compliant with the Directive.

The test method tolerance limits for distillation at 150°C, aromatics and ethanol were not exceeded and therefore those samples were compliant with the Directive.

**Member State's notes:** All non-compliant sample results were notified to the Public Prosecutor's Office. One sample was notified to the President of the Energy Regulatory Office and another to the customs authorities /environmental protection authorities.

##### **RON 98 Petrol**

**Detail:** Summer vapour pressure, aromatics and oxygen content limit values (of 60 kPa, 35.0%v/v and 2.7%*m/m*) were exceeded. Values, by parameter, reached extremes of 86.6, 37.1%v/v and 3.1%*m/m*.

For RON and MON, all samples tested were within the tolerance limits for Directive limit values, but four samples were not compliant the *national* minimum values of RON = 98 and MON = 88.

**Statistical significance:** The tolerance limits for statistical significance were exceeded for four samples (exceeding the vapour pressure limit) and one sample (oxygen content). These samples were thus non-compliant with the Directive.

The results for aromatics were within the tolerance limits.

**Member State's notes:** All non-compliant sample results were notified to the Public Prosecutor's Office and the President of the Energy Regulatory Office. Most were also notified to the customs authorities /environmental protection authorities. One of the batches of petrol that was not compliant with the national minimum values for RON and MON was removed from the market.



## Diesel

**Detail:** Cetane number, distillation 95% point and sulphur content limit values (of 51, 360°C and 50 ppm) were exceeded by a number of samples. Values, by parameter, reached extremes of 49.7, 362.9°C and 368 ppm.

**Statistical significance:** The sample results were within the tolerance limits for statistical significance for the cetane number and distillation test methods (of 48.5 and 365.9), but exceeded the tolerance limit for the sulphur content test method (of 54.0).

In total, three samples of diesel were non-compliant with the Directive, with values of 74, 80 and 368 ppm.

**Member State's notes:** All non-compliant sample results were notified to the Public Prosecutor's Office and the President of the Energy Regulatory Office. Two samples were also notified to the customs authorities /environmental protection authorities.

The batch of fuel with a sulphur content of 368ppm was removed from the market.

## 22.3 Temporal trends

The following Figure 22.2 to Figure 22.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Note that in the new Member States, 2005 was the first full year of reporting and 2004 data was from May to December. In Poland, petrol sales decreased from 2004 to 2006 by 2.3% whereas diesel sales increased by 27% (by volume). Low-sulphur and sulphur-free fuels were marketed for the first time in 2005.

**Figure 22.2: Temporal trends in national sales of petrol and diesel (million litres)**

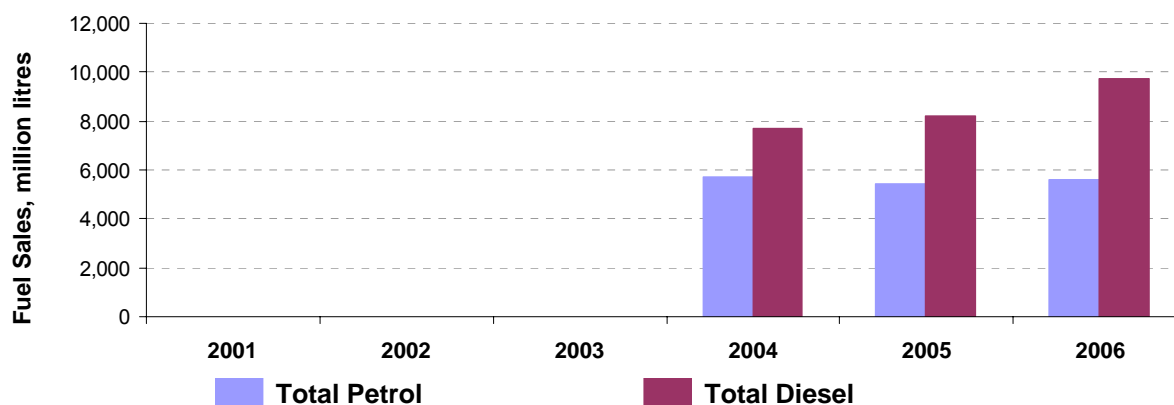


Figure 22.3: Temporal trends in national sales of low sulphur petrol (%)

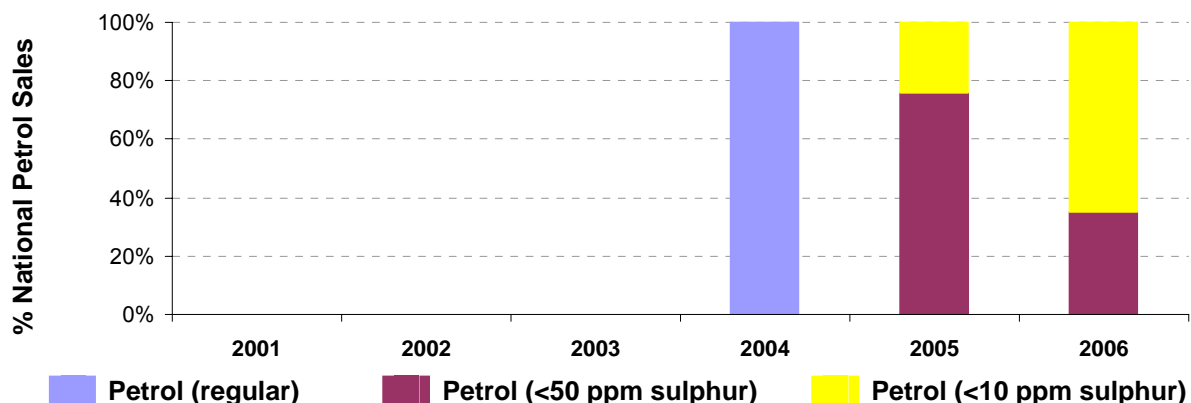


Figure 22.4: Temporal trends in national sales of low sulphur diesel (%)

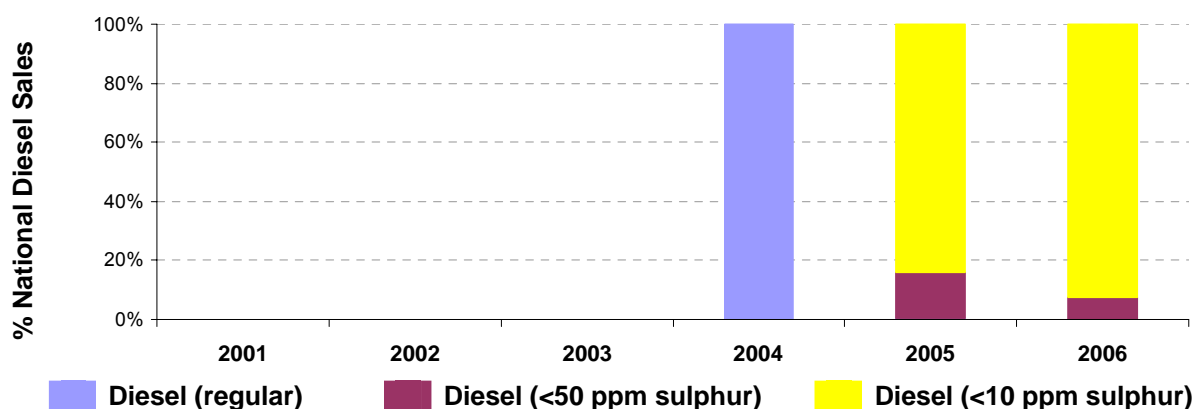
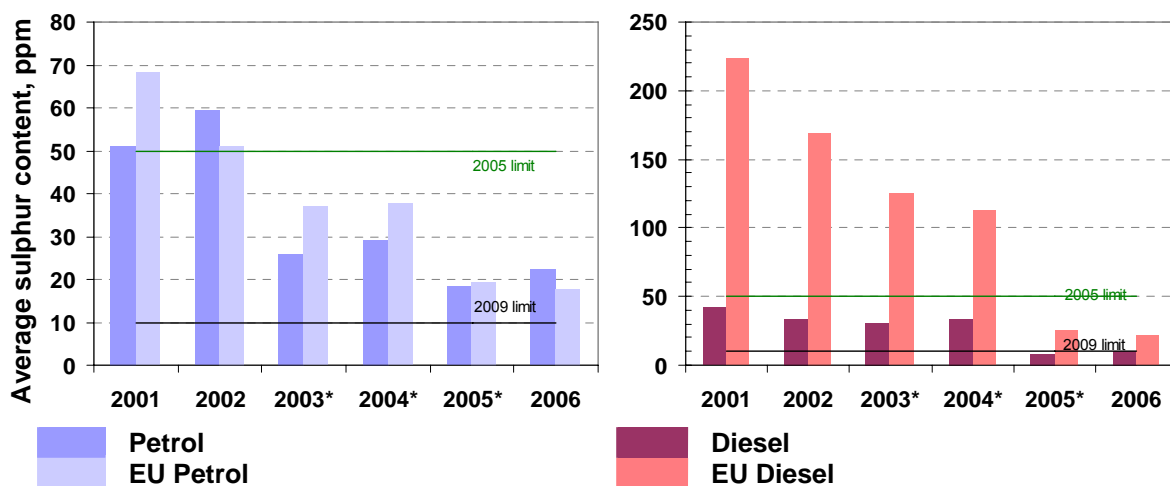


Figure 22.5 shows the shift to low-sulphur and sulphur-free fuels resulted in a significant reduction in sulphur content from 2004 to 2006. The average sulphur content of petrol and diesel was well below the 2005 limit of 50ppm with diesel also being below the EU average.

Figure 22.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 22.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

Key Areas for Improvement
<ul style="list-style-type: none"><li>Poland should report separate results for each of the fuel grades, including low sulphur and sulphur-free grades.</li></ul>

## 23 Portugal

### 23.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
8	95<RON<98	<50 ppm	Euro super	8
12	RON 98	<10 ppm	Super plus	12
14	Diesel	<50 ppm	Gasóleo	14
15	Diesel	<10 ppm	Gasóleo	14

#### 23.1.1 Sales

Figure 23.1: National fuel sales volume proportions by fuel type (%)

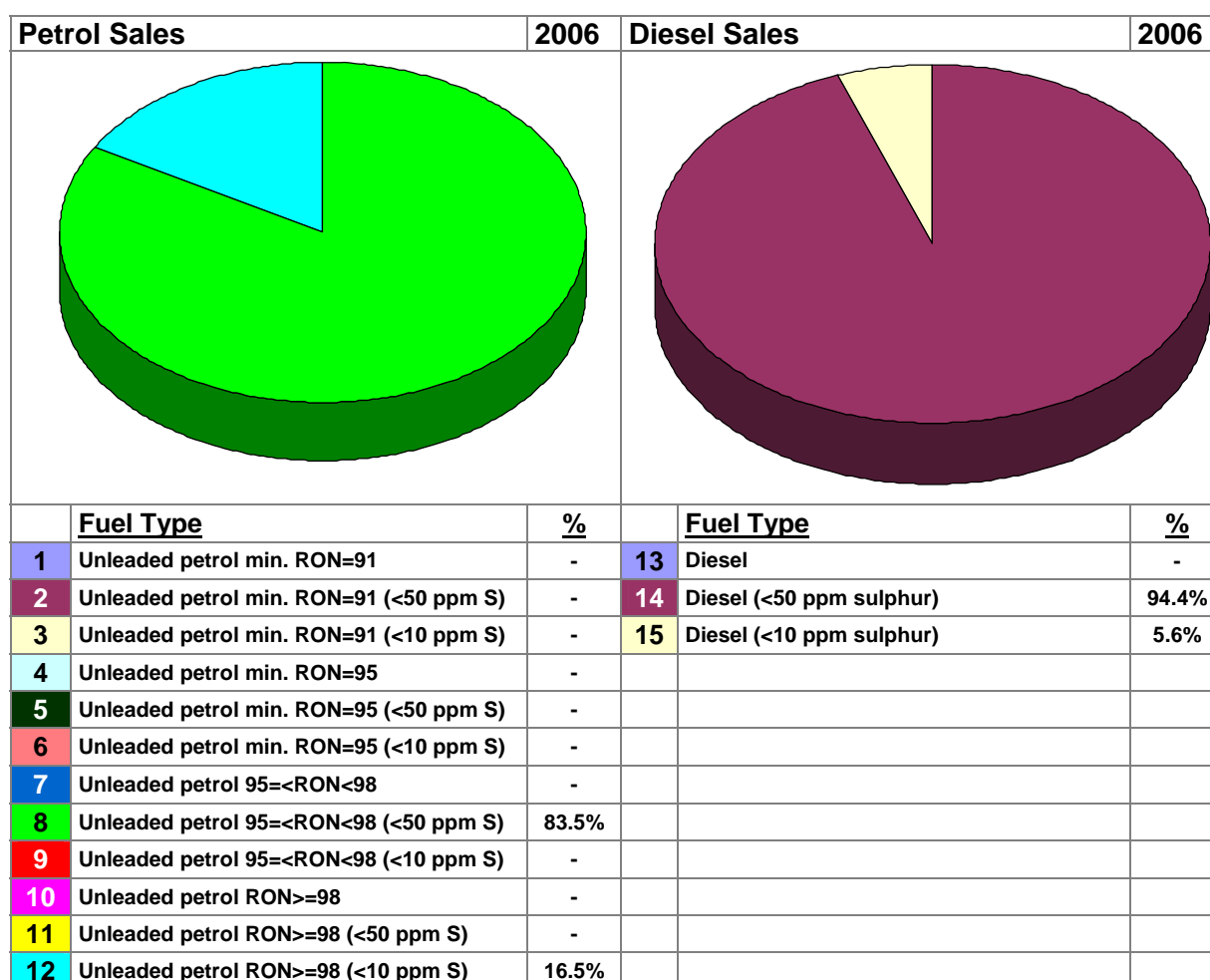


Figure 23.1 shows that in Portugal the majority (83.5%) of petrol marketed in 2006 was RON 98 (up from 65% in 2001), with the remainder being at RON>98 (16.5%). A small quantity of sulphur-free diesel (5.6%) was sold.

## 23.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Unleaded petrol (minimum RON  $\geq$  98) with less than 10 ppm sulphur, is distributed all over the country. Diesel with less than 10 ppm sulphur, is distributed in approximately 200 highway/motorway refuelling stations and urban retail sites.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes for petrol, no for diesel.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of diesel has decreased since 2001, with a significant reduction from 2004 to 2005. The average sulphur content of petrol also decreased from 2004 to 2005 but increased from 2005 to 2006, as shown in Table 23.1.

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 23.1: Annual trend in average sulphur content in petrol and diesel fuels

PT	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>	447	57	61	71	16	23	18
<i>Diesel</i>	272	296	261	241	37	28	22

## 23.2 Fuel Quality Monitoring 2006

### 23.2.1 Description of system

**Responsible organisation(s):** DGE (Directorate General Energy), Institute for the Environment and Oil companies.

**Format of Fuel Quality Monitoring System (FQMS):** National System

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** The companies themselves carry on tests, taking samples in refineries and terminals, and randomly across the country in retail sites. There are two refineries that supply the market, one in the north and the other in the south.

**Time/frequency of sampling:** Monthly, except no samples were taken in April or October.

**Specification of test methods:** Methods specified in Directive 98/70/EC

**Collection of sales data:** Fuel companies collect the data and send it to DGE.

**Other details:** The EN 14274 statistical model is being implemented. Meanwhile Portugal will follow the same methodology used in precedent reports.

## 23.2.2 Sampling and reporting

Portugal was not compliant with the sampling and reporting requirements in 2006, with sampling numbers not sufficient to give equivalent confidence with EN 14274 and also no required sample analysis for lead content were reported. Portugal is yet to implement a monitoring system in full compliance with the requirements of EN 14274. The following Table 23.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 23.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
8	95<RON<98 <50 ppm S	8	83.5%	14	15	-	Yes	11 of 18	
12	RON 98 <10 ppm S	12	16.5%	14	14	-	Yes	11 of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>28</b>	<b>29</b>	<b>-</b>	<b>Yes</b>	<b>11 of 18</b>	
14	Diesel <50 ppm S	14	94.4%	22	20	-	Yes	5 of 5	
15	Diesel <10 ppm S	14	5.6%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>22</b>	<b>20</b>	<b>-</b>	<b>Yes</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

(1) The EN 14274 statistical model is being implemented. Meanwhile we will follow the same methodology used in precedent reports

## 23.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 95-98**

**Detail:** One or more samples exceeded the summer vapour pressure limit value of 60 kPa, with a maximum of 61.7 kPa. Sample(s) were also below the MON limit value of 85, with a minimum of 84.5.

**Statistical significance:** The tolerance limit for statistical significance for vapour pressure test method is 61.8 kPa, and for MON is 84.5, therefore the sample(s) were compliant with the Directive.

#### **Petrol RON 98**

**Detail:** One or more samples exceeded the summer vapour pressure limit value of 60 kPa, with a maximum of 61.7 kPa.

**Statistical significance:** The tolerance limit for statistical significance for vapour pressure test method is 61.8 kPa, therefore the sample(s) were compliant with the Directive.

#### **Diesel**

**Detail:** Density at 15°C (limit value 845 kg/m<sup>3</sup>) was exceeded by at least one sample with a maximum of 845.2 kg/m<sup>3</sup>. Distillation 95% point

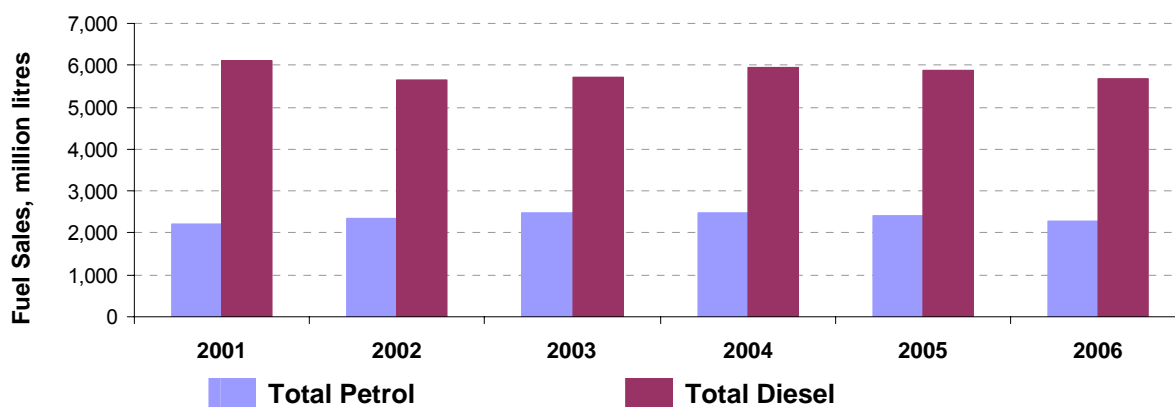
(limit value 360°C) was exceeded by at least one sample with a maximum of 365.1 °C.

*Statistical significance:* The tolerance limit for statistical significance for the test methods (845.3 kg/m<sup>3</sup> for density and 365.9 °C for distillation) were not exceeded for these samples, which were therefore compliant with the Directive.

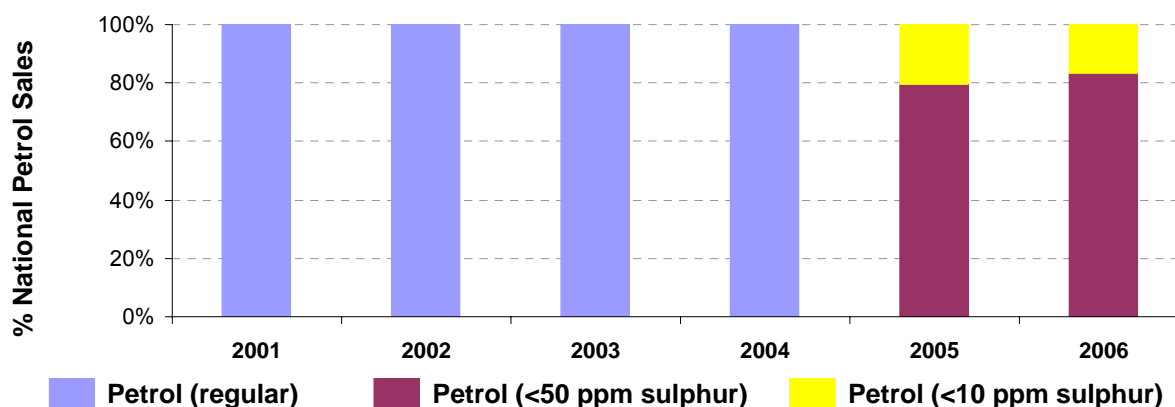
### 23.3 Temporal trends

The following Figure 23.2 to Figure 23.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2006, the sales of petrol increased by 3% (down 6.1% from 2005), while sales of diesel decreased by 7% (down 3.2% from 2005). There was a complete shift from 'regular' to low-sulphur and sulphur-free fuels in 2005.

**Figure 23.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 23.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 23.4: Temporal trends in national sales of low sulphur diesel (%)**

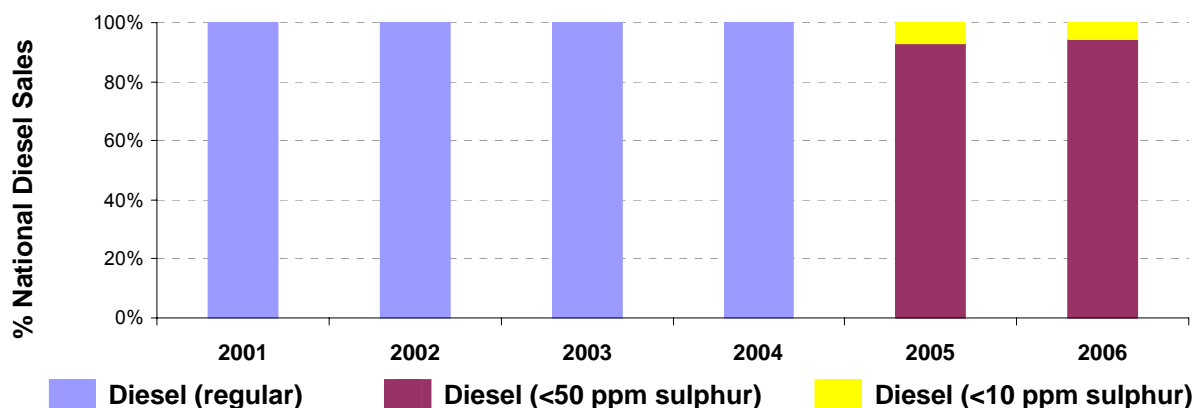
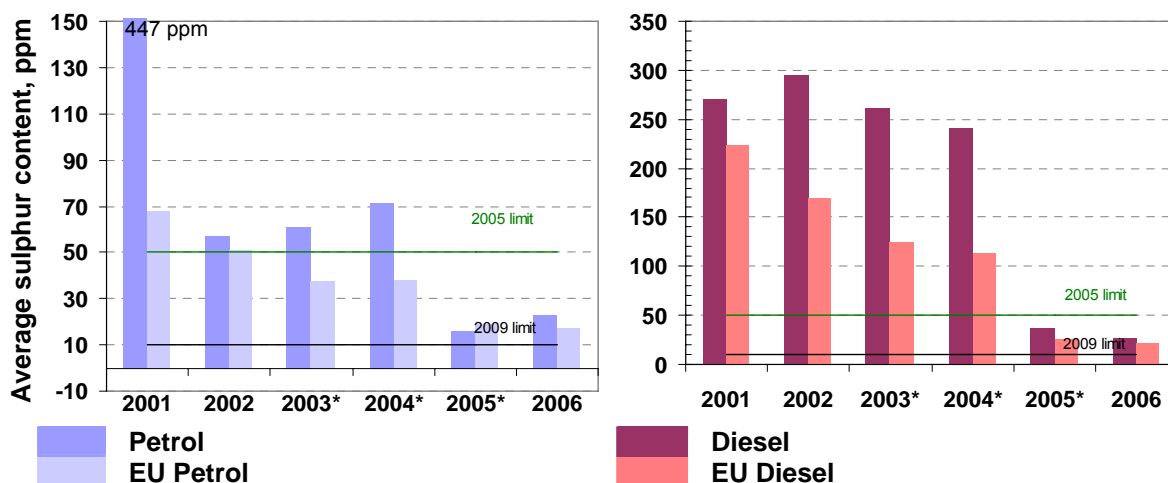


Figure 23.5 shows the trend in average sulphur content of petrol and diesel fuels in Portugal compared with the EU average. With the shift to low sulphur and sulphur-free fuels in 2005, there was a significant reduction in sulphur content, to well below the 50ppm limit. The average sulphur content for petrol and diesel was above the EU.

**Figure 23.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 23.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Portugal’s National FQMS does not appear to be equivalent in confidence with the requirements of EN 14274. A small number of samples were taken, and these were taken at refineries, terminals and refuelling stations. Portugal should indicate the number of samples taken at refuelling stations.
- Portugal was mostly compliant with reporting requirements:
  - No results were provided for the lead content petrol parameter.



## 24 Romania

Although Romania did not join the EU until 2007 and is not required to report on 2007 monitoring in 2008, it has provided information on 2006 monitoring carried out.

### 24.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported. Note that Romania joined the European Union on 1 January 2007. Therefore in 2006 the 50ppm sulphur limit under the Directive did not apply. Romania has advised that since EU accession, only low sulphur and sulphur free fuels have been marketed in its territory.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
4	RON 95	<150 ppm	Unleaded RON 95 with lead substitute	4
5	RON 95	<50 ppm	Unleaded RON 95	5
11	RON 98	<50 ppm	Unleaded RON 98	11
12	RON 98	<10 ppm	Unleaded RON 98 low sulphur (<10ppm)	12
13	Diesel	<350 ppm	Diesel <150ppm sulphur (Euro 3)	13
14	Diesel	<50 ppm	Diesel <150ppm sulphur (Euro 4)	14
15	Diesel	<10 ppm	Diesel <10ppm sulphur (Euro 5)	15

#### 24.1.1 Sales

Figure 24.1: National fuel sales volume proportions by fuel type (%)

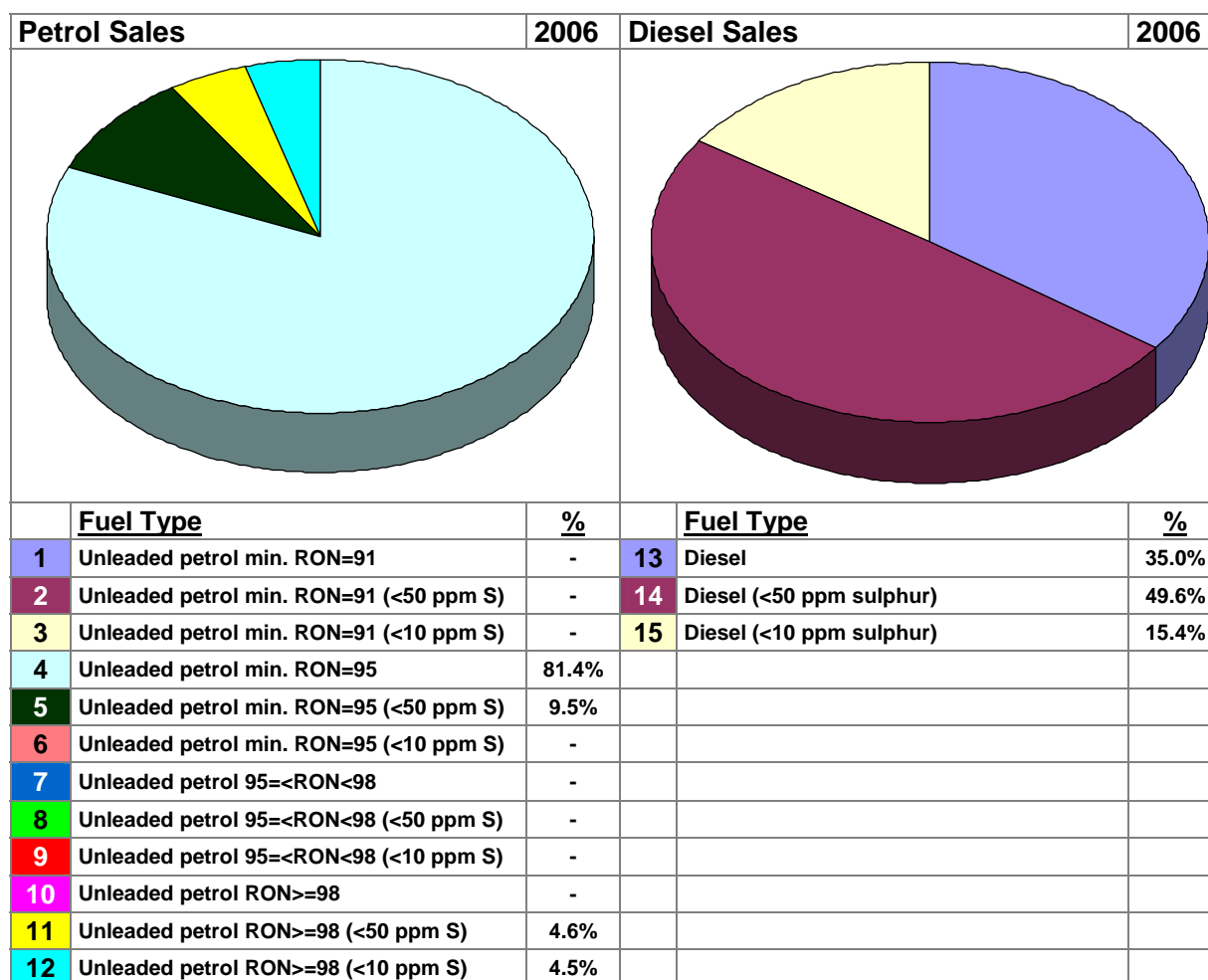


Figure 25.1 shows that the majority (90.9%) of petrol sold was of RON 95 grade with the remainder RON 98 grades. Total sales of petrol grades of sulphur-free quality accounted for 9.1%. 65% of the diesel fuel sold was low sulphur (49.6%) or sulphur-free (15.4%) quality.

### 24.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were available in around half of the service stations in each of Romania's eight regions in 2006.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No information provided.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes.

**Average sulphur content of all petrol and diesel sold:** Table 25.1 shows the average content of fuel sold in 2006 in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 24.1: Annual trend in average sulphur content in petrol and diesel fuels

RO	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
Petrol						48	18
Diesel						46	22

## 24.2 Fuel Quality Monitoring 2006

### 24.2.1 Description of system

**Responsible organisation(s):** Ministry of Economy and Finance.

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C. Due to the lack of sales data per region, Statistical Model C was applied.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Samples were taken in each month from June to December 2006.

**Specification of test methods:** In compliance with Directive 98/70/EC.

**Collection of sales data:** Ministry of Economy and Finance.

## 24.2.2 Sampling and reporting

Romania was essentially compliant with the sampling and reporting requirements in 2006, with the exception of the number of samples taken being too low. The following Table 25.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 24.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
4	RON 95	4	81.4%	28	25	100	Yes	All of 18	
5	RON 95 <50 ppm S	5	9.5%	20	19	10	Yes	All of 18	
11	RON 98 <50 ppm S	11	4.6%	3	6	5	Yes	All of 18	
12	RON 98 <10 ppm S	12	4.5%	0	1	5	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>51</b>	<b>51</b>	<b>120</b>	<b>Yes</b>	<b>All of 18</b>	
13	Diesel	13	35.0%	40	16	100	Yes	All of 5	
14	Diesel <50 ppm S	14	49.6%	10	32	100	Yes	All of 5	
15	Diesel <10 ppm S	15	15.4%	0	3	100	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>51</b>	<b>300</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 24.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 95 Petrol <150ppm sulphur**

**Detail:** The minimum sample results for RON, MON and distillation at 100°C (of 84.0, 75.0 and 37.0%v/v respectively) were below the minimum limit values (of 95, 85, 46.0%v/v). The maximum limit values for aromatics (35.0 %v/v) and sulphur content (50 ppm) were exceeded, with maximum values of 43.3%v/v and 120 ppm.

**Statistical significance:** All of the abovementioned sample results were beyond the tolerance limits for statistical significance for the respective test methods: 94.6 (RON), 84.5 (MON), 43.6%v/v (distillation at 100°C), 37.2 %v/v (aromatics). Therefore these samples were non-compliant with the Directive.

**Member State's notes:** The Ministry of Economy and Finance informed the National Authority for Consumer Protection (NACP) about the non-compliances. NACP decided to fine all stations that did not respect environmental specifications, with approximate EURO 12,000. After one month all stations which were not in conformity were verified. The results show that they were in compliance.

**RON 95 Petrol <50ppm sulphur**

*Detail:* The RON and MON values of 88.1 and 81.5 were below the minimum limit values (of 95 and 85 respectively). The minimum reported value of 45.0%v/v for distillation at 100°C was below the minimum limit value of 46.0%v/v. The maximum limit values for aromatics (35.0 %v/v) and sulphur content (50 ppm) were exceeded, with maximum values of 41.8%v/v and 103 ppm.

*Statistical significance:* The sample results were beyond the tolerance limits for statistical significance for the following test methods: 94.6 (RON), 84.5 (MON), and 37.2 %v/v (aromatics). Therefore these samples were non-compliant with the Directive.

The samples were within the tolerance limit for distillation at 100°C (43.6%v/v) and were therefore compliant with the Directive.

*Member State's notes:* As for RON 95 Petrol <150ppm sulphur.

**RON 98 Petrol <50ppm sulphur**

All samples tested were in compliance with limit values.

**RON 98 Petrol <10ppm sulphur**

All samples tested were in compliance with limit values.

**Diesel <350ppm sulphur**

*Detail:* The cetane number of 48.0 was below the minimum limit value of 51. The maximum limit values for density (845.0 kg/m<sup>3</sup>), distillation at 95% (360°C) and sulphur content (50 ppm) were exceeded by several samples, with maximum values of 852.0 kg/m<sup>3</sup>, 377.0°C and 1300ppm.

*Statistical significance:* All of the abovementioned sample results were beyond the tolerance limits for statistical significance for the respective test methods: 48.5 (cetane), 365° C (distillation), 380 (sulphur content). Therefore these samples were non-compliant with the Directive.

*Member State's notes:* As for RON 95 Petrol <150ppm sulphur.

**Diesel <50ppm sulphur**

*Detail:* The limit values for density (845.0 kg/m<sup>3</sup>) and sulphur content (50 ppm) were exceeded by several samples, with maximum values of 846.4.0 kg/m<sup>3</sup> and 620ppm.

*Statistical significance:* These sample results were beyond the tolerance limits for statistical significance for cetane (48.5) and sulphur content (62.0 ppm), and were therefore non-compliant with the Directive.

*Member State's notes:* As for RON 95 Petrol <150ppm sulphur.

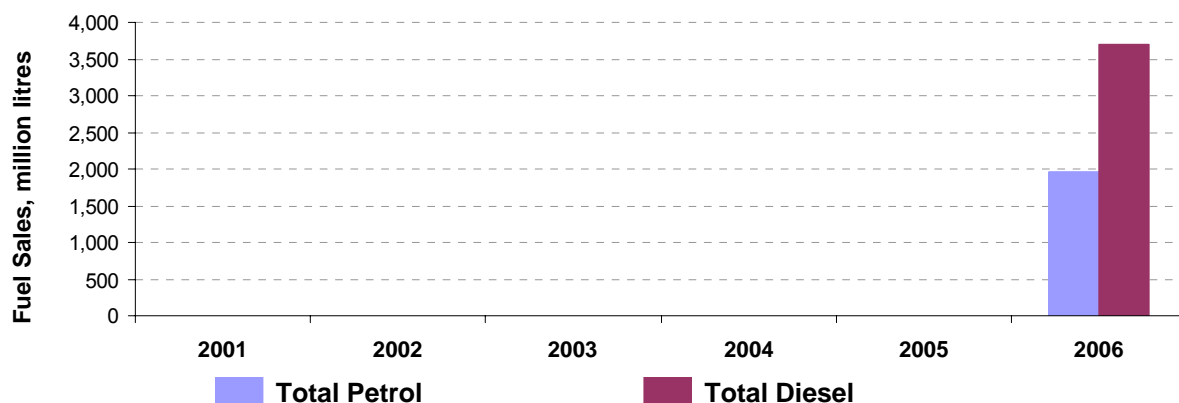
**Diesel <10ppm sulphur**

All samples tested were in compliance with limit values.

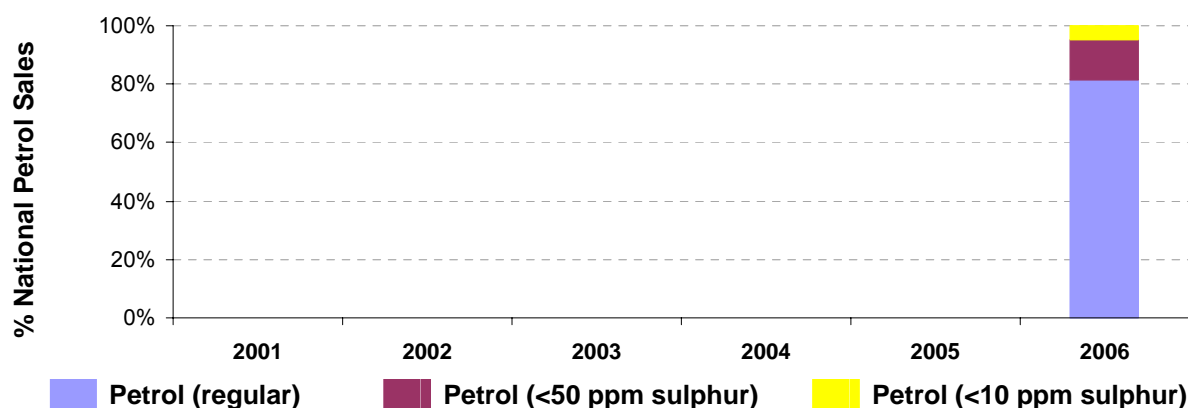
## 24.3 Temporal trends

The following Figure 25.2 to Figure 25.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. 2006 was the first year for which Romania have reported data (even though this is not required until 2007).

**Figure 24.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 24.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 24.4: Temporal trends in national sales of low sulphur diesel (%)**

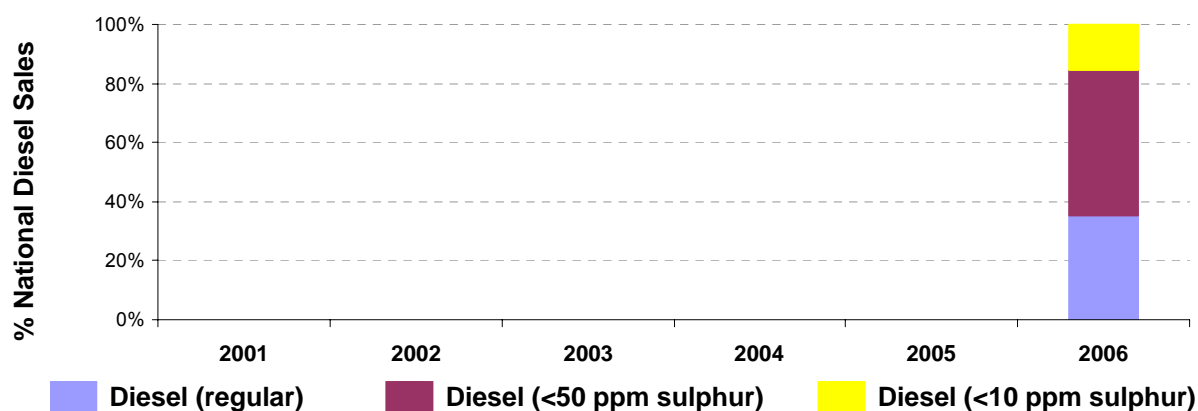
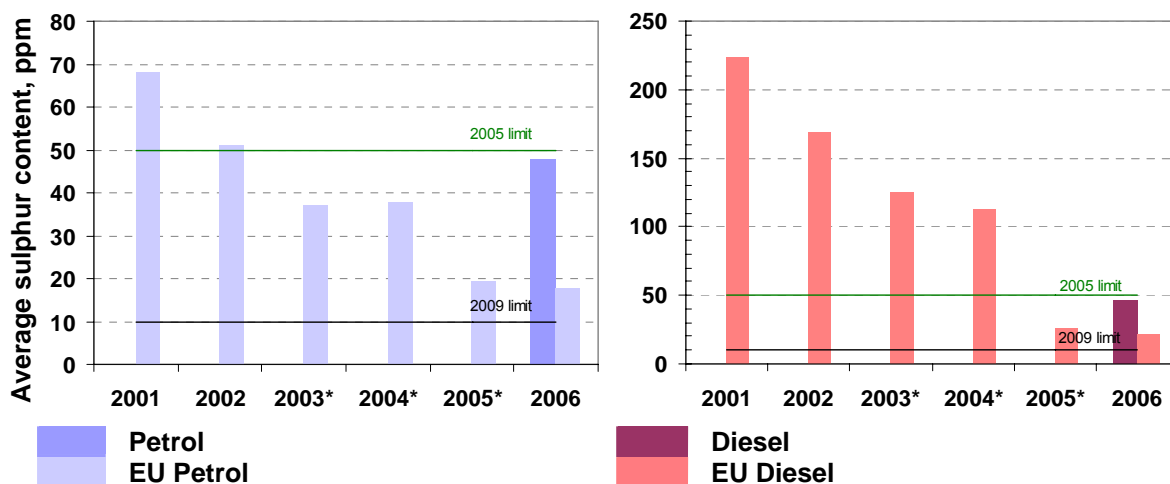


Figure 25.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was below the 2005 limit (<50 ppm) and above the EU average.

**Figure 24.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 24.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Romania has chosen to use Statistical Model C in its Fuel Quality Monitoring system, however this does not appear entirely consistent with the European Standard specification (discussed in section 2.2.2). Instead statistical Model A seems more appropriate on the basis of the NUTS regional classification, which would require further information to be reported on sample numbers in different regions. Romania should present a clear rationale for Model C use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions.
- Insufficient numbers of samples were taken to comply with Statistical Model C, which requires a minimum of 50 samples of each major fuel grade in each of the summer and winter periods. Of the minor fuel grades, only one sample was taken of RON 98 <10ppm petrol which is unlikely to be sufficient to monitor the quality of this grade throughout the year.
- Although it is acknowledged that Romania was not required to comply with the Directive limit of <50ppm sulphur in 2006, we note that the average sulphur content of diesel fuel marketed as low sulphur (<50ppm) was 62 ppm, with a maximum of 620 ppm.

## 25 Slovakia

### 25.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported. However, the split of sulphur grades provided by Slovakia is based upon the results of the sample analysis and not actual marketed grades. There are actually only four national grades marketed in Slovakia: Normal 91, Super 95, Super Plus 98 and Diesel fuel.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	NORMAL 91	2
3	RON 91	<10 ppm	NORMAL 91	2
5	RON 95	<50 ppm	SUPER 95	5
6	RON 95	<10 ppm	SUPER 95	5
11	RON 98	<50 ppm	SUPER PLUS 98	11
12	RON 98	<10 ppm	SUPER PLUS 98	11
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

#### 25.1.1 Sales

Figure 25.1: National fuel sales volume proportions by fuel type (%)

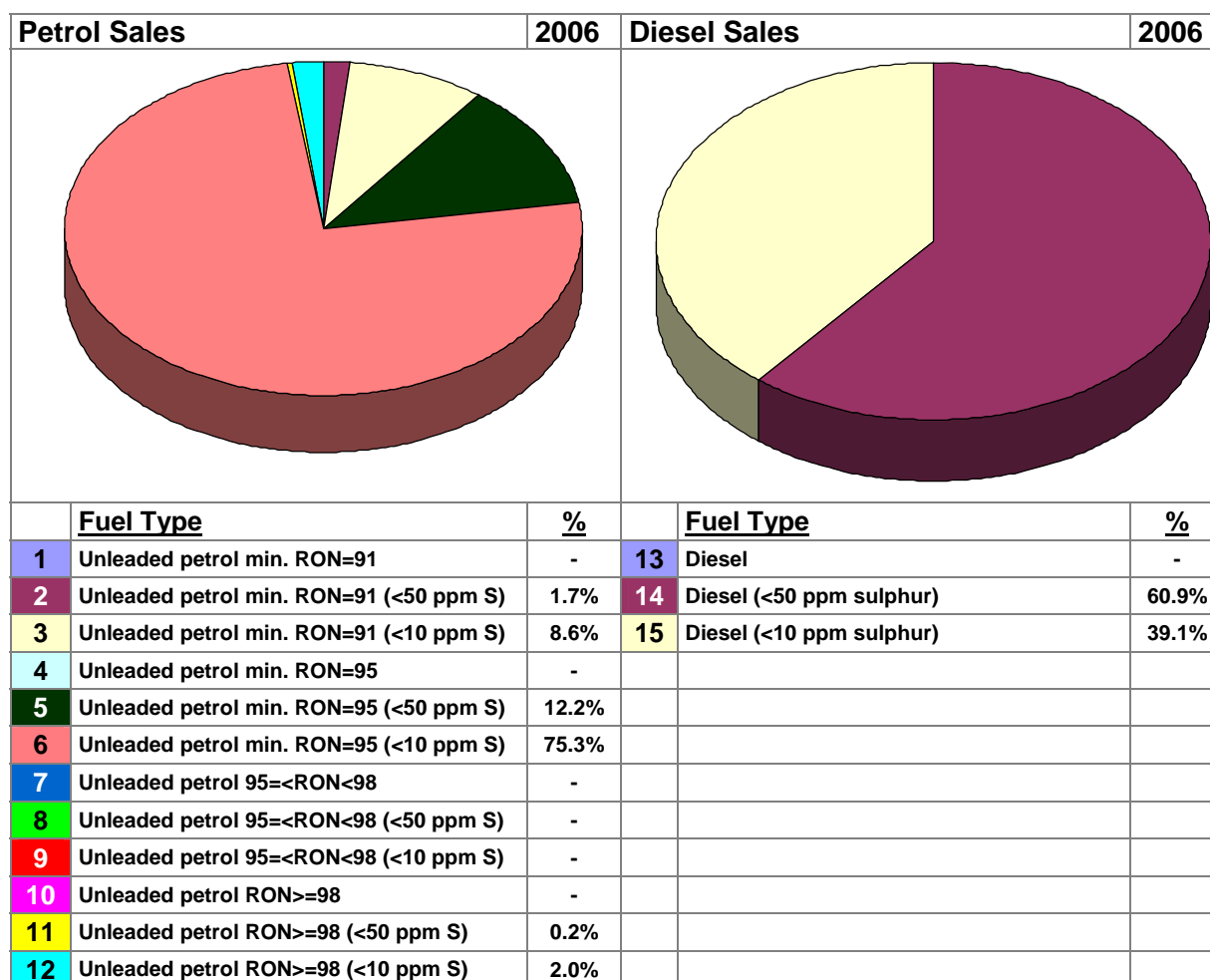


Figure 25.1 shows that the majority (87.5%) of petrol sold was of RON 95 grade (comprising of 12.2% regular grade and 75.3% sulphur free). RON 91 and RON 98 grades comprised 10.3 % and 2.2% respectively. Total sales of petrol grades of sulphur-free quality accounted for almost 86% of national sales in 2006 (83.5% in 2005). Over 60% of the diesel fuel sold was low sulphur and 39.1% was of sulphur-free quality. (N.B. there are actually only four official national grades, however Slovakia has provided estimated sales data for fuels complying with different sulphur levels).

### 25.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were available in significant quantities for petrol and diesel across Slovakia in 2006.

**Are sulphur-free grades clearly labelled differently / marketed separately?** The sulphur-free fuels (<10 ppm sulphur) were again not labelled at refuelling stations.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** N/A. Artificial division into <50 and <10 is based on sulphur content of sample results.

**Average sulphur content of all petrol and diesel sold:** Table 25.1 shows the average content of fuel sold in 2004 to 2006 in relation to the EU25 average.

**Additional information:**

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 25.1: Annual trend in average sulphur content in petrol and diesel fuels

SK	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>				8	7	10	18
<b>Diesel</b>				117	13	15	22

## 25.2 Fuel Quality Monitoring 2006

### 25.2.1 Description of system

**Responsible organisation(s):** Slovak Inspectorate of the Environment. The analyses of samples were carried out by Slovnaft VURUP, a.s. (Testing laboratories accredited according to ISO/IEC 17025).

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations

**Time/frequency of sampling:** Samples were taken most months across the winter and summer periods.

**Specification of test methods:** In compliance with Directive 98/70/EC.



**Collection of sales data:** the Ministry of Environment of Slovak Republic is responsible for collection of data from motor fuel distributors/dealers.

## 25.2.2 Sampling and reporting

Slovakia was fully compliant with the sampling and reporting requirements in 2006. The following Table 25.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 25.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	1.7%	50	50	9	Yes	All of 18	
3	RON 91 <10ppm S	2	8.6%	0	0				
5	RON 95 <50 ppm S	5	12.2%	59	50	100	Yes	All of 18	
6	RON 95 <10 ppm S	5	75.3%	0	0				
11	RON 98 <50 ppm S	11	0.2%	16	12	4	Yes	All of 18	
12	RON 98 <10 ppm S	11	2.0%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>125</b>	<b>112</b>	<b>113</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	60.9%	52	50		Yes	All of 5	
15	Diesel <10 ppm S	14	39.1%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>52</b>	<b>50</b>	<b>-</b>	<b>Yes</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 25.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 91 Petrol**

*Detail:* In two samples the RON and MON were below the minimum limit values (of 91 and 81 respectively), with values of 90.2 and 82.7 for RON and 80.5 and 77.4 for MON. The limit value for vapour pressure (60 kPa) was exceeded by four samples, with 63.8, 63.9, 72.4, 75.0 kPa. One sample exceeded the limit value for aromatics (35.0 %v/v), with 37.5 %v/v, and another exceeded the limit value for benzene (1.0 %v/v), with 1.1 %v/v.

*Statistical significance:* The tolerance limits for statistical significance for the RON and MON test methods are 90.6 and 80.5 respectively, therefore both samples were non-compliant with the Directive. The summer vapour pressure and aromatics samples and were also beyond the tolerance limits of 61.8 kPa and 37.2 %v/v respectively, and were therefore also non-compliant. The result for benzene was within the tolerance limit of 1.1 % v/v and thus complied with the Directive.

*Member State's notes:* The dealers were penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

**RON 95 Petrol**

*Detail:* In two samples the RON value was below the minimum limit value of 95, with values of 90.4 and 92.8. The MON value was, in one sample, below the minimum limit of 85 with a value of 80.8.

The limit value for vapour pressure (60 kPa) was exceeded by 1 sample, with 62.8 kPa.

3 samples exceeded the aromatics value of 35 %v/v with 47.5 %v/v, 38.8 %v/v and 39.4 %v/v, whereas one sample exceeded the benzene value of 1%v/v with 12 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the RON test method is 94.6, for benzene is 1.1 %v/v, and for aromatics is 37.2%v/v. Therefore these samples were non-compliant with the Directive. The summer vapour pressure sample was also beyond the tolerance limit value of 61.8kPa.

*Member State's notes:* The dealers were penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

**RON 98 Petrol**

*Detail:* Aromatics limit value (of max. 35.0 %v/v), oxygen content limit value (2.7% m/m), and ethers with  $\geq 5$  carbon atoms limit value (15% v/v) were exceeded with 36.0 %v/v, 2.8 % m/m, and 15.4 % m/m,

*Statistical significance:* The sample results were within the tolerance ones of 37.2% m/m, 2.9 % m/m, and 15.6 % m/m respectively, therefore they were compliant with the Directive.

*Member State's notes:*

**Diesel**

*Detail:* Cetane value of 49.8 was below the limiting value of 51.

The distillation limit value of 360° C was exceeded by one sample with a value of 366.7° C. Also, the sulphur content (regular grade) limit value of 50 mg/kg was exceeded by 1 sample with a value of 66.4 mg/kg.

*Statistical significance:* The tolerance limit for statistical significance for cetane is 48.5, therefore the samples were compliant with the Directive.

The tolerance limit for statistical significance for the distillation test method is 365° C, whereas the one for the sulphur content (regular grade) testing method used EN ISO 20846 is 54.0 mg/kg, therefore the samples were non-compliant with the Directive.

*Member State's notes:* The dealers were penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

## 25.3 Temporal trends

The following Figure 25.2 to Figure 25.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol and diesel sales both increased by 2% and 19.3% respectively compared to 2005. Proportions of fuel meeting the <10ppm criteria also slightly increased to 86% in 2006 from 83% in 2005 for petrol and to 39% from 30.6% for diesel.

Figure 25.2: Temporal trends in national sales of petrol and diesel (million litres)

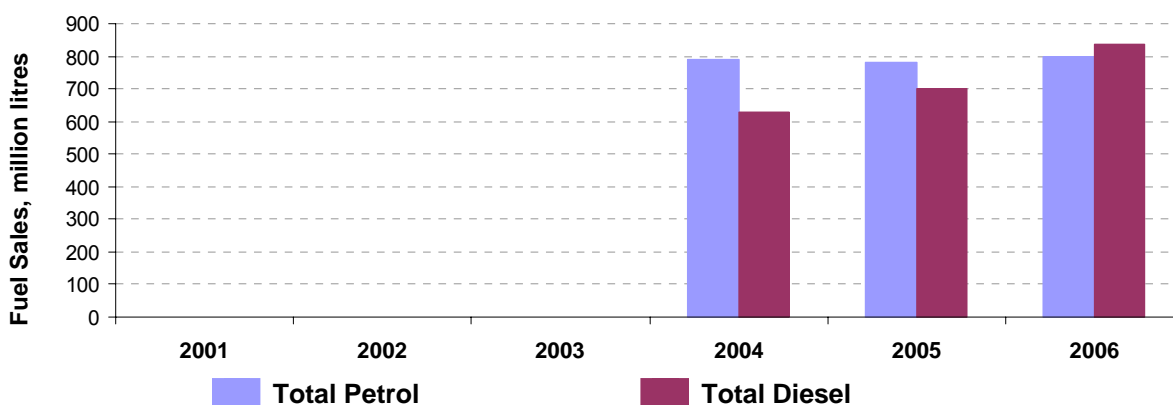


Figure 25.3: Temporal trends in national sales of low sulphur petrol (%)

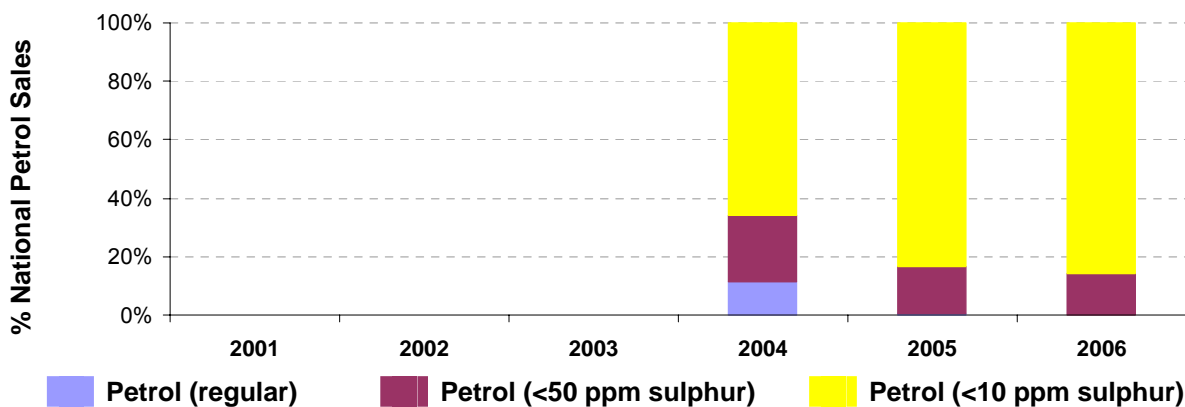


Figure 25.4: Temporal trends in national sales of low sulphur diesel (%)

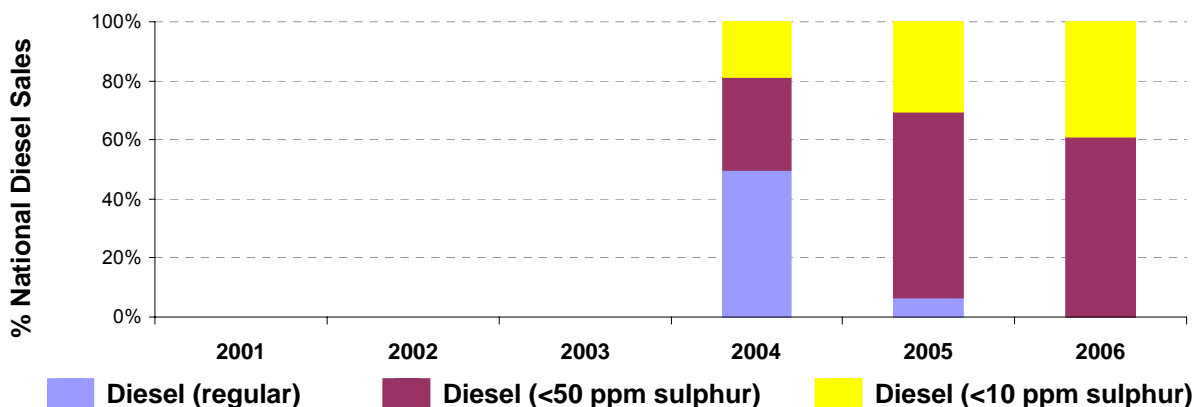
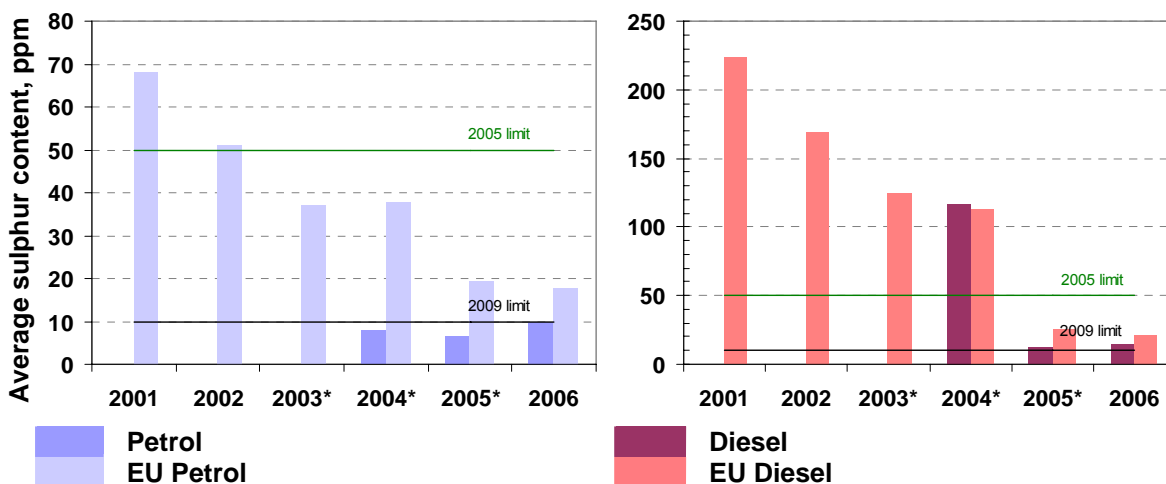


Figure 25.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) and the EU average.

**Figure 25.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 25.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Slovakia has stated that it uses Statistical Model C, however this does not appear entirely consistent with the European Standard specification (discussed in section 2.2.2). Instead statistical Model A seems more appropriate on the basis of the NUTS regional classification, which would require further information to be reported on sample numbers in different regions. Slovakia should present a clear rationale for Model C use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions.

## 26 Slovenia

### 26.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
8	95<RON<98	<50 ppm	NMB 95 Euro Super	8
11	RON 98	<50 ppm	NMB 98 Super Plus	11
14	Diesel	<50 ppm	Euro Diesel	14

#### 26.1.1 Sales

Figure 26.1: National fuel sales volume proportions by fuel type (%)

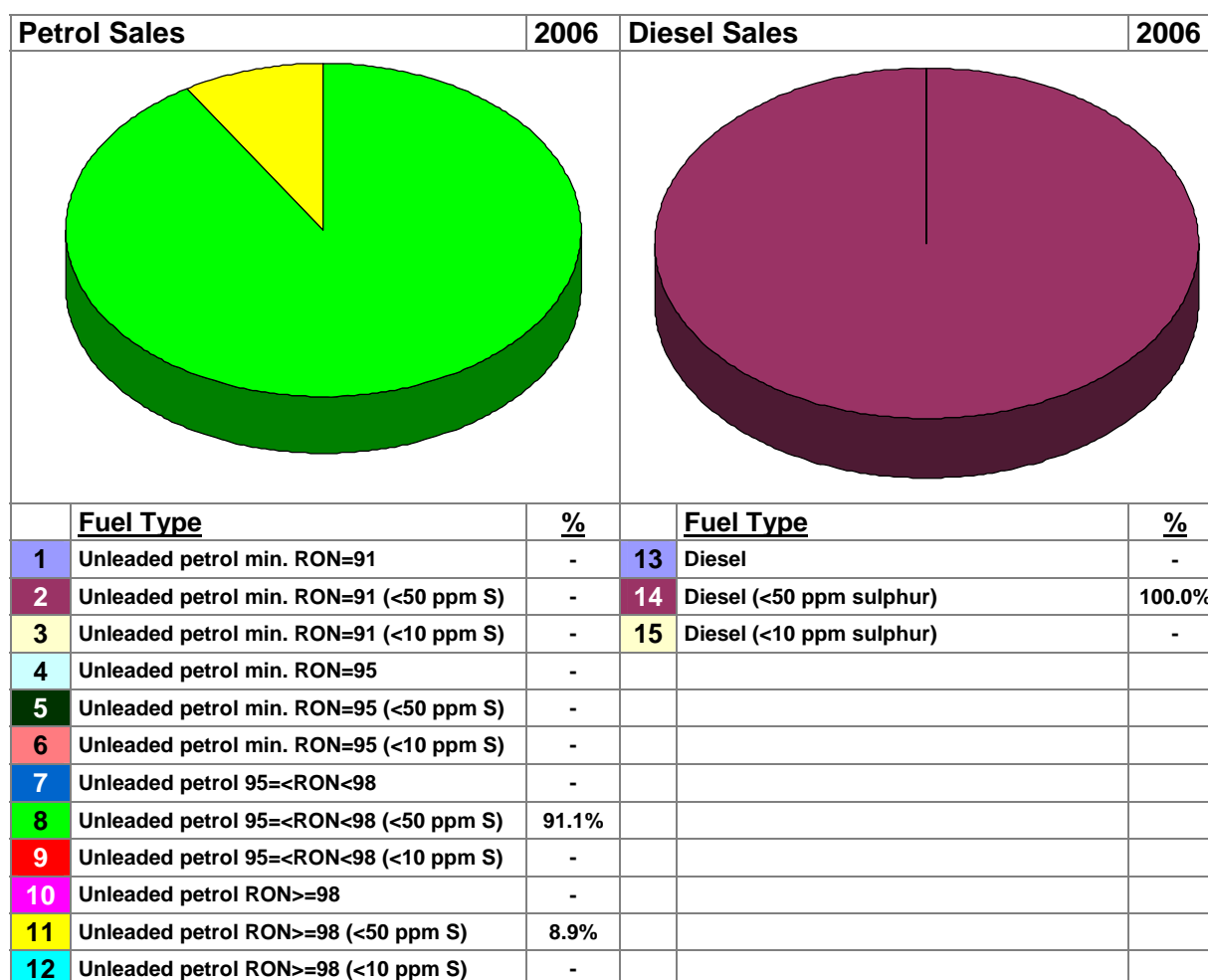


Figure 26.1 shows data for the three official national fuel grades in Slovenia, which are all low sulphur (<50ppm) grades. The majority of petrol sold was of RON 95-98 category again (91.1%) with the remainder being RON 98. In addition to the three low sulphur grades, small

amounts of sulphur free (<10ppm) petrol and diesel were also sold in 2006, as outlined in the following section.

## 26.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** There are no official statistics available concerning the volume and/or geographical extent to which sulphur free petrol or diesel fuels are marketed. Sulphur free petrol availability is national-wide. Unleaded petrol NMB 98 SUPER PLUS (RON  $\geq 98$ ) was the most sulphur free fuel sold in 2006. Distribution of sulphur free diesel was limited on some district petrol stations. Small quantities of Unleaded petrol (minimum RON  $\geq 98$  & < 10 ppm Sulphur), Unleaded petrol (minimum 95  $\leq$  RON < 98 & < 10 ppm Sulphur) and Diesel fuel (< 10 ppm sulphur) were also sold in Slovenia in year 2006. Oil distributors provided the data of sulphur-free fuels. There are however only three official national fuel grades in Slovenia.

**Are sulphur-free grades clearly labelled differently / marketed separately?** No, the sulphur-free fuels were not labelled at refuelling stations.

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** No.

**Average sulphur content of all petrol and diesel sold:** Table 26.1 shows the average content of fuel sold in relation to the EU25 average.

### Additional information:

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 26.1: Annual trend in average sulphur content in petrol and diesel fuels

SI	Average Sulphur Content, ppm						EU25
	2001	2002	2003	2004	2005	2006	2006
<b>Petrol</b>				39	27	26	18
<b>Diesel</b>				236	47	43	22

## 26.2 Fuel Quality Monitoring 2006

### 26.2.1 Description of system

**Responsible organisation(s):** Environmental Agency of the Republic of Slovenia

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model C.

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal).

**Location(s) of sampling:** Samples of petrol were taken at refuelling stations each month across the winter and summer periods.

**Time/frequency of sampling:** Samples were taken across the winter and summer periods, except for petrol for which winter samples were more than 2/3 of the total samples taken. Total number of samples for petrol was 91 (below the Directive suggested requirement) and for diesel 151.

**Specification of test methods:** In compliance with Directive 98/70/EC, although the test method for diesel cetane number (PML.07.23) was not in compliance with the Directive.

**Collection of sales data:** The Statistical Office of the Republic of Slovenia and fuel distributors provided the national sales data.

## 26.2.2 Sampling and reporting

Slovenia was almost fully compliant with the sampling and reporting requirements in 2006. The following Table 26.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 26.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
8	95<RON<98 <50 ppm S	8	91.1%	53	57	100	Yes	17 of 18	(1)
11	RON 98 <50 ppm S	11	8.9%	8	18	9	Yes	17 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>61</b>	<b>75</b>	<b>109</b>	<b>Yes</b>	<b>17 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	100.0%	68	83	100	Yes	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>68</b>	<b>83</b>	<b>100</b>	<b>Yes</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

(1) No vapour pressure results were provided for RON 98

## 26.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 95 Petrol**

**Detail:** The aromatics limit value of 35 %(v/v) was exceeded by two samples with 37.0 and 39.0 %(v/v) and the sulphur content value of 51.2 mg/kg exceeded the limit of 50 mg/kg. Six samples exceeded the summer vapour pressure limit of 60 kPa, with values between 61.6 and 70.6 kPa.

**Statistical significance:** The tolerance limits for statistical significance for the test methods used are 36.0 %(v/v) for aromatics and 61.8 kPa for summer vapour pressure, therefore the aromatics samples and 5 of the 6 vapour pressure samples were not compliant with the Directive.

The tolerance limit for sulphur content is 54.7 mg/kg, therefore this samples was compliant with the Directive.

**Member State's notes:** According to the national legislation, which transposes the Directive 98/70/EC, and was amended in June 2006, the distributors will be penalised as a result of the exceedance.

#### **RON 98 Petrol**

**Detail:** In two samples, the aromatics values of 39 and 38.4 %(v/v) exceeded the limit value of 35. No analysis results were provided for summer vapour pressure for

RON 98 petrol so compliance could not be established with this parameter.

*Statistical significance:* The samples exceeded the tolerance limit for statistical significance (94.6 for RON and 37.2 for aromatics), therefore they were not compliant with the Directive.

*Member State's notes:* As above.

**Diesel**

*Detail:* Cetane values (49.4 and 50.5) were below the minimum limit value of 51.

The sulphur content limit value of 50 mg/kg was exceeded by 6 samples, with values of 54.1 to 1,490 mg/kg.

Distillation 95% value for winter of 361.6°C exceeded the limit value of 360°C.

*Statistical significance:* The cetane tolerance limit is minimum 48.5, therefore the samples were compliant with the Directive. However, no sampling information was provided for cetane and the statistical method used has not been indicated.

The sulphur content tolerance limit is 54.7 mg/kg, therefore 5 of the 6 samples were not compliant with the Directive.

The tolerance limit for distillation 95% value for winter was within the tolerance limit of 365.9 °C of the test method, therefore the samples were compliant with the Directive.

*Member State's notes:* As above.

**26.3 Temporal trends**

The following Figure 26.2 to Figure 26.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales decreased from 2005 to 2006 by 3%, whereas diesel sales increased by 14%.

**Figure 26.2: Temporal trends in national sales of petrol and diesel (million litres)**

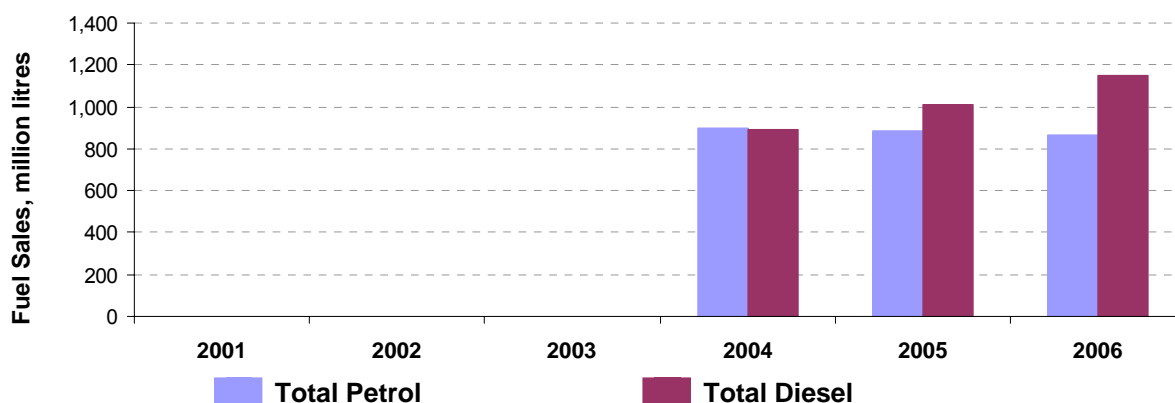




Figure 26.3: Temporal trends in national sales of low sulphur petrol (%)

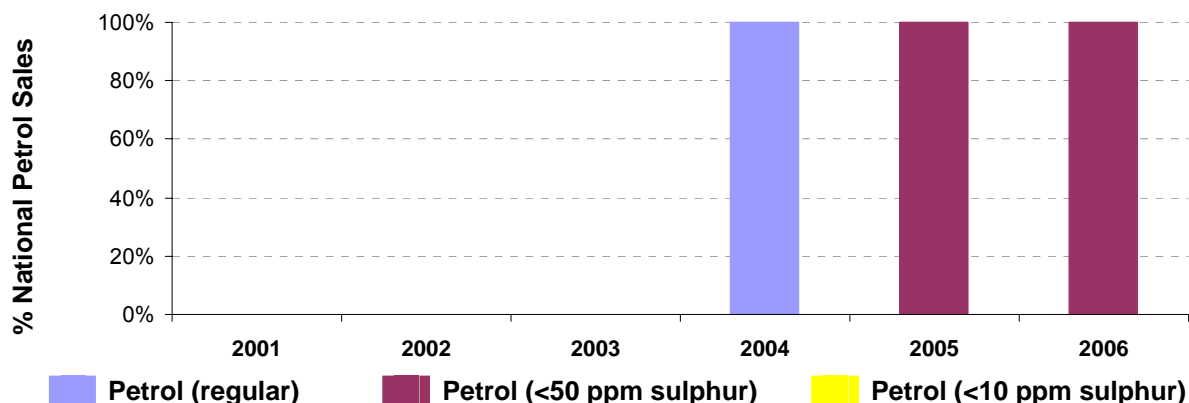


Figure 26.4: Temporal trends in national sales of low sulphur diesel (%)

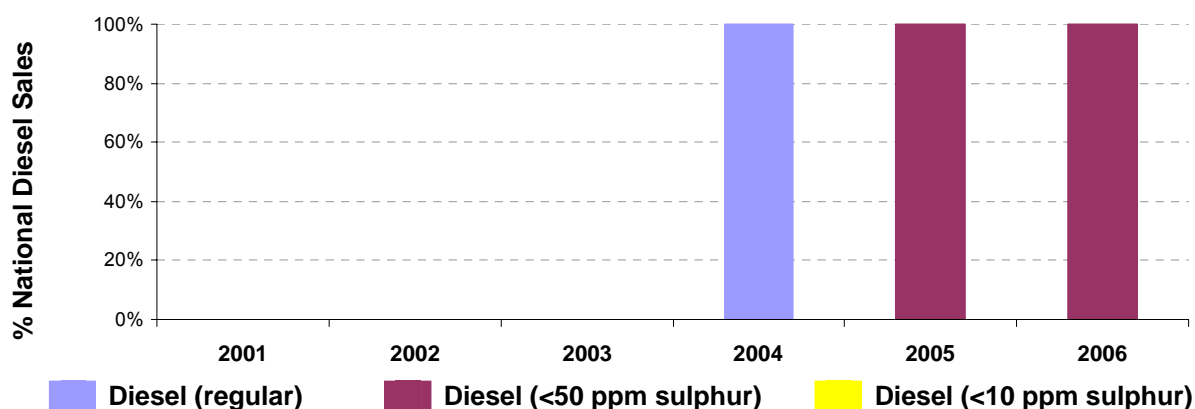
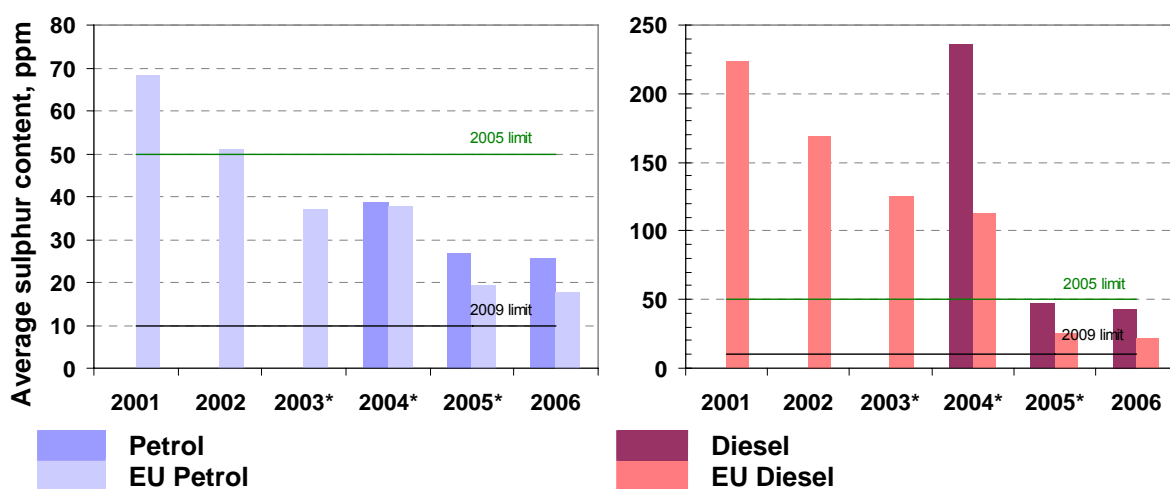


Figure 26.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was below the 2005 limit (<50 ppm) but above the EU average.

Figure 26.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 26.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle.
- The test method for diesel cetane number (PML.07.23) was not in compliance with the Directive.
- No analysis results were provided for summer vapour pressure for RON 98 petrol so compliance with this parameter could not be established.

## 27 Spain

### 27.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Gasolina I.O.95	5
8	95<RON<98	<50 ppm	Gasolina I.O.97	5
12	RON 98	<10 ppm	Gasolina I.O.98	12
14	Diesel	<50 ppm	Gasóleo de Automoción	14
15	Diesel	<50 ppm	Gasóleo de Automoción sin azufre	15

#### 27.1.1 Sales

Figure 27.1: National fuel sales volume proportions by fuel type (%)

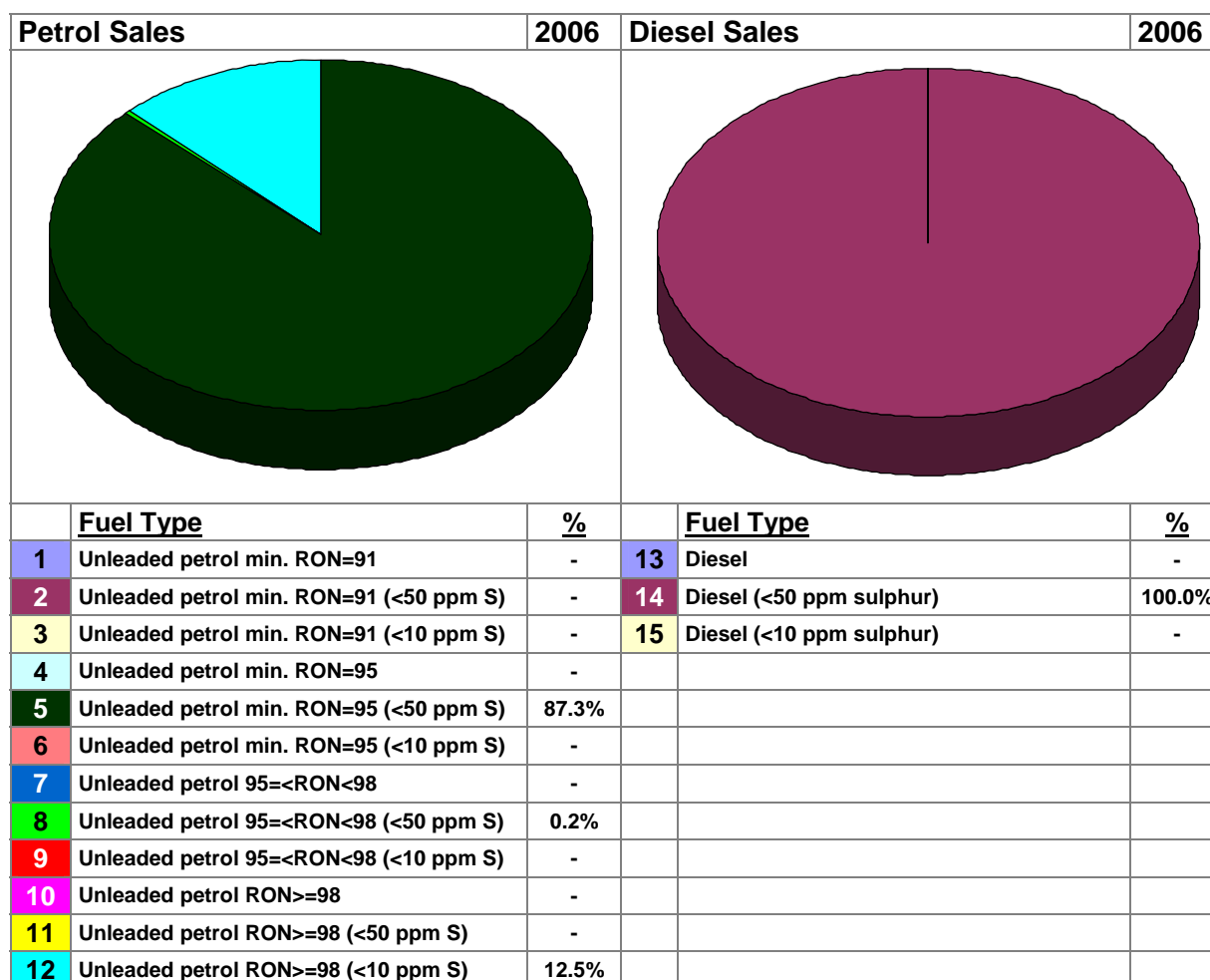


Figure 27.1 shows that the majority of fuel sold in Spain in 2006 was again RON 95 grade (87% compared to 64% in 2001), with the rest comprising of RON 95-98 (0.2%, down from

6% in 2005 and from 26% in 2001) and RON>98 (12.5%, up from 9% in 2001). RON>98 fuel sales were entirely sulphur-free in 2005 and 2006, however no sulphur-free diesel sales figures were available.

It is worth noting that no sales figures for sulphur-free diesel are reported, although they are included in the sales figures for diesel < 50ppm.

### 27.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** All RON>=98 grade fuels were sulphur-free in Spain in 2006.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** Average sulphur content of petrol and diesel in Spain has varied little between 2001 and 2004, but then decreased significantly with the introduction of the <50 ppm limit and <10ppm fuels in 2005 - see Table 27.1.

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 27.1: Annual trend in average sulphur content in petrol and diesel fuels

<b>ES</b>	<b>Average Sulphur Content, ppm</b>						<b>EU25</b>
<b>Fuel/Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2006</b>
<b>Petrol</b>	96	103	103	100	23	17	18
<b>Diesel</b>	278	276	267	253	33	26	22

## 27.2 Fuel Quality Monitoring 2006

### 27.2.1 Description of system

**Responsible organisation(s):** Dirección General de Política Energética y Minas - Ministerio de Industria, Turismo y Comercio

**Format of Fuel Quality Monitoring System (FQMS):** National System

**Country Size:** Large (more than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st May to 30th September (Normal)

**Location(s) of sampling:** Refuelling stations, Terminals / Depots and Refineries

**Time/frequency of sampling:** Monthly throughout the year

**Specification of test methods:** No information provided

**Collection of sales data:** No information provided.

**Other details:** There are nine refineries in Spain with a total fuel processing capacity of 65 MT/year. Imports of petrol and diesel for 2006 were 586 and 6,571 kT respectively. Exports of petrol and diesel in 2005 were 3,520 and 373 kT respectively.

## 27.2.2 Sampling and reporting

Spain was compliant with the sampling and reporting requirements in 2005, however it has not provided information on whether its national monitoring system is equivalent in confidence with the requirements of EN 14274. Unleaded petrol 95<RON<98 (Gasolina 97 I.O) consumption was negligible, and therefore an appropriate samples taking was not performed. The following Table 27.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 27.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1)</sup>			
5	RON 95 <50 ppm S	5	87.3%	96	159	-	Yes	All of 18	(1)
8	95<RON<98 <50 ppm S	5	0.2%	0	0	-			(1)
12	RON 98 <10 ppm S	12	12.5%	88	149	-	Yes	All of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>184</b>	<b>308</b>	-			
14	Diesel <50 ppm S	14	100.0%	88	155	-	Yes	All of 5	(1)
15	Diesel <10 ppm S	15	0.0%	37	53	-	Yes	All of 5	(1)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>125</b>	<b>208</b>	-			

**Notes:** S = Summer; W = Winter

- (1) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 27.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **RON 95 Petrol**

All samples tested were in compliance with limit values.

#### **RON 98 Petrol**

All samples tested were in compliance with limit values.

#### **Diesel < 50 ppm**

All samples tested were in compliance with limit values.

#### **Diesel < 10 ppm**

All samples tested were in compliance with limit values.

## 27.3 Temporal trends

The following Figure 27.2 to Figure 27.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales at decreased by 18% between 2001 and 2006, with diesel sales increasing by 36%. Sulphur-free fuels were introduced for the first time in 2005.

Figure 27.2: Temporal trends in national sales of petrol and diesel (million litres)

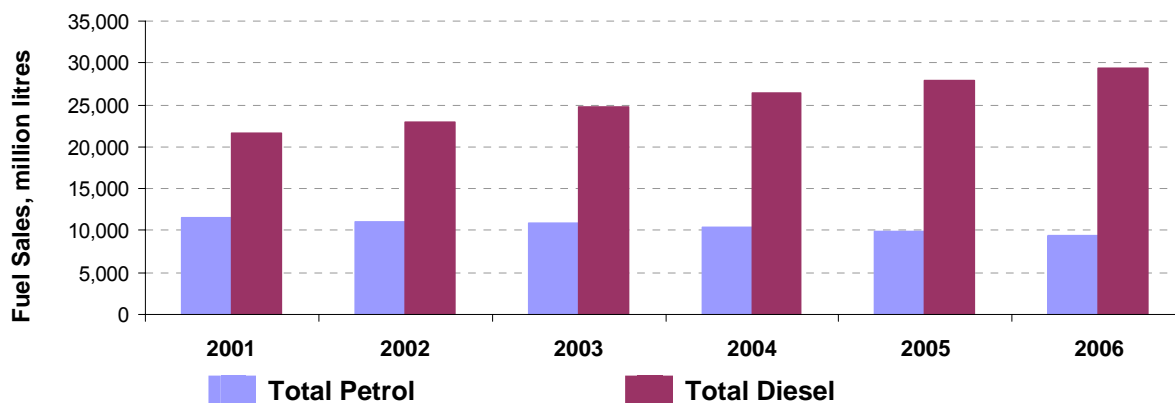


Figure 27.3: Temporal trends in national sales of low sulphur petrol (%)

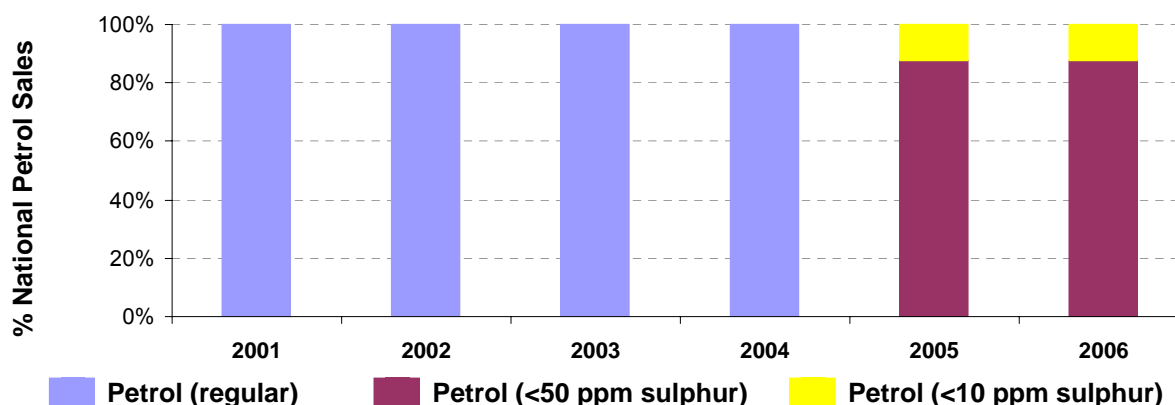


Figure 27.4: Temporal trends in national sales of low sulphur diesel (%)

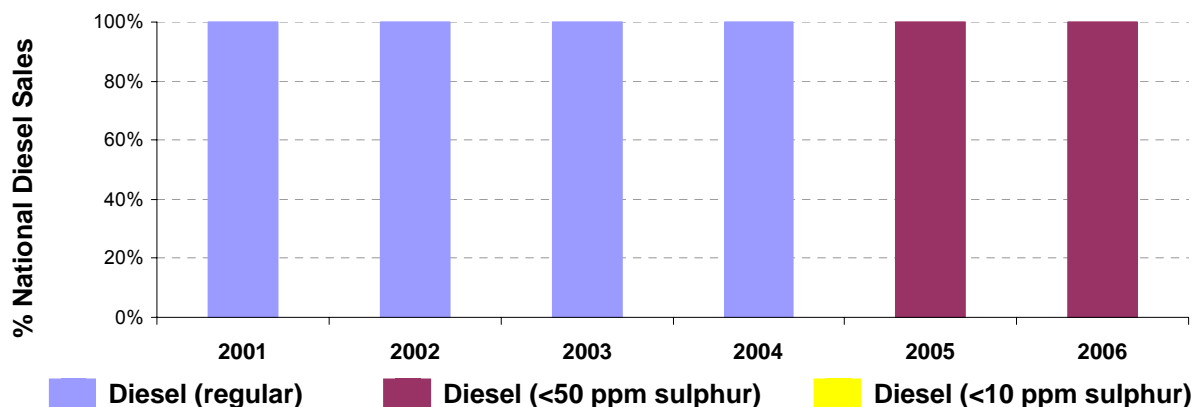
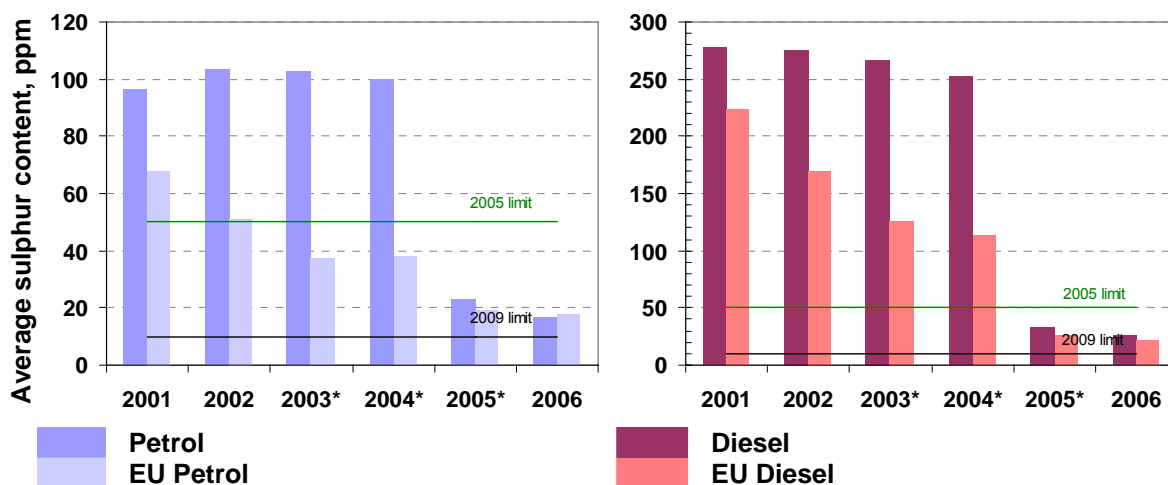


Figure 27.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased steadily since 2001, with a substantial decrease with the introduction of the mandatory limit of <50ppm and sulphur-free fuels in 2005. Average sulphur content is still above the EU average in 2006 for diesel, however it is just below the average for petrol.

**Figure 27.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 27.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Spain has not provided information on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274.
- Spain is carrying out sampling at refineries and depots as well as refuelling stations. Information on sample numbers taken from refuelling stations would help assessment of its national FQMS comparability with EN 14274.
- Sales of sulphur free diesel are not provided and Spain has provided no assessment of the geographical availability of sulphur-free diesel in its territory.

## 28 Sweden

### 28.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
6	RON 95	<10 ppm	Class 1 petrol unleaded 95	6
12	RON 98	<10 ppm	Class 1 petrol unleaded 98	12
15	Diesel	<10 ppm	EN 590 < 10 ppm S, and Environmental Class 1 diesel	15

#### 28.1.1 Sales

Figure 28.1: National fuel sales volume proportions by fuel type (%)

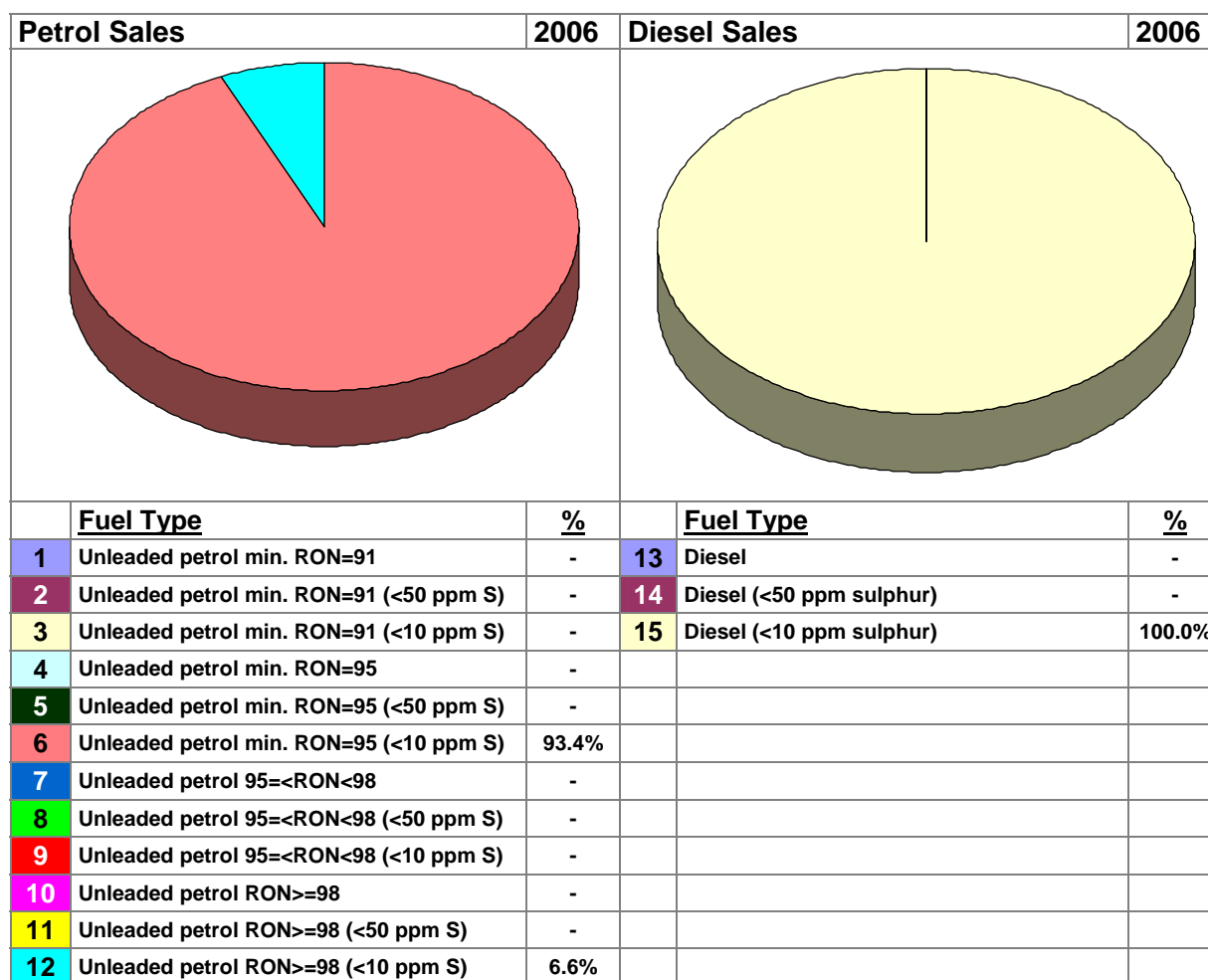


Figure 28.1 shows that all petrol sold in Sweden in 2006 was sulphur-free (<10 ppm), 93.4% being RON 95 (93% in 2005) and 6.6% RON 98. All diesel sold was also sulphur-free grade (<10 ppm).



Note: Diesel fuel sales include also fuel for off road use - Sweden has the same grade on road as well as off road diesel fuel, Diesel for transportation use is approx 3 700 000 m<sup>3</sup>.

## 28.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** All petrol and diesel fuel sold throughout Sweden was sulphur-free in 2005 and 2006. As early as 1996, 85% of all diesel fuel sold was sulphur-free.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Yes

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 28.1.

[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].

Table 28.1: Annual trend in average sulphur content in petrol and diesel fuels

SE	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>	21	17	13	9	4	3	18
<i>Diesel</i>	1	2	2	2	2	2	22

## 28.2 Fuel Quality Monitoring 2006

### 28.2.1 Description of system

**Responsible organisation(s):** The Swedish Road Administration

**Format of Fuel Quality Monitoring System (FQMS):** National System

**Country Size:** Small (less than 15 million tonnes automotive fuel dispensed per year)

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Every batch from the refinery and imports to terminals

**Time/frequency of sampling:** All year round - see above

**Specification of test methods:** No information provided.

**Collection of sales data:** Reported by the major oil companies in the market.

**Other details:** Three national refineries and a number of international refineries serve the market.

## 28.2.2 Sampling and reporting

Sweden was not compliant with the sampling and reporting requirements in 2006, as the national system does not involve sampling at refuelling stations, as required by EN 14274. Sampling at refuelling stations is a prerequisite criterion in establishing similar confidence to this standard. The following Table 28.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 28.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
6	RON 95 <10 ppm S	6	93.4%	345	330	-	Yes	12 of 18	(1)
12	RON 98 <10 ppm S	12	6.6%	98	53	-	Yes	12 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>443</b>	<b>383</b>	-	<b>Yes</b>	<b>12 of 18</b>	<b>(1)</b>
15	Diesel <10 ppm S	15	100.0%	161	484	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>161</b>	<b>484</b>	-	<b>No</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter

- (1) For RON95 petrol: Oxygen content and five of the seven oxygenates have not been reported (Sweden's note: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel).  
For RON98 petrol: Six of the seven oxygenates (i.e. other than ethers with more than 5 carbon atoms per molecule) have not been reported.
- (2) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 28.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

**Detail:** In one or more samples, the cetane number of 50 was below the minimum limit value of 51.0.

**Statistical significance:** The sample/s were within the minimum tolerance limit of 48.5, and were thus compliant with the Directive.

*Member State's notes:*

## 28.3 Temporal trends

The following Figure 28.2 to Figure 28.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales decreased by 1% between 2001 and 2006, whereas diesel sales increased by 24%. All petrol sold in 2001 - 2004 was low sulphur (<50 ppm), with full market conversion to sulphur-free in 2005. All diesel fuel was sulphur free (<10 ppm) in 2001-2006.

Figure 28.2: Temporal trends in national sales of petrol and diesel (million litres)

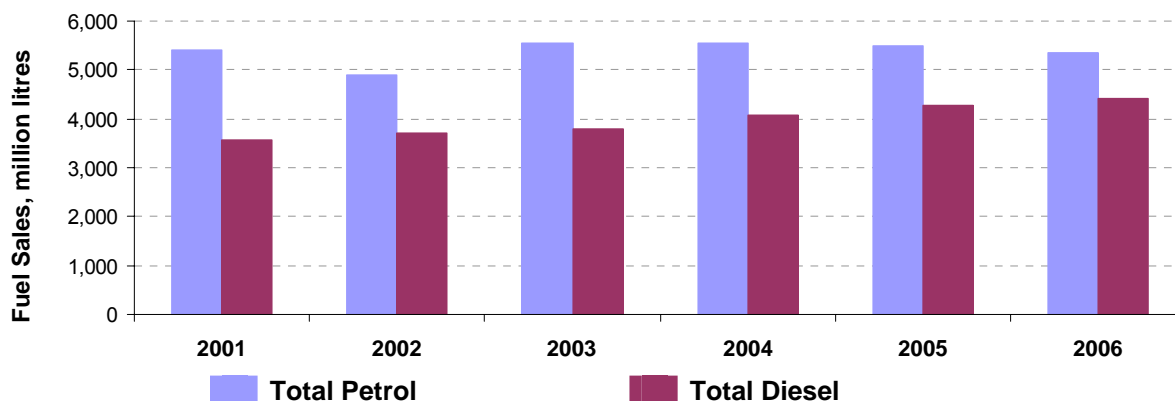


Figure 28.3: Temporal trends in national sales of low sulphur petrol (%)

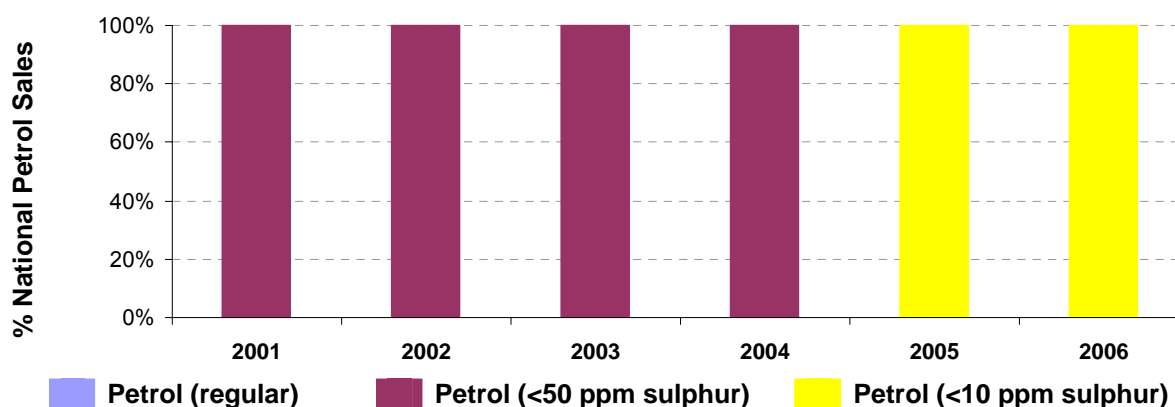


Figure 28.4: Temporal trends in national sales of low sulphur diesel (%)

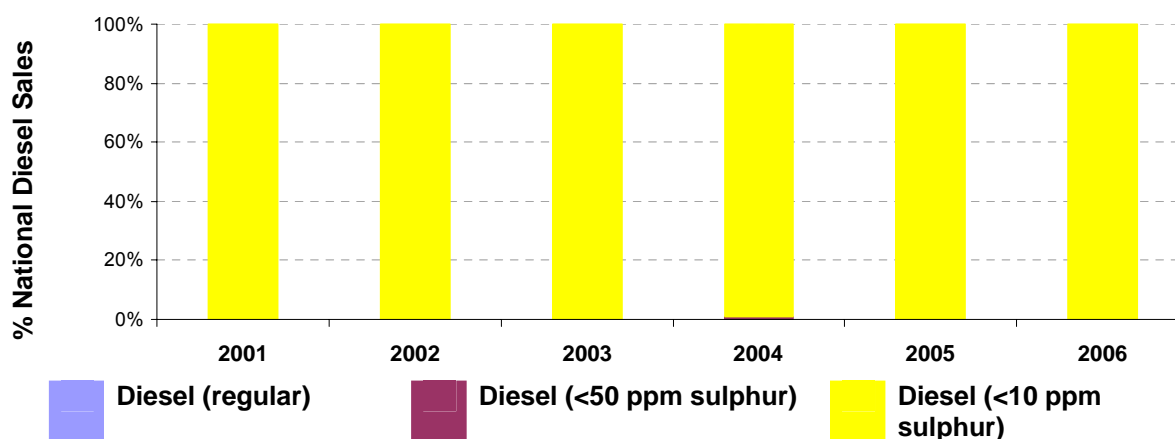
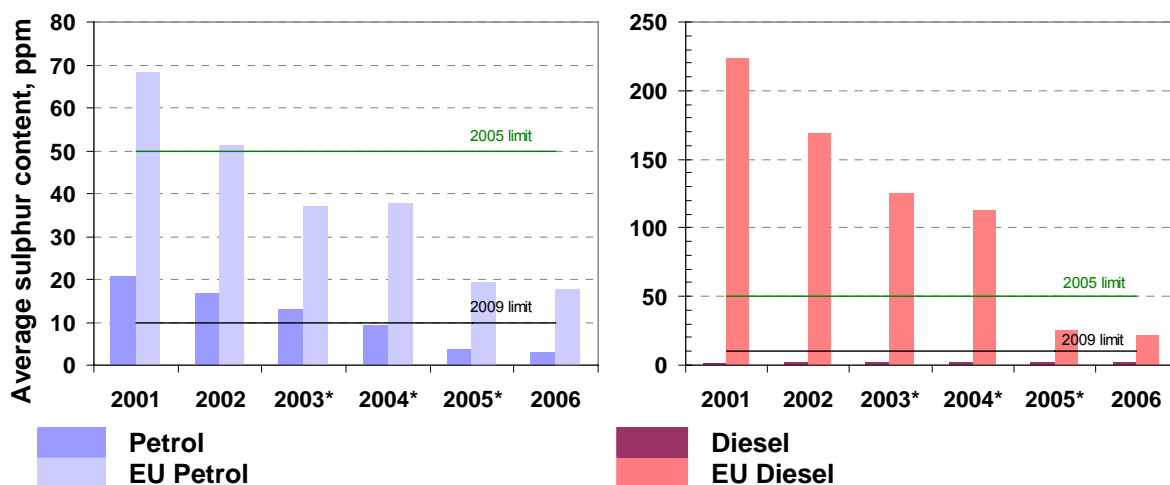


Figure 28.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased slowly since 2001 and are well below the mandatory <50ppm limits, the EU average and the 2009 <10 ppm limits.

**Figure 28.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 28.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- Sweden has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard. In fact Sweden is only carrying out sampling at refineries and depots, with no samples taken at fuel dispensing sites – which is a prerequisite requirement for statistical confidence comparable to EN 14274. Sweden’s current system therefore provides no assurance that fuel dispensed at the pumps has not been tampered with since it left the refinery/depot.
- Results for summer and winter periods should be reported separately for the diesel fuel grade, as was done for the two petrol fuel grades.

## 29 United Kingdom

### 29.1 Fuel Availability 2006

The following table lists the fuels that were reported to be available nationally in 2006 and the category (the reference number) under which sample analysis results were reported.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Premium unleaded petrol	5
8	95<RON<98	<50 ppm	Super unleaded petrol	8
14	Diesel	<50 ppm	ULSD	14

#### 29.1.1 Sales

Figure 29.1: National fuel sales volume proportions by fuel type (%)

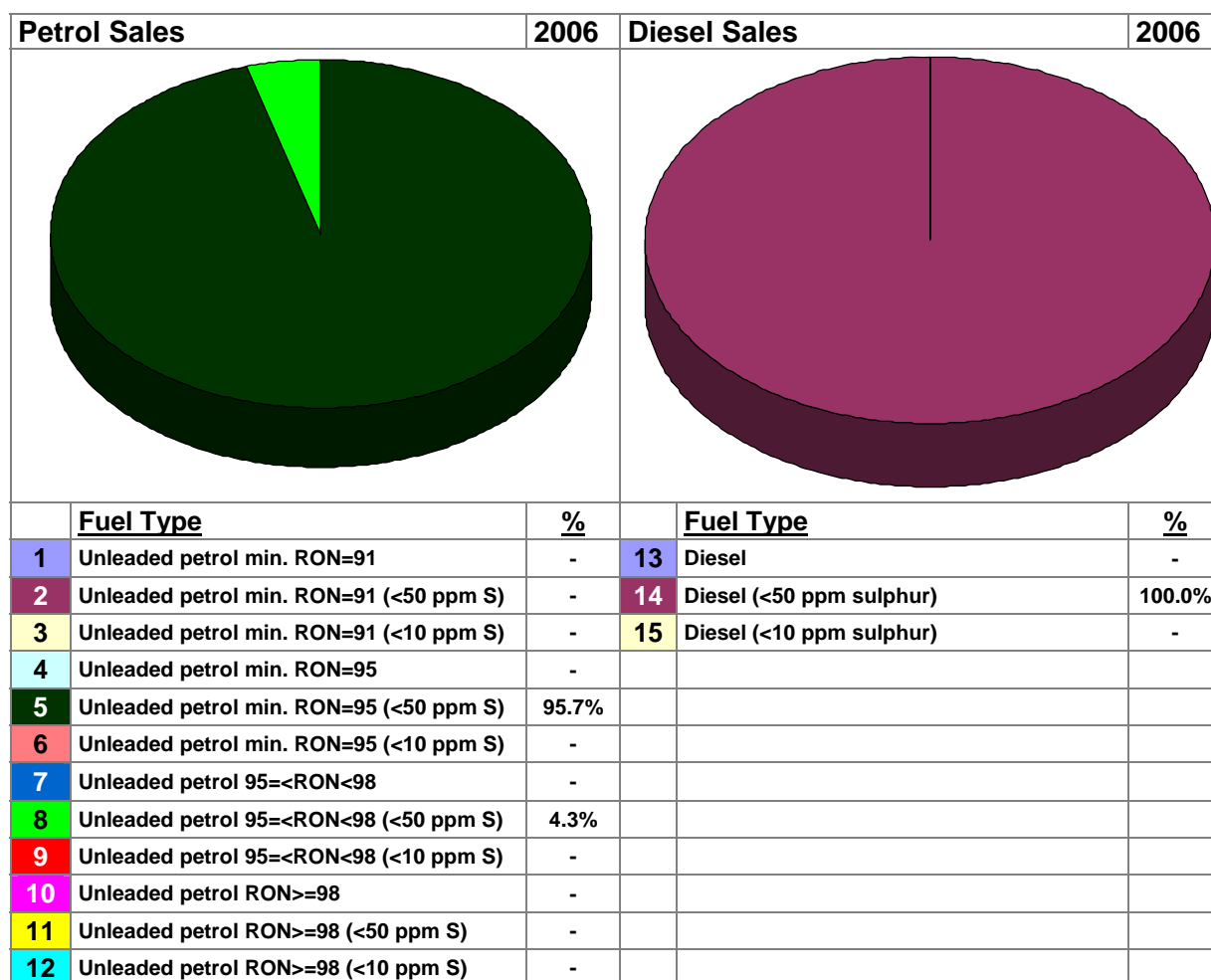


Figure 29.1 above shows the wide availability of low sulphur (<50 ppm) fuels on the UK market in 2006, with 100% of all petrol and diesel fuel sold being low sulphur, as in previous years. For petrol 96% of fuel sold is RON 95, similar to 2002-5. The remaining 4.3% of fuel

was accounted for by RON 98 fuel (includes LRP and Super Unleaded), down from 6% in 2001.

### 29.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Substantial investment has been made at UK refineries in anticipation of an early move to sulphur free fuels in the UK, in response to Budget announcements of UK Government policy. Enabling legislation, Statutory Instrument 2007 No 1608, giving effect to the further reduction of sulphur levels under Directive 2003/17/EC, was laid before Parliament on 5 June 2007. This comes into force on 4 December 2007 for super unleaded petrol and diesel, and 1 January 2009 for premium unleaded petrol, reducing permitted sulphur levels to a maximum of 10 ppm.

**Are sulphur-free grades clearly labelled differently / marketed separately?** At present the distribution infrastructure is unable to accommodate supply of separate low sulphur fuels (<10ppm).

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** None available.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 29.1.

*[Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold].*

Table 29.1: Annual trend in average sulphur content in petrol and diesel fuels

UK	Average Sulphur Content, ppm						EU25
Fuel/Year	2001	2002	2003	2004	2005	2006	2006
<i>Petrol</i>	49	41	37	37	33	34	18
<i>Diesel</i>	40	40	38	35	33	19	22

## 29.2 Fuel Quality Monitoring 2006

### 29.2.1 Description of system

**Responsible organisation(s):** UK Government Department for Business, Enterprise and Regulatory Reform (BERR, formerly DTI)

**Format of Fuel Quality Monitoring System (FQMS):** National System

**Country Size:** Large (more than 15 million tonnes automotive fuel dispensed per year).

**Summer Period:** 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Each UK refinery and import terminal tests all fuels prior to release into the UK market. Individual companies send results to the relevant trade organisation (UKPIA or AUKOI), which compiles and send it on to DTI. This is supplemented by separate retail site sampling.

**Time/frequency of sampling:** The UK fuel quality monitoring system makes use of industry quality analyses on every batch of fuel produced in, or imported into, the UK, plus samples taken at distribution terminals and forecourts (to check for contamination in the distribution network). Due to the very large number of samples involved, this approach provides an equivalent, or greater, degree of confidence to EN 14274.

**Specification of test methods:** Testing carried out in NAMAS or ISO 9000 accredited laboratories according to the Directive specifications.

**Collection of sales data:** Sales data is collected by industry and sent to BERR.

## 29.2.2 Sampling and reporting

The United Kingdom was essentially compliant with the sampling and reporting requirements in 2006, and have provided information on the national monitoring system confidence level. The following Table 29.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 29.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
5	RON 95 <50 ppm S	5	95.7%	422	1264	-	No	All of 18	
8	95<RON<98 <50 ppm S	8	4.3%	58	151	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>480</b>	<b>1415</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	528	1638	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>528</b>	<b>1638</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

**Notes:** S = Summer; W = Winter

## 29.2.3 Compliance with fuel quality limit values

### Non-compliance with Directive 98/70/EC limit values

(Details on the limit values, test methods and tolerance limits can be found in Appendix 2).

#### **Petrol RON 95**

**Detail:** One or more samples of RON and MON were below the minimum limit values of 95 and 85 respectively with minimum of 94.9 and 84.5. Distillation at 100°C samples were below the minimum limit value of 46%v/v with 44.2 %v/v. Olefins samples exceeded the maximum limit value of 18%v/v with 18.1%v/v.

**Statistical significance:** The minimum tolerance limits for statistical significance for the RON and MON test methods (94.6 and 84.5) were not exceeded for these samples, and they were therefore compliant with the Directive. Distillation at 100°C tolerance limit value of 43.6%v/v was not exceeded as well as olefins limit value of 20.7%v/v, and therefore both complied with the Directive.

#### **Petrol RON 97/LRP**

**Detail:** One or more samples of summer vapour pressure exceeded the limit value of 70 kPa with a maximum of 70.7 kPa. Samples of distillation at 100°C were below the limit value of 46%v/v with a minimum of 45.0 %v/v. Sulphur content limit value of 50 mg/kg was exceeded by samples with a maximum value of 50.1 mg/kg.

**Statistical significance:** The maximum tolerance limit for statistical significance for the DVPE test method (71.9 kPa) was not exceeded for these samples and therefore they were compliant with the Directive. The tolerance limit for distillation at 100°C (43.6%v/v) was not exceeded by the

samples, as well as the sulphur content tolerance limit therefore they were compliant with the Directive.

**Diesel**

*Detail:* Cetane number minimum limit value of 51.0 was not complied by some samples with a minimum value of 50.9.

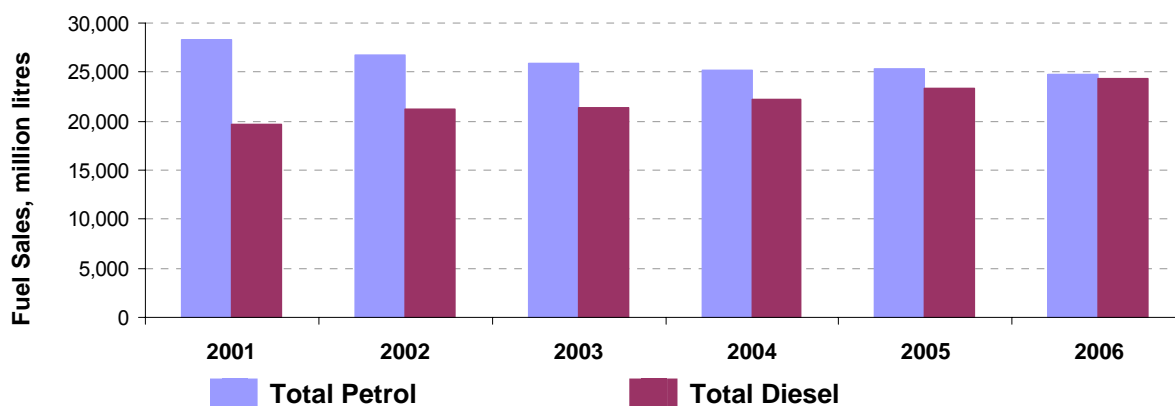
*Statistical significance:* The tolerance limit value for statistical significance for the cetane test method (48.5) was not exceeded for these samples and therefore they were compliant with the Directive.

### 29.3 Temporal trends

The following Figure 29.2 to Figure 29.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2006, total petrol sales fell by 13% and diesel sales rose by 23%, so that by 2006 they have almost converged to similar values. There was also significant transfer from standard petrol to low-sulphur petrol (<50 ppm), with a complete transfer to low-sulphur petrol in 2002.

Figure 29.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). Although the UK was one of the first Member States to switch completely to low sulphur (<50ppm) fuels, there has been relatively slow improvement in sulphur content since 2001. The average sulphur content of both petrol and diesel fuels has decreased since 2001 with levels remaining at a similar level since 2003 for petrol and 2001 for diesel, as a result the UK average sulphur content of petrol fuel is now above the EU average, with diesel only slightly below the average..

**Figure 29.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 29.3: Temporal trends in national sales of low sulphur petrol (%)**



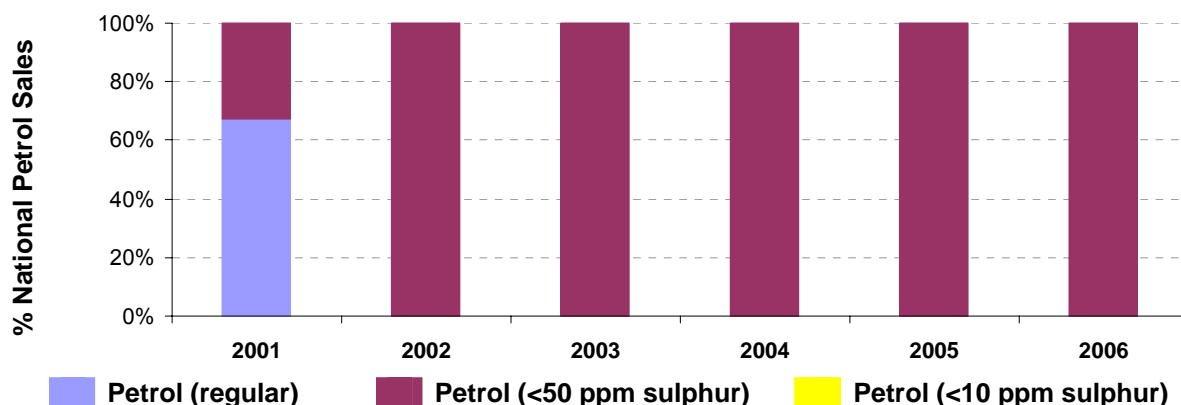


Figure 29.4: Temporal trends in national sales of low sulphur diesel (%)

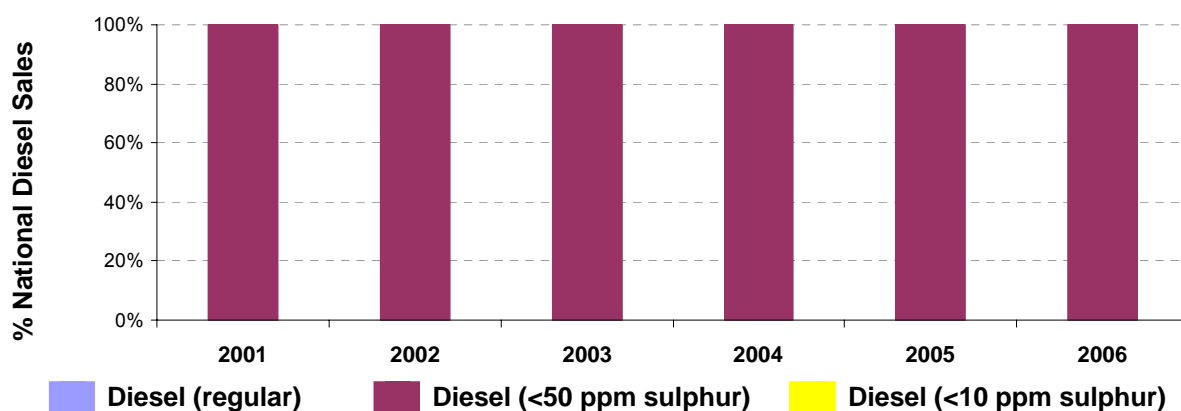
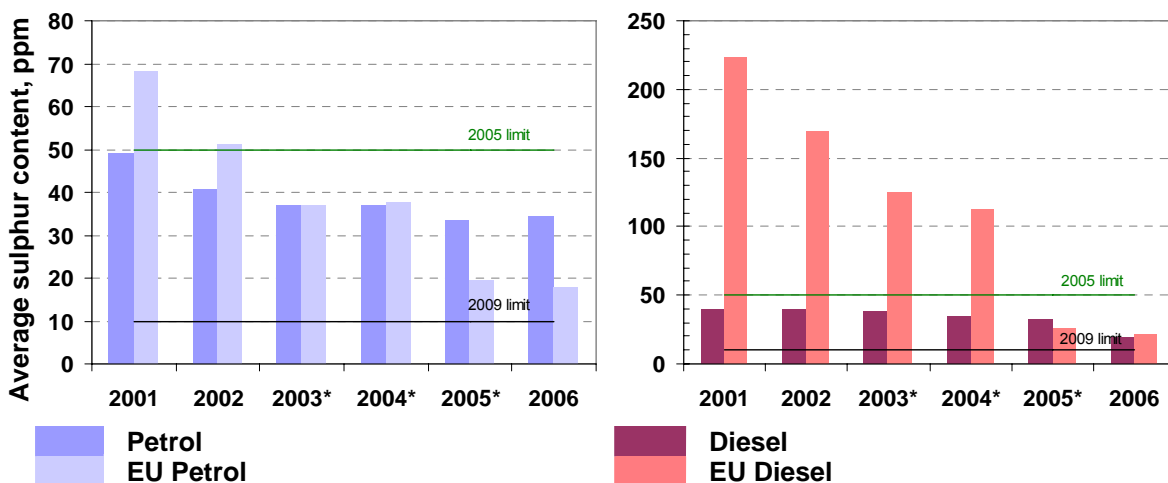


Figure 29.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



\* EU average excludes France, who did not report in 2003-5 and includes new EU10 Member States from 2004.

## 29.4 Key Areas for Improvement

The following table summarises the main areas in which improvements could be made to the monitoring system, reporting or compliance with Directive limit values.

### Key Areas for Improvement

- The UK was almost 4 months late in submitting its report in 2007.
- Sulphur free fuels are not available at all, in breach of the Directive requirements.
- The UK has not provided the numbers of samples taken for analysis from refuelling stations.
- Results for the summer and winter periods should be reported separately, as there are different fuel quality requirements in summer and winter as well as requirements to take a minimum number of samples in each period.

## 30 EU Summary

### 30.1 Fuel Availability 2006

#### 30.1.1 Sales

Figure 30.1: EU Fuel sales proportions by fuel type (%)

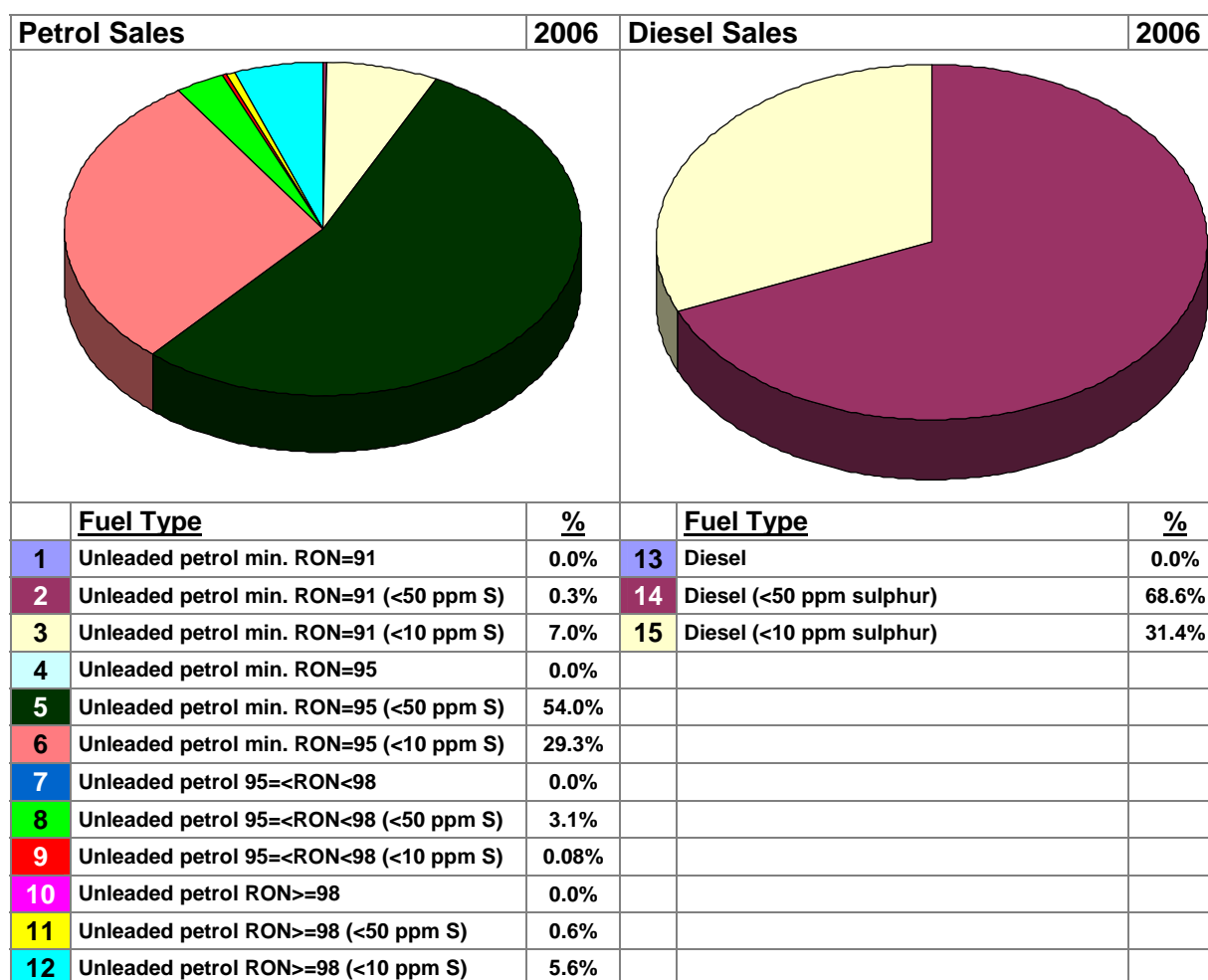
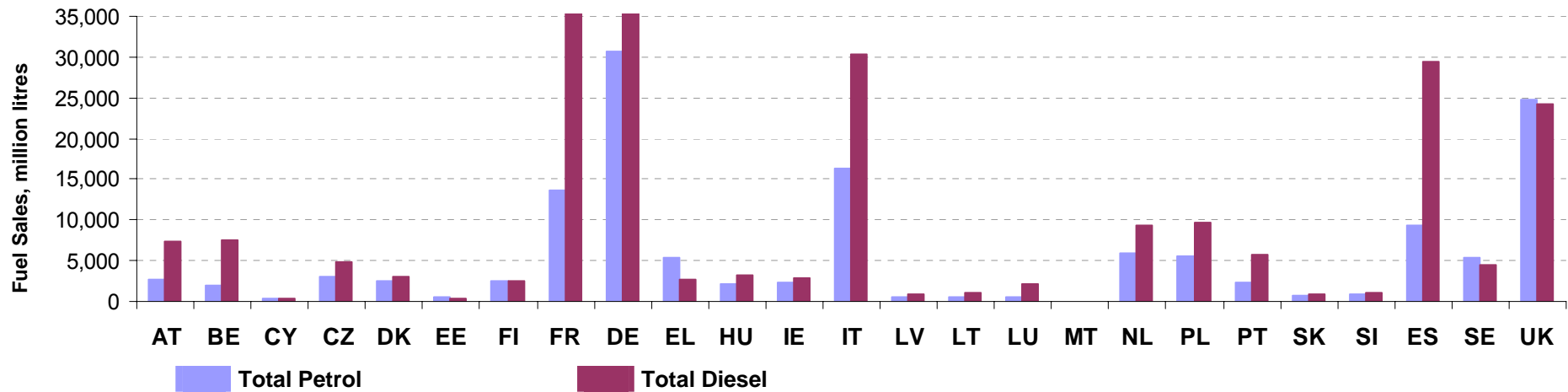


Figure 30.1 (see also Table 30.1) shows the 2006 data for the EU, excluding Malta who failed to submit a report. The variety of RON and sulphur grade fuels available across the EU decreased in 2005 with the new mandatory limit of <50ppm sulphur. The majority of sales in 2006 comprised RON 95 (83%, with 54% low sulphur and 29% sulphur free). Of all petrol sold, 58% was low sulphur (<50 ppm) and 42% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 69% and 31%. Sales from the new EU10 Member States comprised 10.1% and 9.9% of total petrol and diesel sales in the EU respectively (down slightly since 2005). Higher proportions of sulphur-free petrol grades were sold in the EU10 (49%) compared to the EU15 (41%). Similarly, much higher proportions of sulphur-free diesel, was sold in the EU10 (58%) compared to the EU15 (29%).

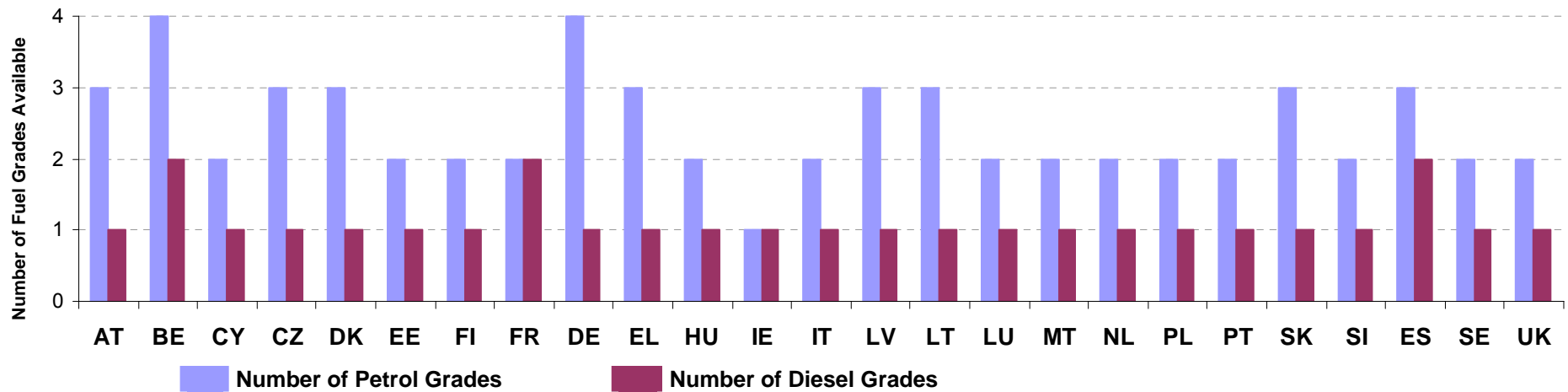


**Figure 30.2: National fuel sales by fuel type across the EU (million litres)\***



\* Excludes Malta who did not submit a report

**Figure 30.3: Number of fuel grades available nationally by fuel type across the EU**



Similarly to 2001 - 2005, the largest total sales of fuels (of submissions received) in 2005 were made in France, Germany, Italy, Spain and the United Kingdom (Figure 30.2). Diesel sales are dominant in almost all Member States, however the relative sales of petrol and diesel vary significantly.

Since 2001 there has been increased homogeneity in the number of grades of fuel reported to be available across the EU (Figure 30.3), in 2006 there are generally 2-3 petrol grades available, mainly a result of different octane levels (RON category), however separate sulphur-free grades are appearing in some cases. In 2006, 10 EU15 Member States (same as in 2005 and compared to only 1 in 2001) had either separately marked fuel grades for sulphur free (<10 ppm) fuels, or only this fuel grade available (in others fuel meeting the sulphur limit is available but unmarked at sale). 4 of the new EU10 Member States, who joined in May 2005, had separate (marked) sulphur-free fuel grades in 2006 or only grades of this quality available.

### 30.1.2 Sulphur content

Already in 2001 - 2005 low sulphur fuels were available in many countries across the EU, even though mandatory introduction was not required until 2005 (see Figure 30.4 and Figure 30.5). Low sulphur (<50 ppm) grades were mandatory from 1 January 2005, as was the introduction of sulphur-free (<10 ppm) fuels, however a significant number of Member States are yet to introduce separately marketed (and labelled) sulphur free fuels, a few have not provided sufficient information to judge whether they are available *“on an appropriately balanced geographical basis”*, as required by the Directive, and Cyprus and the UK have still not yet made them available at all. Malta had also not made them available in 2005 but has submitted no report for 2006, so it is not possible to say whether the situation changed.

Member States do not have to fully switch to sulphur-free fuels until 2009. However, in the EU15, five Member States (Austria, Denmark, Finland, Germany and Sweden) had already fully moved over to sulphur free petrol grades and similarly (except Austria) for sulphur-free diesel grades in 2006. In Germany sulphur-free diesel has been available since 2003 and in Sweden virtually all diesel has been sulphur-free since 1999. Two of the new Member States had also fully switched to sulphur-free fuel grades – Estonia for petrol only and Hungary for both petrol and diesel. In addition, in Luxembourg, Slovakia and Slovenia where low sulphur fuel grades (< 50 ppm) are marketed, the average sulphur content of some or all of these grades was found to be below 10 ppm. Thus in these countries it appears that fuel sales may be sulphur free, although this is not certain or guaranteed because the fuel grades allow for a sulphur content of up to 50 ppm.

As already mentioned, separate (or labelled) sulphur-free fuel grades, or separate sales figures were not available in 2006 in some Member States. However, fuels complying with the <10ppm sulphur criterion were available in many cases, e.g. the Netherlands. This can be seen in Figure 30.6, which presents the average sulphur content of petrol and diesel grades by Member State across the EU. (Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold). Table 30.2 demonstrates that the annual average sulphur content of petrol and diesel fuels sold in the EU is decreasing.

**Table 30.2: Annual trend in average sulphur content in petrol and diesel fuels**

EU	Average Sulphur Content, ppm						EU15	EU10	EU15*		
	Fuel/Year	2001	2002	2003*	2004*	2005*	2006	2006	2006**	2001	2002
<b>Petrol</b>		68	51	37	38	19	18	18	18	65	44
<b>Diesel</b>		223	169	125	113	25	22	22	17	207	136

\*Excludes France, who did not report in 2003 - 2005. New EU10 joined from 2004.

\*\*Excludes Malta, who did not report in 2006.

Figure 30.4: National sales of low sulphur petrol grades across the EU (%)

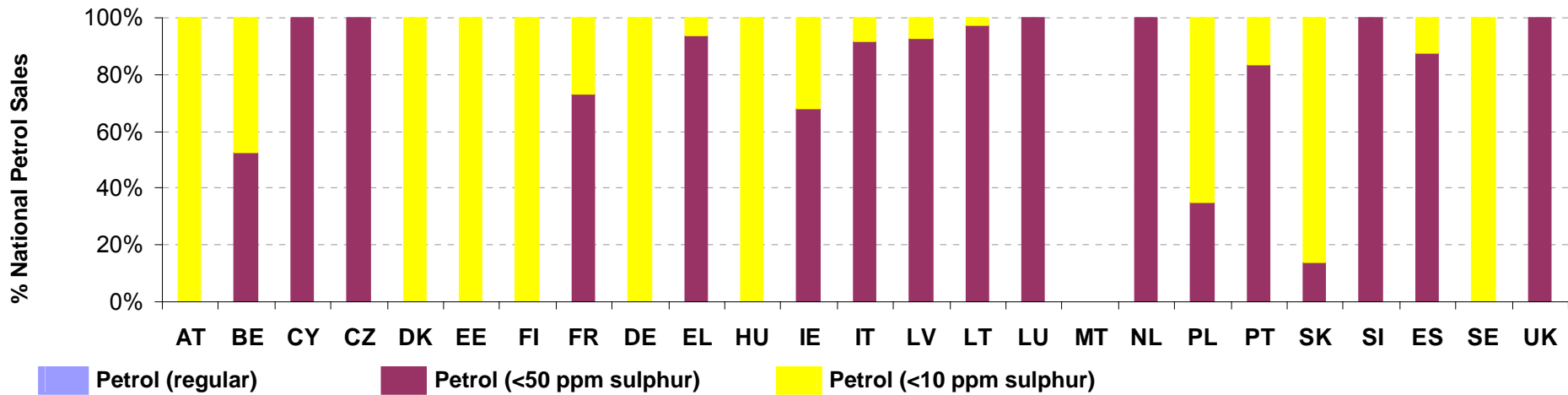
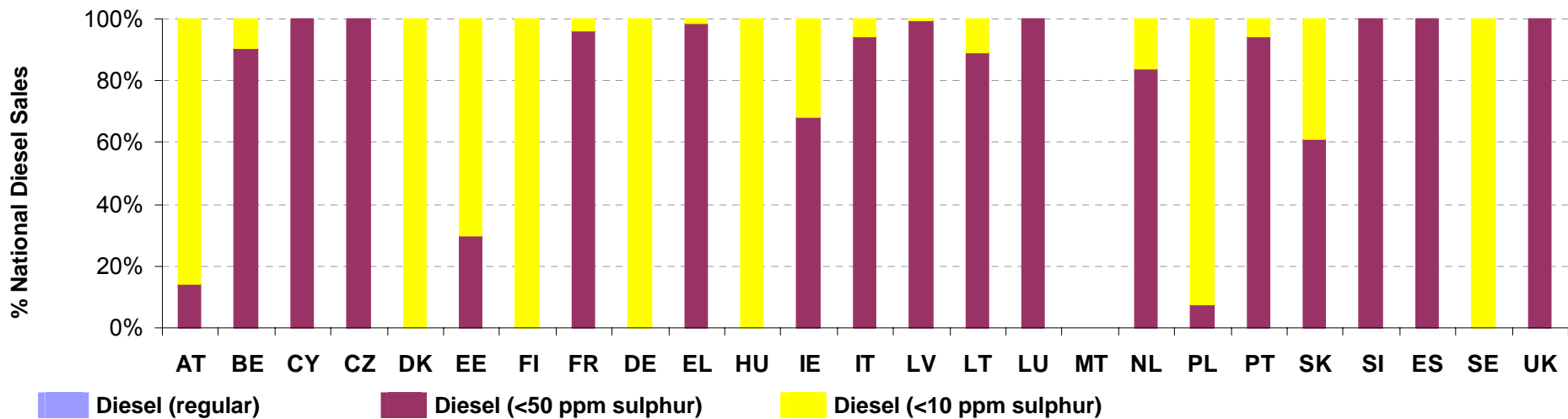
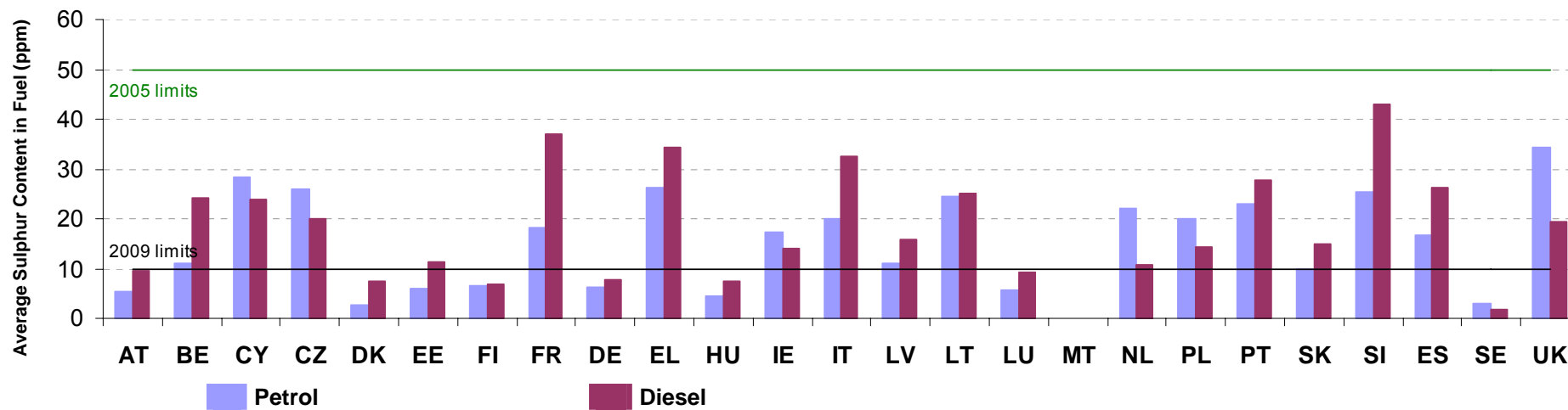


Figure 30.5: National sales of low sulphur diesel grades across the EU (%)



Notes:  
Excludes Malta, who did not report in 2006.

Figure 30.6: Average sulphur content of petrol and diesel grades across the EU (%)



Notes:  
Excludes Malta, who did not report in 2006



## 30.2 Fuel Quality Monitoring 2006

### 30.2.1 Description of systems

A number of different approaches have been used to implement Fuel Quality Monitoring Systems (FQMS) across the EU. These range from those based on European Standard EN 14274<sup>19</sup> with sampling at a range of fuel retail stations through to national systems. For example, systems in Sweden and the UK integrate sampling and analysis of all refinery or imported batches into the requirements for distribution of fuels within the country. There is also random sampling across the distribution chain throughout the year. The systems active in several Member States were originally designed for other purposes, which explain some of the variations in coverage and application across the EU.

A greater degree of homogeneity was expected from 2004, when Member States are required to report in accordance with EN 14274. According to the amended Directive: *"Member States shall establish a fuel quality monitoring system in accordance with the requirements of the relevant European Standard"* (EN 14274 and EN 14275<sup>20</sup>) from 1 January 2004. (A discussion of the changes resulting from these new standards was provided in section 1.2.3). Since 2001 a significant number of changes have been made to Monitoring Systems. Austria, Finland, France, Ireland, Italy and the Netherlands have now moved their systems to ones based upon EN 14274 (as have 7 of the new EU10 Member States). Greece and Portugal have stated it is still in the process of changing its system to comply fully with EN 14274 (however they stated this in 2004, 2005 reporting).

Of those reporting for 2006, 10 Member States in total are still using National Systems. Alternative monitoring systems may be permitted by the Directive, provided such systems ensure the results are of an equivalent confidence, although the criteria for assessing this are not specified. It is therefore not clear whether the existing systems not based on EN 14274 meet this criterion and only Cyprus, Denmark and Malta have provided information justifying their use of National Systems with reduced sampling. The UK has also provided information on the statistical confidence of its system.

### 30.2.2 Sampling and reporting

There was still a wide range of sampling intensities across the EU in 2006 (Figure 30.7), as for previous years. There are requirements in EN 14274 on the numbers and locations of samples taken in their FQMS. EN 14274 lists a number of useful factors to take into account in assessing the sampling regime, such as the number of refineries supplying the market, the number of fuel grades available and the number of different imported fuel grades and sources. The standard specifies minimum number of samples per fuel grade (in each of the winter and summer periods), as discussed in the introductory section 2.2.2.

Figure 30.7 and Table 30.3 show that many Member States appear to satisfy the specifications for sampling numbers. However, it should be noted that the standard specifies individual samples taken at separate refuelling stations. In many reports from Member States using National Systems, sampling from separate refuelling sites is not always specified and in some cases sampling also takes place at other points of the distribution

<sup>19</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

<sup>20</sup> EN 14275:2003 - Automotive fuels - Assessment of petrol and diesel fuel quality - Sampling from retail site station pumps and commercial site fuel dispensers.

chain. For example, the systems of Luxembourg and Sweden (and in Greece for 2005 and 2006) only take samples from refineries and/or terminals, which is clearly not sufficient to achieve the confidence required by the European Standard, as there is no method of assurance that the fuel is not contaminated/tampered with between the refineries/depots and the retail outlets. In contrast, Finland, Ireland, Portugal, Spain and the UK take samples from across the entire distribution chain. In such cases reports do not always provide information on the number/proportion of samples that were for refuelling stations.

In terms of design and sample numbers (from refuelling stations), the monitoring systems in Austria, Czech Republic, Finland, Italy, Hungary, Latvia, Poland, Slovakia, Slovenia and possibly Germany, Spain (although they used their own system) can be stated to fully comply with EN 14274. Cyprus and the UK were consistent with the sample number and essentially with other criteria too, but did not report summer and winter sample analysis separately, as indicated in EN 14274. The reason for this dual reporting is that there are differences between summer and winter fuel grades. Other Member States using the European Standard narrowly missed out on full compliance mainly due to slightly lower sample numbers, such as Estonia, Ireland, Lithuania.

However, where EN 14274 is used, in terms of selecting the suitable statistical model as discussed in the introductory section 2.2.2, there remain issues to resolve. Several small-sized Member States are still indicating that they are using Model C in 2006, despite having clearly defined separate regions according to the NUTS classification system<sup>21</sup> at Level 2 (800,000 – 3 million people). These include Austria (10 NUTS Level 2 regions), Czech Republic (8 NUTS Level 2 regions), Hungary (7 NUTS Level 2 regions), Ireland (3 NUTS Level 2 regions) and Slovakia (4 NUTS Level 2 regions). In some of these countries it is clear that there is also more than one source/supply point for petrol and diesel fuels, suggesting that Model C may not be appropriate and that possibly either Model A or B should be used instead (e.g. Model A may be more appropriate for Austria). Where Model C is used, Member States should in future present a clear rationale for its use on the basis of both number of fuel sources/supply points and size/possibility of division of the territory into regions. Ireland has stated that its preliminary assessments concluded that subdividing Ireland into sub-regions would not be particularly beneficial on the basis of few fuel terminals. However, since the FQMS is based on retail station sampling it is recommended that this be revisited.

Assessing other countries utilising their own National Systems is difficult without additional information from the Member States on the statistical confidence of their system and details on the fuel supply situation in their country. However, it seems likely that in certain countries the national system does not match the same level of confidence as EN 14274. Portugal appears to have insufficient samples to achieve the same confidence, and Sweden's system does not involve sampling at refuelling stations at all, so is clearly not able to establish confidence that the quality of the fuel at the pump is the same as at the refinery/terminal. In 2005 and 2006, Greece has also only sampled at the refinery, although it has been stated this is a temporary measure.

In general, however, significant progress seems to have been made again by all countries in improving monitoring system methodologies, increasing the number of samples taken and analysed and in the reporting aspects. Figure 30.7 illustrates this, showing improvements in sampling rate in 2006 of EU15 countries in contrast to the 2001 sampling in Figure 30.8 – notably in Greece, Ireland and the Netherlands. Diesel sampling by Portugal has *decreased* by around 70%, however. Sampling numbers are also up significantly in the new EU10.

<sup>21</sup> The Nomenclature of Territorial Units for Statistics (NUTS) is a three-level hierarchical classification, established by Eurostat more than 25 years ago in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the EU. Additional information on NUTS may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

**Table 30.3: Summary of Member State sampling and reporting in relation to the requirements of Directive 98/70/EC and of European Standard EN 14274**

	FQMS Model	Size Cat.	Separate Summer and Winter reporting		Sampling Location	EN 14274 Samples per grade per period <sup>(4)</sup>	Calc. EN 14274 Sample Total Req.		Samples Taken		Compliance with EN 14274 Sampling No.		Notes
			Petrol	Diesel			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	
	(1)	(2)			(3)								
AT	C	Small	Yes	Yes	S	50	203	100	203	100	Yes	Yes	
BE	N	Small	Yes	Yes	S	-	-	-	4722	5276	-	-	(a)
CY	N	Small	No	No	S, T	-	-	-	119	53	-	-	
CZ	C	Small	Yes	Yes	S	50	83	75	871	1064	Yes	Yes	
DK	N	Small	No	No	S	-	-	-	40	20	-	-	
EE	C	Small	Yes	Yes	S	50	156	150	300	100	Yes	No	
FI	A	Small	Yes	Yes	S (T, R)	50	109	100	262	158	Yes	Yes	(b) (c)
FR	B	Large	Yes	Yes	S	200	800	400	175	122	No	No	
DE	N	Large	Yes	Yes	S	-	-	-	414	243	-	-	(d)
EL	A	Small	Yes	Yes	R	50	208	100	289	120	Yes	Yes	(e) (f)
HU	C	Small	Yes	Yes	S	50	82	75	120	120	Yes	Yes	
IE	C	Small	Yes	Yes	S, T, R	50	100	100	115	95	Yes	No	
IT	A	Large	Yes	Yes	S	100	217	211	283	380	Yes	Yes	
LV	N	Small	Yes	Yes	S, T, R	-	-	-	1382	1150	-	-	(d)
LT	C	Small	Yes	Yes	S, T	50	153	150	218	103	Yes	No	
LU	N	Small	No	No	T	-	-	-	3	2	-	-	(g) (d)
MT													(d)
NL	A	Small	Yes	Yes	S	50	105	200	100	100	No	No	
PL	B	Small	Yes	Yes	S	100	312	162	492	220	Yes	Yes	
PT	N	Small	Yes	Yes	S, T, R	-	-	-	57	42	-	-	(h)
SK	C	Small	Yes	Yes	S	50	152	75	237	102	Yes	Yes	
SI	C	Small	Yes	Yes	S	50	82	75	136	151	Yes	Yes	
ES	N	Large	Yes	Yes	S, T, R	-	-	-	492	333	-	-	(d)
SE	N	Small	Yes	No	T, R	-	-	-	826	645	-	-	(d)
UK	N	Large	No	No	S, T, R	-	-	-	1895	2166	-	-	

**Notes:**

- (1) N = National Fuel Quality Monitoring System (FQMS);  
A, B or C = FQMS based on EN 14274 Statistical Model A, B or C
- (2) Small countries are defined in EN 14274 as with < 15 million tonnes automotive fuel dispensed per year.
- (3) S = Refuelling Stations; T = Terminals / Depots; R = Refinery
- (4) There are reduced sampling requirements for grades comprising of less than 10% total sales
- (a) Oxygen content has not been reported for all four reporting petrol grades. MON, DVPE, Benzene, sulphur content were not reported for grade 11; MON, summer vapour pressure and sulphur content were not provided for RON98 petrol.
- (b) Octane number was analysed from additional samples taken from refineries and terminals (39 samples)
- (c) Cetane number was analysed from additional samples taken from refineries and terminals (48 samples)
- (d) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274
- (e) Greece has stated the FQMS has been designed but it has not been fully applied for 2006, however this has been the case for the last two years. This report concerns the results of the samples from refineries.
- (f) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenate test methods. In this case the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear in most cases, whether this has been carried out, however Portugal have stated no other oxygenates are added to the fuel. The total organically bound oxygen is calculated from the % by mass of the components after identification.
- (g) No sample analyses were provided for all 7 oxygenates parameters
- (h) The EN 14274 statistical model is being implemented. Meanwhile we will follow the same methodology used in precedent reports
- (i) Malta did not provide a report for 2006 monitoring.

Figure 30.7: Fuel Quality Monitoring sampling rate across the EU in 2006 (average number of samples per fuel grade)

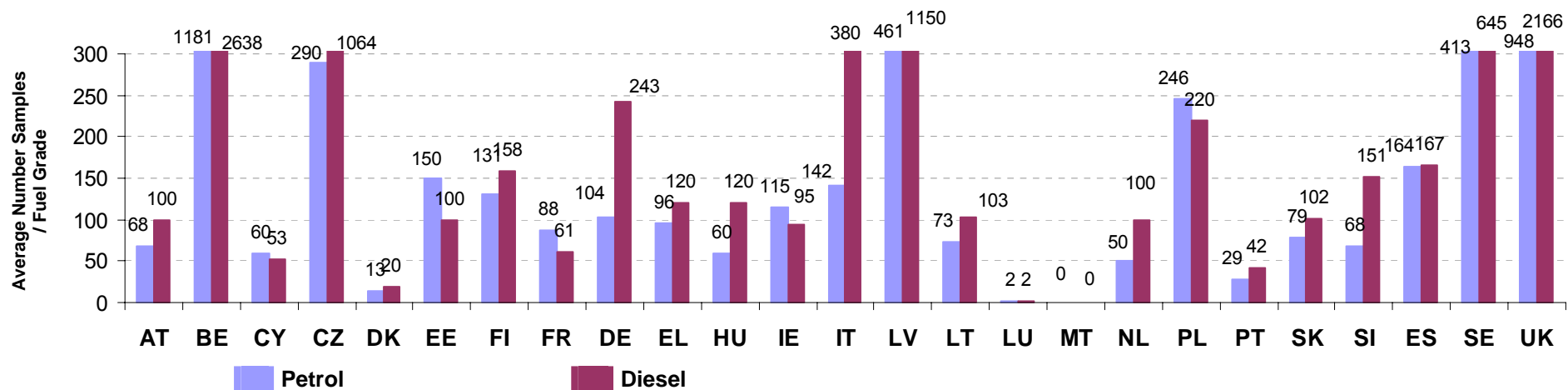
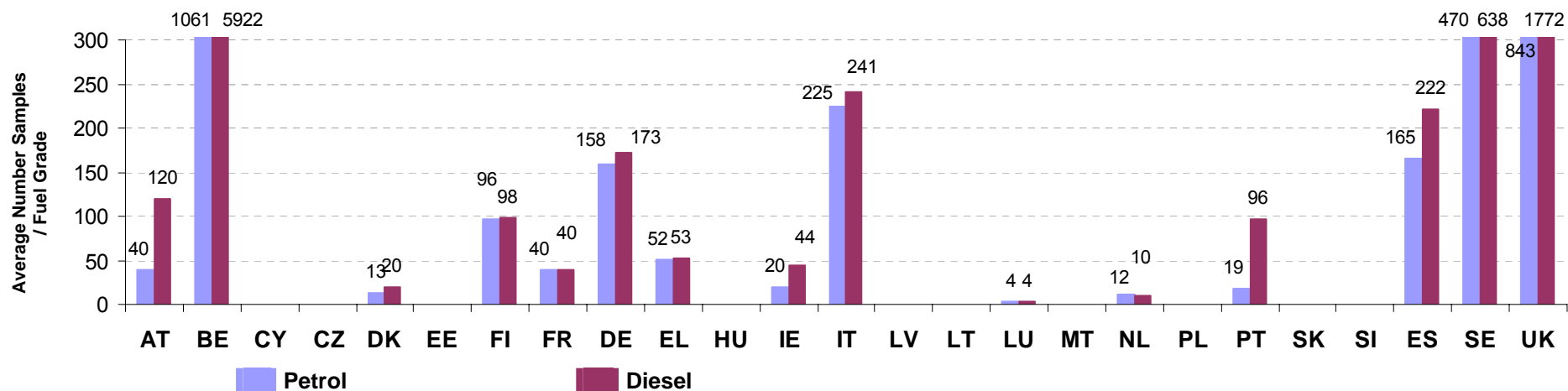


Figure 30.8: Fuel Quality Monitoring sampling rate across the EU in 2001 (average number of samples per fuel grade)



### 30.2.3 Compliance with 98/70/EC limit values

#### ***Petrol reporting***

In 2006, 16 of the Member States (8 of the EU15) reported at least one petrol sample that was non-compliant with Directive 98/70/EC. This is compared to 10 in 2001 from EU15 Member States and 17 EU MS in 2005 (8 of the EU15). Of these, the main parameters of concern were again research/motor octane number (RON/MON, 25 samples), summer vapour pressure (DVPE, 38 samples) and distillation - evaporation at 100/150°C (4 samples). Although many Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for the test methods) compared to previous years. Several of the new EU10 Member States reported significant numbers of samples non-compliant with limit values in previous years, which have been significantly reduced in 2006. Belgium reported a higher proportion of non-compliant samples than other Member States in 2005, with improved compliance levels on previous years, however insufficient detail has been provided in 2006 to gauge actual non-compliance numbers. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### ***Diesel reporting***

For diesel, 10 of the Member States (3 of the EU15) reported at least one sample that was non-compliant with Directive 98/70/EC. This is compared to 4 in 2001 from EU15 Member States and 13 EU MS in 2005 (4 of the EU15). Of these, the parameters of concern were sulphur content (21 samples), distillation 95% point (8 samples), cetane number (5 samples) and density (5 samples). Although several Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for the test methods) compared to previous years. As for petrol several of the new EU10 Member States reported significant numbers of samples non-compliant with limit values in previous years, which have been significantly reduced for 2006. Belgium reported a higher proportion of non-compliant samples than other Member States in 2005, but has provided insufficient detail to assess total numbers in the 2006 report. Sulphur content proved a particular problem for the previous year (mainly the new EU10), due to the new mandatory <50 ppm level from the start of 2005, which appears to have been resolved in 2006. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### ***Overall Summary***

Table 30.4 summarises the compliance of Member States with Directive 98/70/EC for the year 2006 reporting in terms of the results of the analysis of samples against limit values and the reporting format and content. As in 2001 - 2005 the quality of the compliance assessment suffers in a few cases from incomplete information provided by Member States. Details of action taken with regard to limit value non-compliance by Member States are included where provided in the individual country chapters of this report.

In terms of compliance with Directive 98/70/EC, of the 24 reports received (Malta not submitted a report), 8 Member States are in complete compliance with limit values for both petrol and diesel for all samples (compared to 5 in 2001 for the EU15 and 6 in 2005 for EU25). Giving the benefit of doubt for measurement of oxygenates (for 2 Member States, see notes 4/5 of the table), 19 Member States also provided complete reporting across the range of parameters specified for monitoring in the Directive. Detail on specific non-compliances is provided in the individual country chapters and a new summary of temporal trends in compliance is provided in section 30.3.3.

The recent amendments to Directive 98/70/EC (Directive 2003/17/EC) included the insertion of a paragraph which states “Member States shall determine the penalties applicable to

*breaches of the national provisions adopted pursuant to this Directive. The penalties determined must be effective, proportionate and dissuasive.”* It is expected that the implementation of this requirement will have positive repercussions on compliance. Indeed the number of non-compliant samples has again in general decreased this year. Though improved on previous years, the percentage of non-compliant Belgian samples in 2005 was significantly higher than in other EU countries (information was not provided for 2006).

**Table 30.4: Summary of Member State compliance with 98/70/EC for 2006 reporting.**

Member State	Limit value non-compliance <sup>(1)</sup> [95% confidence limits] (Non-compliant samples / Total samples]		Incomplete reporting [Number of parameters not measured / Total]		Late report (Due by 30/6/2006) <sup>(2)</sup>	Notes
	Petrol	Diesel	Petrol	Diesel		
Austria	2 / 203				<4 months	
Belgium	>7 / 4722	>5 / 5276	8 / 18		<7 months	(2)
Cyprus			7 / 18			(7)
Czech Republic	16 / 871	18 / 1064				
Denmark	2 / 40					
Estonia	11 / 300	1 / 100			<5 months	(8)
Finland	1 / 262	2 / 158				
France	3 / 175	1 / 122			<1 month	(3)
Germany	8 / 414				<7 months	
Greece			6 / 18		<8 months	(4)
Hungary	6 / 120					
Ireland	8 / 115				<1 month	
Italy	4 / 283		1 / 18			(5)
Latvia	3 / 1382	3 / 1150			<1 month	
Lithuania	1 / 218	1 / 103				(9)
Luxembourg			7 / 18		<7 months	
Malta					Not received	
Netherlands						
Poland	9 / 492	3 / 220				
Portugal			7 / 18		<2 months	
Slovakia	16 / 237	2 / 102				
Slovenia	8 / 136	5 / 151	1 / 18		<1 month	(10)
Spain						
Sweden			6 / 18			(6)
UK					<4 months	
<b>No. Countries</b>	<b>16</b>	<b>10</b>	<b>8</b>	<b>0</b>	<b>13</b>	

**Notes:**

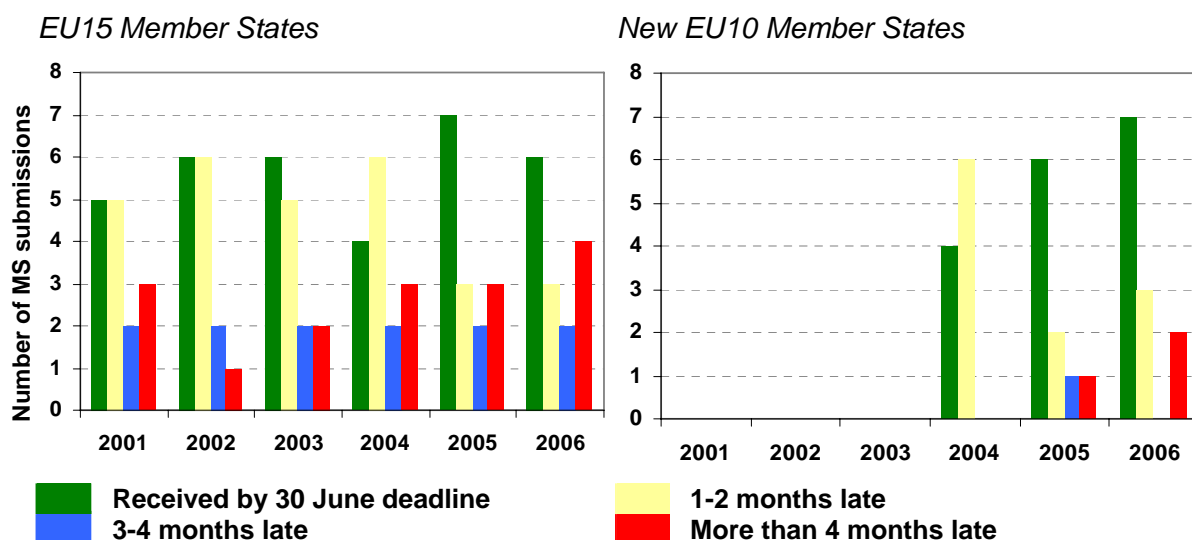
- (1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete. Where it has not been possible to establish from submissions the number of samples exceeding the limit value a '>' symbol indicates that the number of samples exceeding limits is a minimum and might be greater.
- (2) Directive 98/70/EC states that Member States should submit monitoring reports by no later than 30th June each year.
- (3) A partially complete report was submitted in July 2007, however complete details were not provided until January 2008.
- (4) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. In principle, all substances on the list are measured at once using the oxygenate test methods. In this case the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear in most cases, whether this has been carried out (Portugal have stated no other oxygenates are added). Total organically bound oxygen is calculated from the % by mass of the components after identification.
- (5) Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. Analysis for lead was also not provided for <10ppm petrol fuel.
- (6) For RON95 petrol: Oxygen content and 5/7 oxygenates have not been reported (Sweden's note: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel). For RON98 petrol: 6/7 oxygenates (i.e. other than ethers with more than 5 carbon atoms per molecule) have not been reported.
- (7) MON and oxygenates (other than ethers with more than 5 carbon atoms per molecule) were not reported.
- (8) DVPE samples number for Grade 12 not reported
- (9) The full details on numbers of non-compliant samples were not provided.
- (10) No vapour pressure results were provided for RON 98

### 30.3 Temporal trends

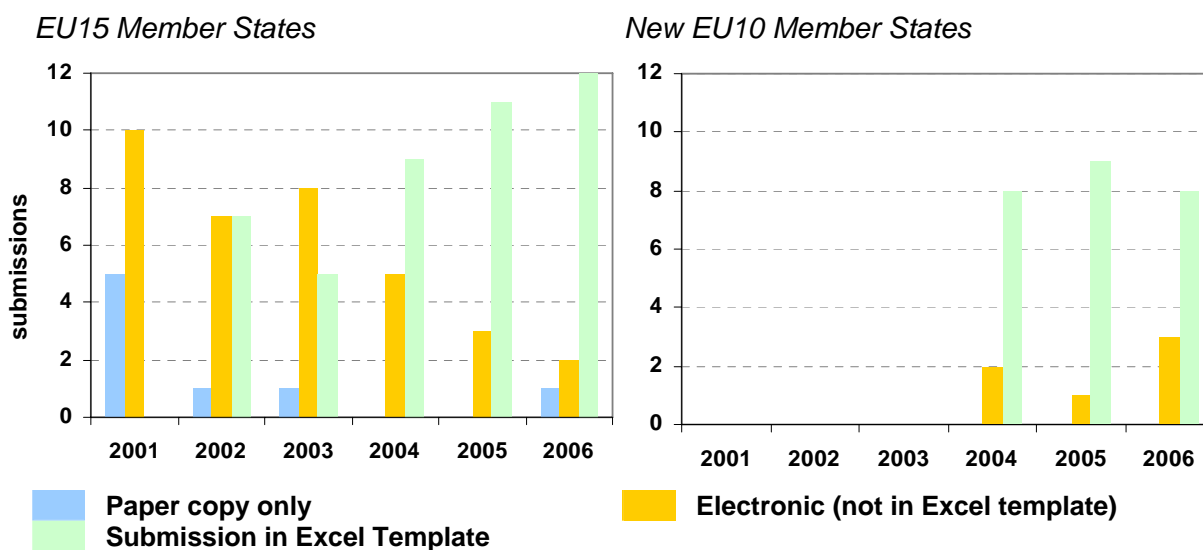
#### 30.3.1 Sampling and reporting

The following figures provide a summary of the temporal trends in the sampling and reporting in the European Union. It can be seen in Figure 30.9 that whilst the numbers of Member States reporting on time has in general improved, a handful of Member States are still delivering very late, preventing timely completion of this summary report. This has been particularly problematic this year with several member states delivering reports over 6 months late and the last full report received (from Greece) only in February 2008. Figure 30.10 shows that the number of Member States submitting in the Excel reporting template has steadily improved, providing a greater level of consistency and enhancing both speed and accuracy in the evaluation of submissions. Figure 30.11 shows that the level of sampling and analysis is also improving.

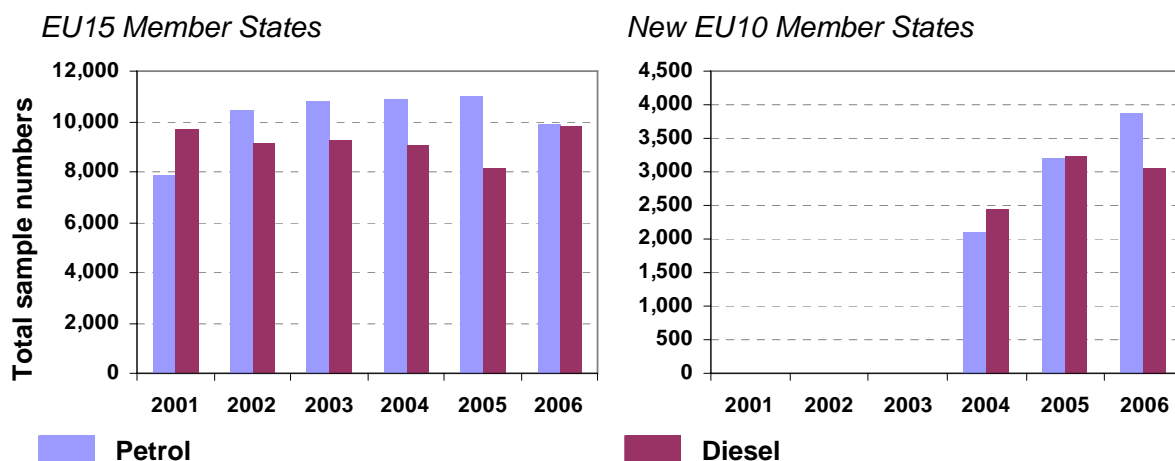
**Figure 30.9: Temporal trends in the punctuality of report submissions**



**Figure 30.10: Temporal trends in the format of Member State submissions**



**Figure 30.11: Temporal trends in the total number of petrol and diesel samples taken**



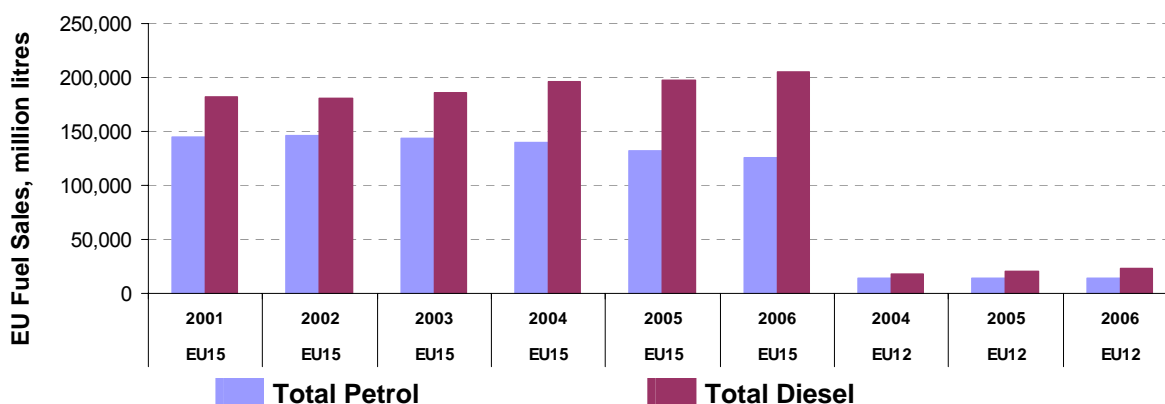
\* EU15 excludes France after 2002, which did not report in 2003-5 and reported in full for the first time again in 2006.

### 30.3.2 Fuel sales and sulphur content

The following Figure 30.12 to Figure 30.14 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales in the European Union. The sulphur content figures exclude France in 2003 - 2005 (where no submissions are provided). Total sales of petrol and diesel remained approximately constant between 2001 and 2002 (increased 1% for petrol, decreased 0.5% for diesel). Sales for 2006 show petrol -3% and diesel +25% compared to 2001 (including sales from the new EU10 from 2004).

In the EU15 sales of low sulphur (<50 ppm) and sulphur-free (<10 ppm) petrol changed from 28% each of total sales in 2003 to 27% and 31% respectively in 2004. Sales of low sulphur and sulphur free diesel changed from 30% and 25% in 2003 to 32% and 28% in 2004. The limit for sulphur was <50ppm from 2005; 38%, 28% of petrol and diesel sales respectively were sulphur-free fuels in 2005<sup>22</sup>, rising to 42% and 31% in 2006. Of petrol and diesel sales for the EU10 in 2005, 15.5% and 36% respectively were sulphur-free, which rose to 49% and 58% for petrol and diesel respectively in 2006.

**Figure 30.12: Temporal trends in EU Sales of petrol and diesel (million litres)\***

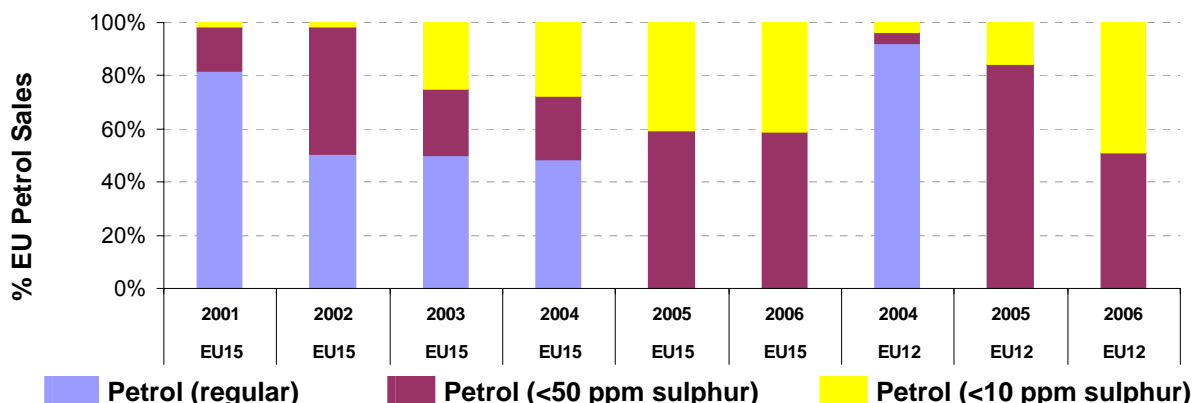


\* France has provided sales data for 2003 – 2005 in its submission for 2006.

<sup>22</sup> These figures are slightly lower than those quoted in last years report as they include new sales data submitted from France this year for the 2003-2005 period. This data was previously missing due to lack of reporting for these years by France.

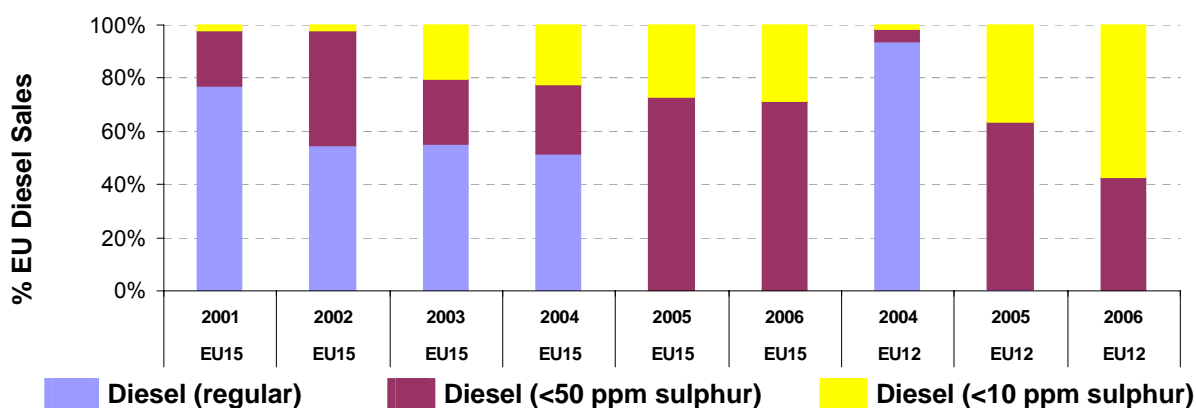


Figure 30.13: Temporal trends in EU Sales of low sulphur petrol (%)\*



\* Excludes France in 2003 - 2005, as no submissions were provided.

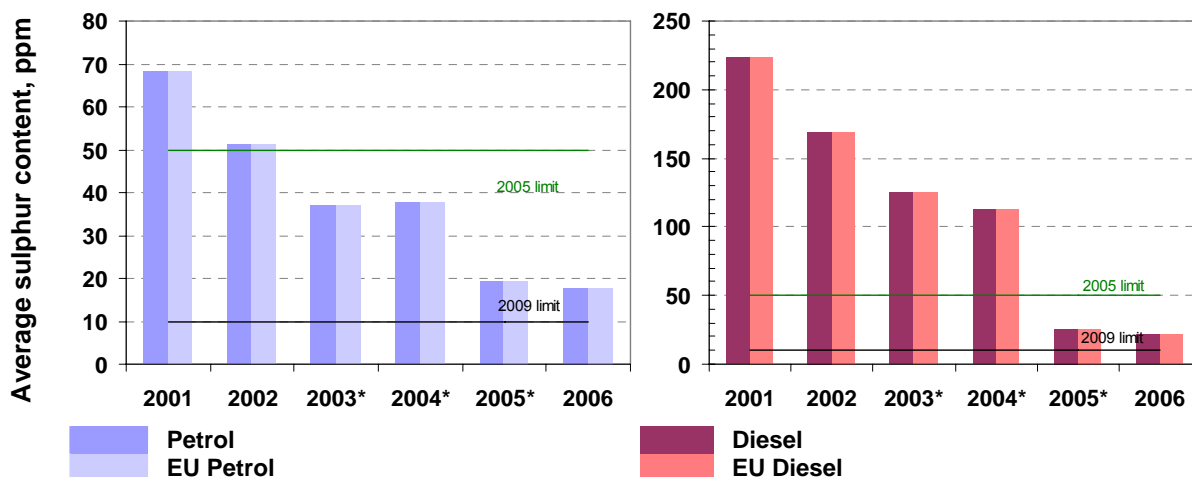
Figure 30.14: Temporal trends in EU Sales of low sulphur diesel (%)\*



\* Excludes France in 2003 - 2005, as no submissions were provided.

Figure 3.1 shows the trend in average sulphur content of petrol and diesel fuels (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased since 2001 with levels dropping significantly with the introduction of the mandatory <50 ppm limits for petrol and diesel and increased sales of sulphur-free fuels.

Figure 30.15: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



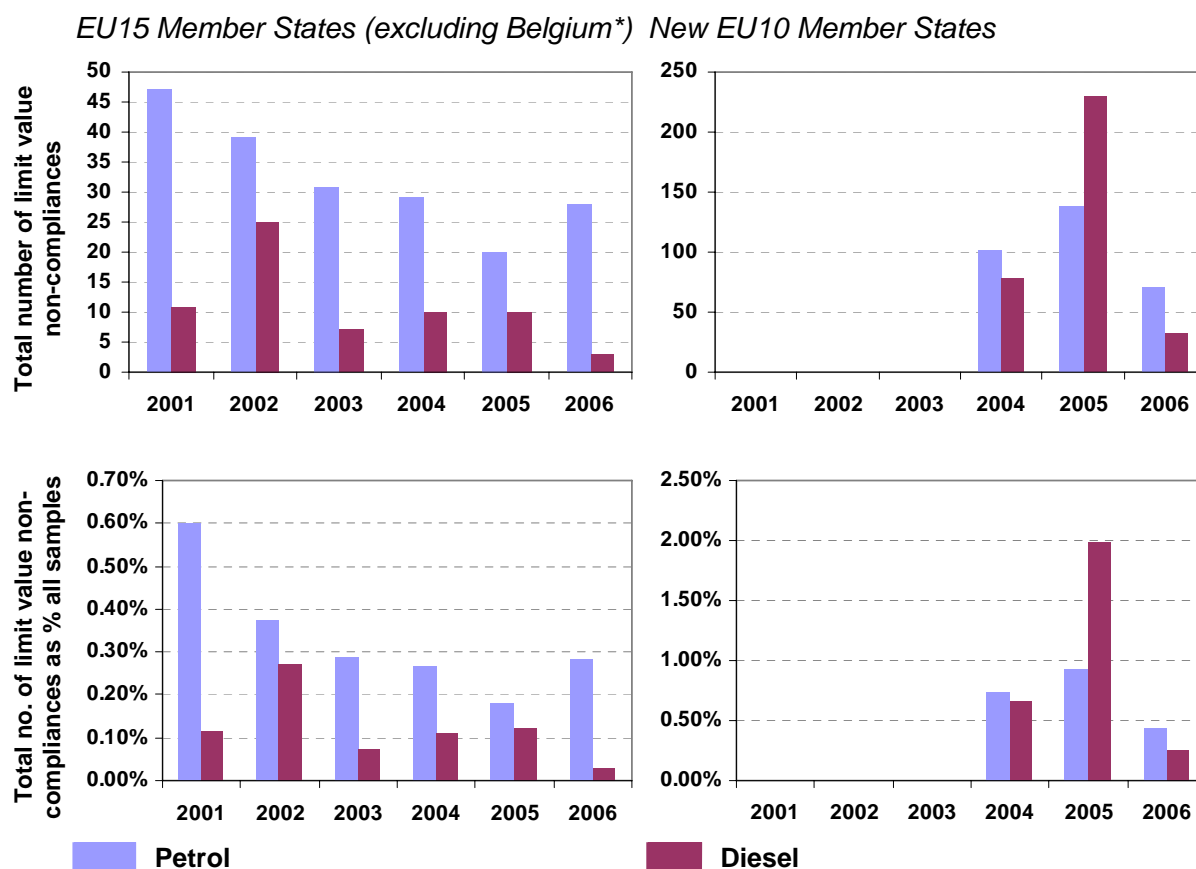
\* Excludes France in 2003 - 2005, as no report was submitted.

### 30.3.3 Compliance with limit values

The following Figure 30.16 to Figure 30.17 show the trends in the numbers of limit value non-compliances for petrol and diesel fuels in the European Union. Figures for Belgium are excluded, as the very high sampling rate (and consequent number of non-compliances) and proportion of non-compliant samples hides the underlying trend across the rest of the Member States. The figures show that in the EU15 the numbers and proportion of non-compliant samples is generally decreasing, although there was a small increase in 2006 for petrol. The slight increase in the proportion of non-compliant diesel samples in 2005 due to increased numbers of sulphur limit non-compliances – most likely due to the introduction of the lower sulphur limit from the start of the year. Belgium reported a significantly higher proportion of non-compliant samples compared to other Member States in 2005 at around 3.5% of all samples (no equivalent information has been supplied for 2006).

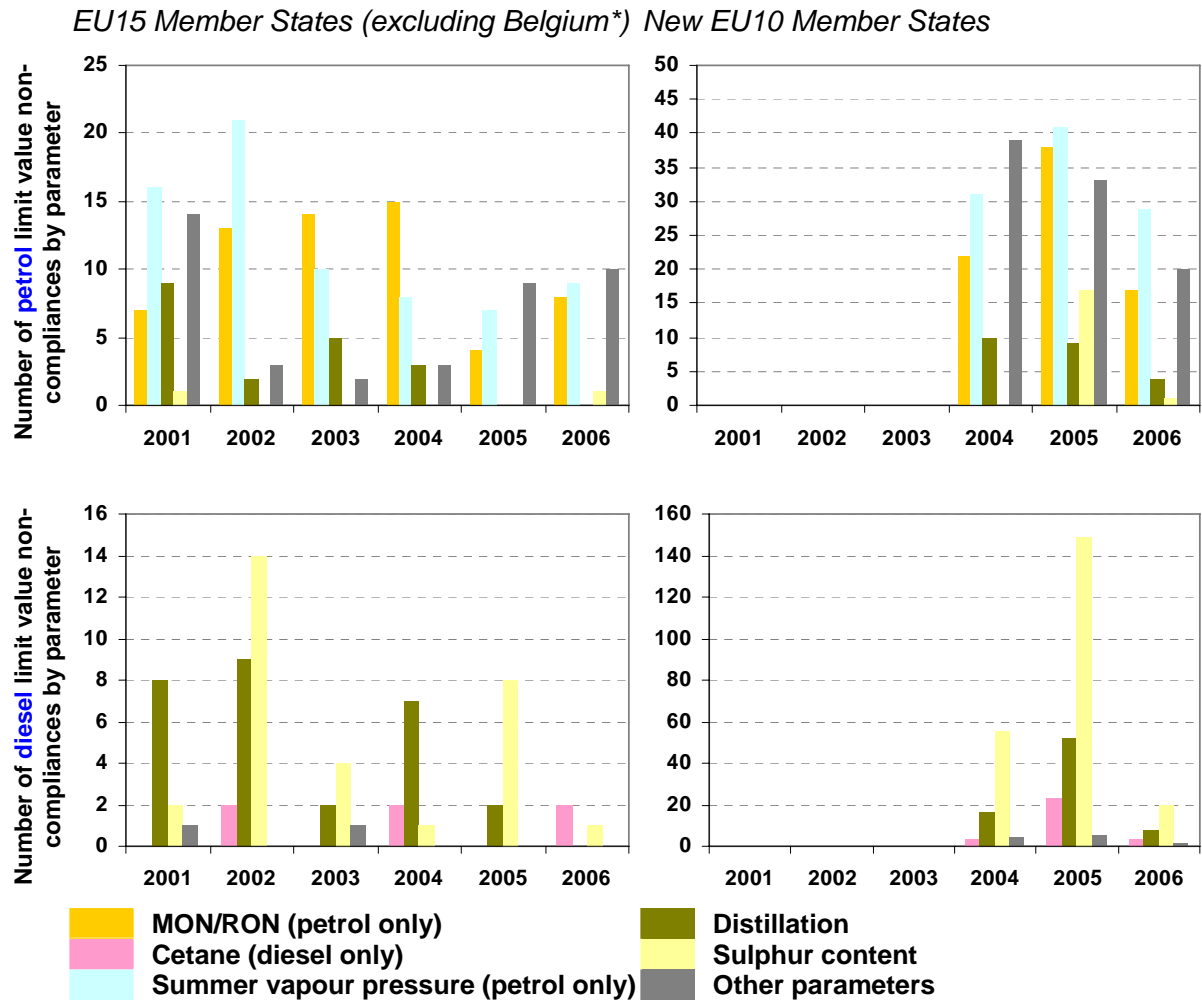
The proportion and actual numbers of non-compliances in the new EU10 are larger than in the EU15. The significant numbers of non-compliances from Czech Republic and Poland in previous years has been substantially reduced for 2006, accounting for most of the reduction from overall 2005 non-compliance numbers. The increase between 2004 and 2005 may be partly due to the fact that reporting for 2004 was only for May-December, and partly due to significantly increased sulphur limit breaches with the introduction of <50 ppm mandatory limit in 2005. In general there have significant improvements from the EU10 Member States between 2004 and 2006.

**Figure 30.16: Temporal trends in total limit value non-compliances for petrol and diesel fuels**



\* Excludes France in 2003 - 2005, as no submissions were provided. Also excludes Belgium, as the very large number of sample analyses (and therefore also non-compliances) hides general trends. The % of non-compliances in Belgium (at around 3.5%) is above other Member States.

**Figure 30.17: Temporal trends in numbers of samples exceeding limit values for specific petrol and diesel fuel parameters**



\* Excludes France in 2003 - 2005, as no submissions were provided. Also excludes Belgium, as the very large number of sample analyses (and therefore also non-compliances) hides general trends. The % of non-compliances in Belgium (at around 3.5%) is above other Member States.

## 31 Discussion and Conclusion

### 31.1 Discussion

#### 31.1.1 2006 Reporting Submissions

##### *Completeness*

The original format for reporting agreed with Member States was officially established with 'Commission Decision 2002/159/EC of 18/02/2002 on the common format for the submission of summaries of national fuel quality data' (see Appendix 1). In this document it is specified that the first report must be submitted to the European Commission by 30th June 2002 in both paper and electronic formats.

In practice, many submissions received for 2001-2004 reporting were late, with the last received by the end of the year and a number of submissions were not sent in electronic format. In addition, a number of submissions were not entirely complete - the most common deficiency being lack of coverage of all specified fuel quality parameters. Some of these previous submissions also contained insufficient explanation and necessitated further communications with the designated national contact to obtain clarifications. This caused delays to the analysis and reporting for these years and complicated the establishment of compliance with the Directive in some cases.

Since then the completeness of submissions has considerably improved and all those for 2004 - 2006 reporting have been in electronic format. However, whilst most submissions for 2006 reporting were received by, or close to the 30th June deadline (and improved numbers since 2004), a number of Member States had still not reported well after this deadline. This has been particularly problematic this year with several member states delivering reports over 6 months late and the last full report received (from Greece) only in February 2008. This consistent very late delivery by certain clearly undermines the efforts of most Member States to deliver in a more timely fashion. Submissions from Belgium, Germany, Luxembourg and Greece were received more than 6 months late (as were the full details of the submission from France). Malta has not submitted a report in 2006.

Extended electronic reporting forms (in Microsoft Excel) were recommended, specified and improved in the 2001-2005 summary reports for the subsequent year's submissions in order to enhance the usefulness of information provided and facilitate more meaningful analysis. Most Member States have provided submissions in this format, even though not required to by the existing Commission Decision, again reducing the need for additional clarifications from Member States and facilitated report production. The numbers submitting in the Excel format is again improved since the previous year.

Responses were received from most Member State contacts for most points of clarification regarding the submissions on 2006 monitoring. Cases of specific data gaps in violation of the Commission Decision have been outlined in the previous Member State sections, together with any clarifying information provided in response to queries.

One significant omission still present in most reports from Member States opting to use their own National Systems (as opposed to one based upon EN 14274<sup>23</sup>) is an explanation of the

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<sup>23</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

reason for this decision and on the statistical confidence of their National System compared to EN 14274 specifications. Also Member States utilising EN14274 Statistical Model C should in future present a clear rationale for its use on the basis of both number of fuel sources/supply points and size/possibility of division of the territory into regions. This situation has unfortunately not improved since the previous years reporting.

### ***Fuel Quality Submission Database***

In addition to the preparation of this summary report, a Microsoft Access database was produced containing the basic reporting data and essential information provided by Member States. The database has been constructed to allow for easy input, storage/viewing of submission data, printable reports including both full reported data sets, as well as Member State and EU Summary Reports with a degree of basic analysis and graphical presentation of results and trends. It is anticipated that this database will again be made available to Member States and potentially the wider general public once the 2006 update is complete. In order to take full advantage of the functionality of the database it was also desirable for submissions to follow a more specific structured format in the future, which prompted the recommendation from the previous year's reports for submissions from Member States to be sent within an Excel template (as discussed in the previous section). Use of the template by the majority of Member States in submissions has facilitated accurate updating of the database for 2006 fuel quality.

### **31.1.2 Reporting Format**

It was clear from early reporting that there were number of areas where the reporting format outlined in Commission Decision 2002/159/EC could be improved. The new European Standard (EN 14274) is effective in addressing many of these issues (discussed in section 1.2.3) and agreement was reached on amendments to the reporting format in previous years. The common format for reporting from 2004 was developed in consultation with Member States and other stakeholders; the complete final version of the reporting format is provided in Appendix 4, with an Excel template based upon this sent to Member States by the EC earlier in the year. This process has reduced the need to return to Member States for clarifications or additional information (as discussed in the previous section) in many cases. However, information is still not always provided on non-compliances with limit values, and descriptions of the statistical confidence of National Systems in relation to EN 14274 requirements. Information in previous years was generally poor on the availability of sulphur-free fuels, discussed further in a later section, although it has improved significantly in the 2005 and 2006 reports.

### ***Reporting on distillation test analyses***

There has been difficulty in previous years in establishing compliance with distillation limit values, because the test reproducibility (determining the tolerance limits) varies according to each specific analysis. In some cases the individual test's reproducibility has not been available from Member States to confirm whether samples were compliant or not. This issue was raised at previous fuel quality expert meetings and in response CEN precision experts made an extensive analysis of large sets of distillation data of petrol and diesel deriving from national monitoring schemes. This analysis resulted in fixed precision statements (reproducibility) for the distillation characteristics reported in Directive 98/70/EC (4 %(V/V) for petrol distillation at 100°C and 150°C and 10°C for diesel distillation 95% point). CEN recommended in 2005 that these fixed precision statements should be implemented into the EU Fuel Quality Monitoring Submissions Reporting Template and be used to determine compliance where the reproducibility of a specific test is unavailable. This has resulted in clearer and more consistent reporting and evaluation of these test results.

**Reporting on availability and analyses on sulphur-free fuels**

From current indications there are still cases where <10 ppm fuels do not appear to be labelled in certain Member States. This is a problem as it significantly undermines the value of having meeting this criterion available - without labelling consumers have no possibility to choose sulphur-free fuels, particularly important for owners of vehicles utilising technology that requires them. This lack of labelling may have hampered the introduction of vehicles using technology requiring the fuels before full mandatory introduction in 2009. A result of this could be the full potential offered for reductions in CO<sub>2</sub> from the road transport sector not being realised.

Within current reporting requirements, where analyses for sulphur-free grades are not separated out, there will only be an indication of whether fuels comply with the <50 ppm limit value (mandatory from 2005). To give confidence that the fuels sold as sulphur-free comply with this specification it would be useful if Member States reported separately the sulphur content analyses carried out on them. Reporting provisions developed in the 2005 and 2006 Excel Reporting Templates aimed to encourage specific reporting of compliance with the <10 ppm limit value of fuels sold as sulphur-free. Most Member States have utilised this provision to provide separate data for sulphur-free fuels when reporting other parameters together with <50 ppm grades, giving greater assurance that these grades are indeed meeting the <10 ppm requirements.

More detail has also been provided this year by the majority of Member States on the availability of sulphur free fuels, although in some cases introduction has not included separate labelling (Belgium, Czech Republic, Ireland, Latvia, Luxembourg, the Netherlands, Slovakia and Slovenia), or even has not yet begun (Cyprus, Malta and UK only). Member States with less than 60% sales of sulphur-free fuels have for the most part not provided information in any of the formats suggested in the Commission Recommendation (Appendix 5) for assessment on the geographical availability, with the exception of France, Greece (diesel only), Italy (the most comprehensive) and Portugal.

**31.2 Conclusion and Recommendations**

As set out in the Excel reporting template, revisions to the reporting format outlined in Commission Decision 2002/159/EC and in the European Standard EN 14274: 2003, have enhanced the usefulness of the information and facilitated analysis of EU trends. The quality of the monitoring systems' design, compliance with limit values and information provided in report submissions is continuing to improve in most cases. However, there are still a few key areas for improvement, summarised as follows:

**Key Areas for Improvement**

- 1) A small number of Member States (including Belgium, France, Luxembourg and the UK) are consistently submitting reports very late after the 30 June deadline each year, they are encouraged to report on time to avoid undermining the efforts of others.
- 2) Regarding monitoring system and reporting consistency with EN 14274 requirements:
  - a) Several Member States do not fulfil sufficient sampling for all fuel grades (e.g. France, Netherlands) or are not sampling in sufficient numbers at refuelling stations (as opposed to depot/refinery).
  - b) Where Member States use their own National Systems rather than one based upon the European Standard, there needs to be a description of this system. This description should also provide an assessment that shows the monitoring system's equivalency in statistical confidence to EN 14274: 2003. This has *still* not been provided in most cases for 2004-2006 monitoring and needs to be provided in future.

- c) Where EN 14274 Statistical Model C is used, Member States should present a clear rationale for its use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions. For several Member States using Model C (and not providing this information) there appears to be a good case on the basis of NUTS regional classification for instead using Models A or B. These include Austria, Czech Republic, Hungary, Ireland and Slovakia.
- 3) In relation to the availability of sulphur free fuels, it is necessary for these fuels to be clearly labelled to ensure that the consumer has the opportunity to choose them. Belgium, Czech Republic, Ireland, Latvia, Luxembourg, the Netherlands, Slovakia and Slovenia need to take action to ensure this in 2006 onwards. Reporting on this labelling could help the automotive industry gain confidence in their availability so that vehicles taking full advantage of the fuel are more widely introduced. The UK, Malta and Cyprus also still need to introduce <10ppm fuels.
- 4) It would also be valuable, for the Member States not already doing so, to report separately (to <50pm fuels) the results of sulphur content analyses that were carried out on fuels sold as sulphur-free to further confirm their quality. These analyses need not be additional to existing sample analyses, but simply a subset of the existing total sampling and analysis requirement as part of their monitoring systems, as provided for in the Excel reporting template.
- 5) Temporal information provided indicates that significant advances have been made by the new EU10 Member States to reduce non-compliance compared to the EU average. This good work should be continued in order to further bring down the levels of non-compliances.

Following the success of the Excel reporting templates, revised templates for reporting on 2005/6 monitoring were produced, taking into account additional standard test methods introduced in EN 228:2004 and EN 590:2004 and providing an additional line to allow for separate reporting on sulphur content analyses of samples from fuel sold as sulphur-free. There have been no significant changes to the template for 2007 reporting (presented in Appendix 6). The 2007 template will be sent to Member States as in previous years. The use of the template should further assist Member States in their data reporting and again facilitate accurate data collation and analysis for the 2007 summary report.





# Appendices

## CONTENTS

Appendix 1	Commission Decision of 18/02/2002 on a common format for the submission of summaries of national fuel quality data – 2002/159/EC
Appendix 2	Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits
Appendix 3	Member State 2006 Fuel Quality Submission Tables
Appendix 4	Fuel Quality Monitoring Reporting Format for 2004 onwards
Appendix 5	Commission Recommendation 2005/27/EC
Appendix 6	2007 Excel Reporting Template



## **Appendix 1: Commission Decision of 18/02/2002- 2002/159/EC**



# COMMISSION

## COMMISSION DECISION

of 18 February 2002

on a common format for the submission of summaries of national fuel quality data

(notified under document number C(2002) 508)

(2002/159/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC <sup>(1)</sup>, and in particular Article 8(3) thereof,

Whereas:

- (1) It is necessary for the Member States to monitor the quality of petrol and diesel fuels marketed in their territories in order to ensure compliance with the environmental specifications contained in Directive 98/70/EC and to ensure the effectiveness of measures to reduce atmospheric pollution caused by vehicles.
- (2) It is necessary to establish a common reporting format for the submission of fuel quality monitoring information in accordance with Article 8(3) of Directive 98/70/EC,

HAS ADOPTED THIS DECISION:

### *Article 1*

This Decision establishes a common format for the submission of national fuel quality data in accordance with Article 8 of Directive 98/70/EC.

### *Article 2*

Member States shall use the format set out in the Annex, when making their submission to the Commission.

### *Article 3*

This Decision is addressed to the Member States.

Done at Brussels, 18 February 2002.

*For the Commission*  
Margot WALLSTRÖM  
*Member of the Commission*

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<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58.

## ANNEX

**ON A COMMON FORMAT FOR THE SUBMISSION OF SUMMARIES OF NATIONAL FUEL QUALITY DATA**

## 1. INTRODUCTION

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC <sup>(1)</sup>, as last amended by Commission Directive 2000/71/EC <sup>(2)</sup>, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive. By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report must be made by 30 June 2002. The reporting format contained herein has been established by the European Commission in accordance with Article 8(3) of Directive 98/70/EC and this Decision.

## 2. DETAILS OF THOSE COMPILING THE FUEL QUALITY MONITORING REPORT

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

Reporting year	
Country	
Date report completed	
Institute responsible for report	
Address of institute	
Person responsible for report	
Telephone No:	
E-mail:	

## 3. DEFINITIONS AND EXPLANATION

*Parent fuel grade:* Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade:* Member States may, of course, define 'national' fuel grades which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, 50 ppm sulphur petrol, zero sulphur diesel, 50 ppm sulphur diesel, etc.

Zero sulphur or sulphur-free fuels are petrol and diesel fuels which contain less than 10 mg/kg (ppm) of sulphur.

## 4. DESCRIPTION OF FUEL QUALITY MONITORING SYSTEM

Member States should provide a description on the operation of their national fuel quality monitoring systems.

<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58.

<sup>(2)</sup> OJ L 287, 14.11.2000, p. 46.

## 5. TOTAL SALES OF PETROL AND DIESEL

Member States are requested to complete the following table detailing the quantities of each grade of petrol and diesel marketed in their territory.

Fuel grade	National sales total (litres/tonnes)
Regular unleaded petrol (minimum RON = 91) <sup>(1)</sup>	
Unleaded petrol (minimum RON = 95) <sup>(2)</sup>	
Unleaded petrol (minimum RON = 95 and less than 50 ppm sulphur) <sup>(2)</sup>	
Sulphur-free unleaded petrol (less than 10 ppm sulphur) <sup>(3)</sup>	
Unleaded petrol (95 ≤ RON < 98)	
Unleaded petrol (RON ≥ 98)	
Diesel fuel <sup>(4)</sup>	
Diesel fuel (less than 50 ppm sulphur) <sup>(5)</sup>	
Diesel fuel (less than 10 ppm sulphur) <sup>(6)</sup>	

<sup>(1)</sup> As specified in Annex I of Directive 98/70/EC.

<sup>(2)</sup> As specified in Annex III of Directive 98/70/EC.

<sup>(3)</sup> As specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10 ppm.

<sup>(4)</sup> As specified in Annex II of Directive 98/70/EC.

<sup>(5)</sup> As specified in Annex IV of Directive 98/70/EC.

<sup>(6)</sup> As specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10 ppm.

## 6. GEOGRAPHICAL AVAILABILITY OF SULPHUR-FREE FUELS

The Member States are requested to provide a description on the extent to which (i.e. geographic availability) sulphur-free fuels are marketed in their territory.

<p>Brief description of the geographical extent to which sulphur-free petrol and diesel are marketed within the territory of a Member State.</p>
--

## 7. DEFINITION OF SUMMER PERIOD FOR PETROL VOLATILITY

Directive 98/70/EC requires the vapour pressure of petrol to be less than 60,0 kPa during the summer period which spans 1 May until 30 September. However, for those Member States which experience 'arctic conditions' the Summer period covers the period 1 June to 31 August and the vapour pressure must not exceed 70 kPa. Member States are requested to define the Summer period implemented in their territories.

<p>Sommer period (defined for petrol volatility)</p>	
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## 8. REPORTING FORMAT FOR PETROL

Member States should submit a summary report for the petrol quality monitoring data (for both nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table is attached at Appendix I. Test methods shall be those included in EN228: 2000 or later version as appropriate.

9. REPORTING FORMAT FOR DIESEL FUEL

Member States should submit a summary report for the diesel fuel quality monitoring data (for nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table is attached at Appendix II. Test methods shall be those included in EN590: 2000 or later versions as appropriate.

10. Submission of fuel quality monitoring report

The fuel quality monitoring report should be submitted formally to the following person:

The Secretary General  
The European Commission  
Rue de la Loi/Wetstraat 200  
B-1049 Brussels.

In addition, the report should be submitted in electronic form to the following email address: env-report-98-70@cec.eu.int

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## Appendix I

## Market fuels used in vehicles with spark ignition engines (petrol)

Parameter	Unit	Analytical and statistical results						Limiting value (1)		
		Number of samples	Minimum	Maximum	Mean	Standard deviation	National specification, if any			
							Minimum	Maximum	According to 98/70/EC	
Research octane No	—							95	—	—
Motor octane No	—							85		
Vapour pressure, DVPE	kPa							—		60,0
Distillation:										
— evaporated at 100 °C	%(v/v)							46,0		—
— evaporated at 150 °C	%(v/v)							75,0		—
Hydrocarbon analysis:										
— olefins	%(v/v)									18,0
— aromatics	%(v/v)									42,0
— benzene	%(v/v)									1,0
Oxygen content	%(m/m)									2,7
Oxygenates:										
— Methanol	%(v/v)									3
— Ethanol	%(v/v)									5
— Iso-propyl alcohol	%(v/v)									10
— Tert-butyl alcohol	%(v/v)									7
— Iso-butyl alcohol	%(v/v)									10
— Ethers with five or more carbon atoms per molecule	%(v/v)									15
— other oxygenates	%(v/v)									10
Sulphur content	mg/kg									150
Lead content	g/l									0,005

(1) The limiting values are 'true values' and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

Number of samples in month						Total	
January		April		July		October	
February		May		August		November	
March		June		September		December	





## **Appendix 2: Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits**



## Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits\*

\*Based on information provided by the German Environmental Protection Agency, Italy, Irish EPA and CEN

### Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Research Octane Number (RON) (RON 91 fuel only)	--	95		EN-ISO 5164	2005	0.7	94.6	
Motor Octane Number (MON) (RON 91 fuel only)	--	85		EN-ISO 5163	2005	0.9	84.5	
Vapour Pressure, DVPE --summer period (normal)	kPa		60	EN 13016-1	2000	3.0		61.8
--summer period (arctic or severe weather conditions)	kPa		70	EN 13016-1	2000	3.2		71.9
Distillation *								
--evaporated at 100°C	% (v/v)	46		EN-ISO 3405	2000	4.0*	43.6	
-- evaporated at 150°C	% (v/v)	75		EN-ISO 3405	2000	4.0*	72.6	
Hydrocarbon analysis								
-- Olefins	% (v/v)		18.0	ASTM D1319 EN 14517	95a 2004	4.6 2.6		20.7 19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319 EN 14517	95a 2004	5.1 3.0		24.0 22.8
-- Aromatics	% (v/v)		42.0	ASTM D1319 EN 14517	95a 2004	3.7 2.0		44.2 43.2
			35.0	ASTM D1319 EN 14517	95a 2004	3.7 1.7		37.2 36.0
-- Benzene	% (v/v)		1.0	EN 12177 EN 238 EN 14517	1998 1996 2004	0.10 0.17 0.05		1.06 1.10 1.03
Oxygen content	% (m/m)		2.7	EN 1601	1997	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3	EN 1601	1997	0.4		3.2
-- Ethanol	% (v/v)		5	EN 1601	1997	0.3		5.2
-- Iso-propyl alcohol	% (v/v)		10	EN 1601	1997	0.9		10.5
-- Tert-butyl alcohol	% (v/v)		7	EN 1601	1997	0.6		7.4
-- Iso-butyl alcohol	% (v/v)		10	EN 1601	1997	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15	EN 1601	1997	1		15.6
-- other oxygenates	% (v/v)		10	EN 1601	1997	0.8		10.5
Oxygen content	% (m/m)		2.7	EN 13132	2000	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3.0	EN 13132	2000	0.3		3.2
-- Ethanol	% (v/v)		5.0	EN 13132	2000	0.4		5.2
-- Iso-propyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Tert-butyl alcohol	% (v/v)		7.0	EN 13132	2000	0.5		7.3
-- Iso-butyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15.0	EN 13132	2000	1		15.6
-- other oxygenates	% (v/v)		10.0	EN 13132	2000	0.8		10.5
Sulphur content	mg/kg		150	EN ISO 14596	1998	30		168
				EN ISO 8754	1995	CEN: Not suitable for fuels 150ppm and below***		
				EN 24260	1994	18.6		161
				EN ISO 20846	2004	25.6		165.1
				EN ISO 20847	2004	27.7		166.3
				EN ISO 20884	2004	15.9		159.4
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20		62
				EN ISO 8754	1995	CEN: Not suitable for fuels 150ppm and below***		
				EN 24260	1994	6.8		54
				EN ISO 20846	2004	9.7		55.7
				EN ISO 20847	2004	16.6		59.8
				EN ISO 20884	2004	7.9		54.7

## Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5		13
				EN 24260	1994	3.4		12
				EN ISO 20846	2004	2.7		11.6
				EN ISO 20884	2004	3.1		11.8
Lead content	g/l		0.005	EN 237	1996	0.002		0.0062
				EN 237	2004	0.00062		0.0054

\* R values and limits are fixed precision statements provided by CEN, to be used in the absence of specific values from Member States. Member States may use and report their own defined R depending on their testing conditions.

\*\*\*According to CEN/TR 15139: August 2005 - "Petroleum products and other liquids - Applicability of test methods on sulphur determination in petrol and diesel fuel", the test method EN ISO 8754 is not suitable for determining the sulphur content of petrol or diesel fuels at or below 150ppm and 350ppm, respectively. This is because the method does not comply with the tolerance limit guidance according to EN ISO 4259.

## Diesel

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Cetane number	--	51.0	--	EN-ISO 5165	1998	4.3		48.5
Density at 15°C	kg/m <sup>3</sup>		845	EN-ISO 3675	1998	1.2		845.7
				EN ISO 12185	1996	0.5		845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	1988	10.0*		365.9
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50.0		379.5
				EN 24260	1994	42.4		375.0
				EN ISO 20846	2004	40.0		373.6
				EN ISO 20847	2004	17.9		360.6
				EN ISO 20884	2004	30.9		368.2
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20.0		62
				EN 24260	1994	6.8		54.0
				EN ISO 20846	2004	6.7		54.0
				EN ISO 20847	2004	12.8		57.6
				EN ISO 20884	2004	7.9		54.7
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5.0		13.0
				EN 24260	1994	3.4		12.0
				EN ISO 20846	2004	2.2		11.3
				EN ISO 20884	2004	3.1		11.8



## **Appendix 3: 2006 Member State Fuel Quality Submission Tables**

### **CONTENTS**

- Introduction to reporting tables
- 1 Petrol Reporting
- 2 Diesel Reporting



## Introduction to Appendix 3 Reporting Tables

The following tables represent the output from the Fuel Quality Summary database, produced as part of this work.

### Notes 1:

Where Member States have reported that parameter values are below the limit of detection for a particular test method (e.g. "<X"), these have been entered in the Microsoft Access database as "0" (and hence the tables in this Appendix), with a footnote in the notes accompanying the analysis table stating that the limit of detection for the specific test method is "X"(and therefore values reported as "0" will fall into the range "0 – X").

### Notes 2:

In cases where separate reporting tables for summer and winter period sampling were provided, data were combined in the following manner for each of the parameters for the full-year dataset:

Number of samples (N): direct sum of the two values;

Minimum: the lowest of the two values;

Maximum: the highest of the two values;

Mean (m): Mean of 2 data sets =  $((m_1 * n_1) + (m_2 * n_2)) / N$

Where:

N = total number of samples

$m_1$  = mean data set 1,  $m_2$  = mean data set 2

$n_1$  = no. samples in data set 1,  $n_2$  = no. samples in data set 2

In accordance with:

Mean = sum of sample values / number of samples



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	91.2	97.7	94.81	1.472087231	91	0	91	--
MOTOR OCTANE NO.	--	50	82.5	85.1	83.234	0.638112651	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	54.6	60.3	58.264	1.250103669	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	47.7	59.9	51.766	2.231372781	46	71	46.0	--
evaporated at 150	%(v/v)	50	78.5	92.6	84.164	2.848398046	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	6.3	15.4	12.684	2.173247359	0	0	--	21.0
aromatics	%(v/v)	50	28.9	35.3	33.694	1.370447566	0	0	--	35.0
benzene	%(v/v)	50	0.54	0.87	0.7336	0.067906298	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.7	1	0.82	0.109544512	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0.52	5.65	1.51	1.387830441	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	2.945548082	25.06474164	6.570215193	3.387535845	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	91.2	96.8	93.374	1.359293034	91	0	91	--
MOTOR OCTANE NO.	--	50	82.5	85.2	83.372	0.627284397	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	68.3	91.2	80.892	5.936495221	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	49.5	67	56.054	4.246737523	46	71	46.0	--
evaporated at 150	%(v/v)	50	80.3	95.8	88.54	3.219836477	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	4.6	16	12.65	2.347230239	0	0	--	21.0
aromatics	%(v/v)	50	27.8	34.3	32.272	2.007134215	0	0	--	35.0
benzene	%(v/v)	50	0.57	0.95	0.7936	0.120961454	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.1	0.7	0.2	0.136082763	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	2.97	0.75	0.606217783	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	2.5	9.1	5.764584622	1.7776938	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable; Vapour Pressure: For winter period the maximum value amounts 90 kPa, including tolerance 91,8 kPa. By regarding this fact there is no measured value exceeding the limits!

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	91.2	97.7	94.1				91	--
MOTOR OCTANE NO.	--	100	82.5	85.2	83.3				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	100	54.6	91.2	69.6				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	47.7	67	53.9				46.0	--
evaporated at 150	%(v/v)	100	78.5	95.8	86.4				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	4.6	16	12.7				--	21.0
aromatics	%(v/v)	100	27.8	35.3	33				--	35.0
benzene	%(v/v)	100	0.54	0.95	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	100	0.1	1	0.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0				--	3
Ethanol	%(v/v)	100	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0	5.65	1.1				--	15
Other oxygenate	%(v/v)	100	0	0	0				--	10
SULPHUR CONTENT	mg/kg	100	2.5	25.06474164	6.2				--	50
LEAD CONTENT	g/l	100	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	94.6	97.5	96	0.62572407	91	0	95	--
MOTOR OCTANE NO.	--	50	84.6	85.9	85.33	0.348904993	82.5	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	53.8	60.7	58.262	1.490225295	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	48.2	59	54.176	2.765720189	46	71	46.0	--
evaporated at 150	%(v/v)	50	77.7	91.6	85.606	3.362421989	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	5.3	13.6	10.548	1.904370912	0	0	--	18.0
aromatics	%(v/v)	50	32.2	36.3	34.394	0.921270197	0	0	--	35.0
benzene	%(v/v)	50	0.49	0.84	0.6452	0.089059485	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.5	1.8	0.845454545	0.264535174	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	1.16	9.76	4.3226	1.573820011	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	1.929085722	13.51206146	5.363367972	2.381266929	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	94.7	96.8	95.906	0.477839526	91	0	95	--
MOTOR OCTANE NO.	--	50	84.7	85.8	85.332	0.267597017	82.5	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	72	89.3	82.68	5.015486222	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	51	63.8	55.436	2.375105583	46	71	46.0	--
evaporated at 150	%(v/v)	50	79.8	92.4	87.22	2.614090547	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	5.5	15.9	12.612	2.508568174	0	0	--	18.0
aromatics	%(v/v)	50	32.5	35.9	33.774	0.685955315	0	0	--	35.0
benzene	%(v/v)	50	0.5	0.96	0.6766	0.081280818	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.2	1.4	0.646666667	0.227236361	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	1.1	7.45	3.425744681	1.308797564	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	2.29	9.62	4.730662682	1.720340812	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable; Vapour Pressure: For winter period the maximum value amounts 90 kPa, including tolerance 91,8 kPa. By regarding this fact there is no measured value exceeding the limits!

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	94.6	97.5	95.9				95	--
MOTOR OCTANE NO.	--	100	84.6	85.9	85.3				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	100	53.8	89.3	70.5				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	48.2	63.8	54.8				46.0	--
evaporated at 150	%(v/v)	100	77.7	92.4	86.4				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	5.3	15.9	11.6				--	18.0
aromatics	%(v/v)	100	32.2	36.3	34.1				--	35.0
benzene	%(v/v)	100	0.49	0.96	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	100	0.2	1.8	0.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0				--	3
Ethanol	%(v/v)	100	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	1.1	9.76	3.9				--	15
Other oxygenate	%(v/v)	100	0	0	0				--	10
SULPHUR CONTENT	mg/kg	100	1.929085722	13.51206146	5				--	50
LEAD CONTENT	g/l	100	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	99.2	99.7	99.4	0.264575131	98	0	95	--
MOTOR OCTANE NO.	--	3	88	88.1	88.06666667	0.057735027	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	59	67.6	61.9	4.936598019	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	3	60.3	61.4	61.03333333	0.635085296	46	71	46.0	--
evaporated at 150	%(v/v)	3	87.5	88.1	87.8	0.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	3	9.4	12.7	10.7	1.757839583	0	0	--	18.0
aromatics	%(v/v)	3	33.7	34.2	34	0.264575131	0	0	--	35.0
benzene	%(v/v)	3	0.61	0.66	0.636666667	0.025166115	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	3	2.4	2.7	2.566666667	0.152752523	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	3	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	3	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	3	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	3	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	3	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	3	13.36	14.87	14.26333333	0.79751698	0	0	--	15
Other oxygenate	%(v/v)	3	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	3	2.688786416	5.322598076	3.728933082	1.401437786	0	0	--	50
LEAD CONTENT	g/l	3	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	0	0	0	0	0	0	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	35.0
benzene	%(v/v)	0	0	0	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0	0	0	0	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	0	99.7	99.4				95	--
MOTOR OCTANE NO.	--	3	0	88.1	88.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	0	67.6	61.9				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	3	0	61.4	61				46.0	--
evaporated at 150	%(v/v)	3	0	88.1	87.8				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	3	0	12.7	10.7				--	18.0
aromatics	%(v/v)	3	0	34.2	34				--	35.0
benzene	%(v/v)	3	0	0.66	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	3	0	2.7	2.6				--	2.7
OXYGENATES:										
Methanol	%(v/v)	3	0	0	0				--	3
Ethanol	%(v/v)	3	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	3	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	3	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	3	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	3	0	14.87	14.3				--	15
Other oxygenate	%(v/v)	3	0	0	0				--	10
SULPHUR CONTENT	mg/kg	3	0	5.322598076	3.7				--	50
LEAD CONTENT	g/l	3	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Belgium  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Eurosuper 50s

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2412	85.7	100	96.4	0.72	95	0	95	--
MOTOR OCTANE NO.	--	95	83.6	86.2	85.3	0.38	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	959	53.9	87.9	58.4	2.5	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2412	46.1	67.7	58.1	3.34	46	71	46.0	--
evaporated at 150	%(v/v)	2412	79.3	97.8	88.5	2.17	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2412	0.8	32.8	11.9	4.35	0	18	--	18.0
aromatics	%(v/v)	2412	3.3	43.4	30.3	3.86	0	35	--	35.0
benzene	%(v/v)	95	0.3	1	0.6	0.14	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2412	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	2412	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2412	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	2412	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	2412	0	1.1	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2412	0	14.9	7.4	3.6	0	15	--	15
Other oxygenate	%(v/v)	2412	0	10.1	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	95	3.7	47.7	10.9	7.33	0	50	--	50
LEAD CONTENT	g/l	16	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Belgium  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Eurosuper 10s

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	21	57.1	98.5	94.6	7.4	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	21	55.1	67.8	62.4	3.26	46	71	46.0	--
evaporated at 150	%(v/v)	21	86.6	93.8	90	1.5	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	21	1.2	17.7	12.7	4.37	0	18	--	18.0
aromatics	%(v/v)	21	3.6	31.8	25.5	3.6	0	35	--	35.0
benzene	%(v/v)	0	0	0	0	0	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	21	0	0.6	0	0	0	3	--	3
Ethanol	%(v/v)	21	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	21	0	5.4	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	21	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	21	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	21	0.1	13	7.9	3.75	0	15	--	15
Other oxygenate	%(v/v)	21	0	0.8	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	95	3.7	47.7	10.9	7.33	0	10	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes: Values of lead content are less than 0.1 (minimum) and 0.5 (maximum) mg/kg

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Belgium  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super+ 50S

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2266	95	100.6	98.7	0.99	98	0	95	--
MOTOR OCTANE NO.	--	88	84.9	88.7	87.3	1.36	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	974	53.1	90.8	57.6	3	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2266	46.7	90.3	55.8	3.88	46	71	46.0	--
evaporated at 150	%(v/v)	2266	51.1	97.7	88.3	2.64	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2266	0.5	30.3	7.8	3.81	0	18	--	18.0
aromatics	%(v/v)	2266	6.7	39.8	28.6	4.44	0	35	--	35.0
benzene	%(v/v)	88	0.3	0.9	0.5	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2266	0	0.8	0	0	0	3	--	3
Ethanol	%(v/v)	2266	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2266	0	0.2	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	2266	0	12.7	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	2266	0	1.5	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2266	0.5	14.9	11	2.46	0	15	--	15
Other oxygenate	%(v/v)	2266	0	2	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	88	3.5	41.5	9.6	6.5	0	50	--	50
LEAD CONTENT	g/l	14	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Belgium  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super+ 10S

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	23	98.2	99.6	98.7	0.34	98	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	23	52.4	62.1	58.1	2.49	46	71	46.0	--
evaporated at 150	%(v/v)	23	83.9	92.2	89.4	1.98	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	23	2.9	11.8	7.5	2.57	0	18	--	18.0
aromatics	%(v/v)	23	17.6	31.1	23.5	4.04	0	35	--	35.0
benzene	%(v/v)	0	0	0	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	23	0	0.6	0	0	0	3	--	3
Ethanol	%(v/v)	23	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	23	0	3.6	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	23	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	23	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	23	2.5	12.1	11.5	2.46	0	15	--	15
Other oxygenate	%(v/v)	23	0	1.6	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	88	3.5	41.5	9.6	6.5	0	0	--	50
LEAD CONTENT	g/l	23	0.0003	0.0003	0.0003	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Bulgaria  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	87.7	95	92.14	2.28	92	0	91	--
MOTOR OCTANE NO.	--	0	0	0	0	0	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	44	85	46.5	1.73	46	71	46.0	--
evaporated at 150	%(v/v)	10	79	85	80.9	1.66	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	21.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	35.0
benzene	%(v/v)	10	0.7	1.22	0.98	0.23	0	2	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	10	0	264	163	46.45	0	150	--	50
LEAD CONTENT	g/l	10	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Bulgaria  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	92.5	96.8	95.2	1.31	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	13	43	53.5	47.38	3.2	46	71	46.0	--
evaporated at 150	%(v/v)	13	77.5	85	81.2	2.4	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	35.0
benzene	%(v/v)	12	0.4	0.9	0.69	0.14	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	12	75	198	111.83	37.29	0	150	--	50
LEAD CONTENT	g/l	12	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Cyprus  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	29	95.8	96.8	96.3	0.2	0	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	17	56.9	63.6	59.6	1.9	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	35	49.7	61.4	56.1	2.7	0	0	46.0	--
evaporated at 150	%(v/v)	35	80.5	88.6	84.6	2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	31	11.7	17.4	14.5	1.7	0	0	--	18.0
aromatics	%(v/v)	31	27.6	35.4	32.2	1.6	0	0	--	35.0
benzene	%(v/v)	31	0.4	1	0.7	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	31	0.5	2.7	1.6	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	2.6	14.7	6.8	4.9	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	34	19.5	40.6	28.5	4.5	0	0	--	50
LEAD CONTENT	g/l	31	0.002	0.003	0.002	0.0005	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Cyprus  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	97.7	98.6	98.2	0.2	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	9	59.7	75.8	65.7	6.3	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	39	54.3	59.4	57.3	1.2	46	71	46.0	--
evaporated at 150	%(v/v)	39	80.9	90.3	86.8	3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	39	10.9	16.5	13	1.6	0	18	--	18.0
aromatics	%(v/v)	39	27.4	35.4	33.3	1.3	0	35	--	35.0
benzene	%(v/v)	39	0.3	1	0.8	0.3	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	39	1.8	2.6	2.2	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	39	10.6	14.4	12.68	0.86	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	39	20.3	52.1	26.9	6.6	0	50	--	50
LEAD CONTENT	g/l	39	0.002	0.005	0.002	0.001	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Normal BA-91, Speciál BA-91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	91.3	96.7	93.43	1.322	91	0	91	--
MOTOR OCTANE NO.	--	41	81.3	85.4	82.98	1.04	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	50	71.8	57.78	4.045	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	47.5	61.7	53.43	2.535	0	0	46.0	--
evaporated at 150	%(v/v)	41	72	89.3	78.35	2.383	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	7.1	20.2	13.33	2.376	0	0	--	21.0
aromatics	%(v/v)	41	27.1	36.9	31.63	2.299	0	0	--	35.0
benzene	%(v/v)	41	0.42	0.81	0.56	0.0952	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	41	0.02	2.42	0.46	0.631	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	1	0.002	0.144	0	0	--	3
Ethanol	%(v/v)	41	0	4.2	0.1	0.618	0	0	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	0.1	12.4	2.15	2.887	0	0	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	41	0	53	29	15.365	0	0	--	50
LEAD CONTENT	g/l	41	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Normal BA-91, Speciál BA-91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	30	90.8	96.5	94	1.167	91	0	91	--
MOTOR OCTANE NO.	--	30	81.6	85.5	83.4	0.912	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	30	47.8	66.2	54.1	2.271	0	0	46.0	--
evaporated at 150	%(v/v)	30	75	89.5	78.5	2.898	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	30	4.3	19.7	14.2	3.527	0	0	--	21.0
aromatics	%(v/v)	30	24.8	36.3	32.2	2.362	0	0	--	35.0
benzene	%(v/v)	30	0.41	0.87	0.56	0.117	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	30	0	2.1	0.3	0.466	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	30	0	0	0	0.0249	0	0	--	3
Ethanol	%(v/v)	30	0	0.1	0	0.0179	0	0	--	5
Iso-propyl alcohol	%(v/v)	30	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	30	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	30	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	30	0.1	11.6	1.8	8.74	0	0	--	15
Other oxygenate	%(v/v)	30	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	30	0	52	35.3	13.698	0	0	--	50
LEAD CONTENT	g/l	30	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Normal BA-91, Speciál BA-91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	118	90.8	96.7	93.6	1.300015046	0	0	91	--
MOTOR OCTANE NO.	--	118	81.3	85.5	83.1	1	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	50	71.8	57.8	4.055	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	118	47.5	66.2	53.6	2.64	0	0	46.0	--
evaporated at 150	%(v/v)	118	72	89.5	78.4	2.53	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	118	4.3	20.2	13.6	2.74	0	0	--	21.0
aromatics	%(v/v)	118	24.8	36.9	31.7	2.21	0	0	--	35.0
benzene	%(v/v)	118	0.41	0.87	0.56	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	118	0.01	2.42	0.43	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	118	0	1	0.02	0.1	0	0	--	3
Ethanol	%(v/v)	118	0	4.2	0.07	0.54	0	0	--	5
Iso-propyl alcohol	%(v/v)	118	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	118	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	118	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	118	0.1	12.4	2.07	2.8	0	0	--	15
Other oxygenate	%(v/v)	118	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	118	3	53	29.6	15.8	0	0	--	50
LEAD CONTENT	g/l	118	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super BA-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	288	93	97.6	96.1	0.7	0	0	95	--
MOTOR OCTANE NO.	--	288	83.5	95.6	85.2	0.6	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	288	48.6	73.4	56.7	2.2	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	288	46.1	64.7	52.6	2.5	0	0	46.0	--
evaporated at 150	%(v/v)	288	73.5	88.2	78.2	2.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	288	4	19.3	10.8	2.6	0	0	--	18.0
aromatics	%(v/v)	288	26.5	45.8	33.4	1.5	0	0	--	35.0
benzene	%(v/v)	288	0.3	4	0.5	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	288	0.3	2.9	1.4	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	288	0	0.4	0	0.1	0	0	--	3
Ethanol	%(v/v)	288	0	4.1	0.1	0.4	0	0	--	5
Iso-propyl alcohol	%(v/v)	288	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	288	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	288	0	0.2	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	288	1.6	13.8	7.5	3.5	0	0	--	15
Other oxygenate	%(v/v)	288	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	288	0	55.7	22.7	13.3	0	0	--	50
LEAD CONTENT	g/l	288	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super BA 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	445	93.3	98.1	96.2	0.713	0	0	95	--
MOTOR OCTANE NO.	--	445	84	86.9	85.2	0.348	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	445	39.5	59.4	53.9	2.531	0	0	46.0	--
evaporated at 150	%(v/v)	445	72	88.6	78.9	2.917	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	445	0	21.5	13.1	4.42	0	0	--	18.0
aromatics	%(v/v)	445	27.1	57.6	33	2.002	0	0	--	35.0
benzene	%(v/v)	445	0.29	2.12	0.52	0.139	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	445	0	2.93	1.1	0.609	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	445	0	3	0.1	0.208	0	0	--	3
Ethanol	%(v/v)	445	0	4	0	0.339	0	0	--	5
Iso-propyl alcohol	%(v/v)	445	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	445	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	445	0	1.7	0	0.103	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	445	0.1	13.5	5.8	3.123	0	0	--	15
Other oxygenate	%(v/v)	445	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	446	0	55.7	27.7	14.43	0	0	--	50
LEAD CONTENT	g/l	445	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super BA-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	733	93	98.1	96.1	0.72	0	0	95	--
MOTOR OCTANE NO.	--	733	83.5	95.6	85.2	0.5	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	287	48.6	73.4	56.7	2.21	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	733	39.5	64.7	53.1	2.57	0	0	46.0	--
evaporated at 150	%(v/v)	733	72	88.6	78.4	2.7	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	733	0	21.5	11.7	3.58	0	0	--	18.0
aromatics	%(v/v)	733	26.5	57.6	33.2	1.73	0	0	--	35.0
benzene	%(v/v)	733	0.29	3.98	0.51	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	733	0.02	2.93	1.29	0.66	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	733	0	3	0.04	0.14	0	0	--	3
Ethanol	%(v/v)	733	0	4.4	0.05	0.4	0	0	--	5
Iso-propyl alcohol	%(v/v)	733	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	733	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	733	0	1.7	0	0.06	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	733	0.1	13.8	6.9	3.5	0	0	--	15
Other oxygenate	%(v/v)	733	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	733	0	55.7	25	14.2	0	0	--	50
LEAD CONTENT	g/l	733	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus BA-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	8	98.6	100.7	99.6	0.61	98	0	95	--
MOTOR OCTANE NO.	--	8	87.8	89.6	88.3	0.56	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	8	51.4	58.1	55.78	2.13	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	8	51.7	62.4	60.1	3.23	0	0	46.0	--
evaporated at 150	%(v/v)	8	78.7	87.4	85.4	2.62	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	8	0	8.3	5.9	3.12	0	0	--	18.0
aromatics	%(v/v)	8	32.7	37	36.1	1.29	0	0	--	35.0
benzene	%(v/v)	8	0.21	0.64	0.5	0.14	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	8	1.47	2.83	2.6	0.43	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	8	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	8	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	8	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	8	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	8	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	8	8	15.6	14.3	2.38	0	0	--	15
Other oxygenate	%(v/v)	8	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	8	0	6	0.43	0.94	0	0	--	50
LEAD CONTENT	g/l	8	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus BA-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	97.9	100.5	99.3	0.9696	98	0	95	--
MOTOR OCTANE NO.	--	12	87.5	88.7	88.1	0.307	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	12	49.8	63.1	57.4	5.328	0	0	46.0	--
evaporated at 150	%(v/v)	12	76.7	88.4	86.3	3.015	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	1.2	10.1	7.6	2.783	0	0	--	18.0
aromatics	%(v/v)	12	30	36.7	33.9	2.645	0	0	--	35.0
benzene	%(v/v)	12	0.36	0.67	0.57	0.098	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	12	0.66	1.96	1.96	0.633	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	12	0	0.1	0	0.033	0	0	--	5
Iso-propyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	3.4	14.8	10.8	3.545	0	0	--	15
Other oxygenate	%(v/v)	12	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	12	0	9	5.8	1.803	0	0	--	50
LEAD CONTENT	g/l	12	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus BA-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	20	97.9	100.7	99.3	0.05	98	0	95	--
MOTOR OCTANE NO.	--	20	87.5	89.6	88.1	0.05	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	8	51.4	58.1	55.8	2.13	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	20	49.8	63.1	57.7	0.4	0	0	46.0	--
evaporated at 150	%(v/v)	20	76.7	88.4	84.7	0.05	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	20	0	10.1	6.3	0.15	0	0	--	18.0
aromatics	%(v/v)	20	30	37	34.6	0.4	0	0	--	35.0
benzene	%(v/v)	20	0.21	0.67	0.52	0.01	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	20	0.66	2.83	2.23	0.03	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	20	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	20	0	0.1	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	20	3.4	15.6	12.3	0.15	0	0	--	15
Other oxygenate	%(v/v)	20	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	20	0	9	5	2	0	0	--	50
LEAD CONTENT	g/l	20	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Denmark  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s  
 National Fuel Grade RON 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	92	93.4	92.7	0.989949494	0	0	91	--
MOTOR OCTANE NO.	--	2	83.5	84.5	84	0.707106781	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	62.1	72.2	66.73333333	5.101307022	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	7	51.9	68.4	61.94285714	6.801190372	0	0	46.0	--
evaporated at 150	%(v/v)	7	84.3	94.8	91.37142857	4.180396427	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	0.5	8.8	4.014285714	3.581633041	0	0	--	21.0
aromatics	%(v/v)	7	25.6	32.5	30.12857	2.63989538	0	0	--	35.0
benzene	%(v/v)	7	0.5	0.9	0.742857143	0.161834719	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	0.1	0.2	0.14	0.161834719	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	7	0	5.1	2.042857143	2.563758402	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Denmark  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	95.3	95.4	95.4	0.070710678	0	0	95	--
MOTOR OCTANE NO.	--	2	85.2	85.4	85.3	0.141421356	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	15	66.5	69.6	68.35333333	0.880638297	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	29	49.7	64.7	57.41034483	3.899665263	0	0	46.0	--
evaporated at 150	%(v/v)	29	84.8	94.7	90.71724138	2.955994994	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	29	0.7	10.5	5.072413793	3.242782816	0	0	--	18.0
aromatics	%(v/v)	29	29.2	34.5	31.61034	1.437841842	0	0	--	35.0
benzene	%(v/v)	29	0.4	0.9	0.672413793	0.127885417	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	29	0	1.3	0.131034483	0.231614594	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	29	0	8.6	2.996551724	2.229907551	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Denmark  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	97.8	97.8	97.8	0	0	0	95	--
MOTOR OCTANE NO.	--	2	87.6	87.8	87.7	0.141421356	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	2	69	72.4	70.7	2.404163056	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	4	56.7	62.7	60.675	2.698610754	0	0	46.0	--
evaporated at 150	%(v/v)	4	91.1	92.6	91.75	0.635085296	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	4	0.8	4.1	2.55	1.382027496	0	0	--	18.0
aromatics	%(v/v)	4	29.7	33.5	31.9	1.78699002	0	0	--	35.0
benzene	%(v/v)	4	0.6	0.8	0.7	0.115470054	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	2.3	2.3	2.3	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0.3	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0.1	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	11.9	13.5	12.575	0.763216876	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	4	0	6.2	3.65	2.787471973	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 95 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	78	95.5	97	96.3	0.35	95	0	95	--
MOTOR OCTANE NO.	--	78	84.7	86.5	85.5	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	78	65.1	87.8	69.8	7.4	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	78	47.4	62.2	55.8	2.68	46	71	46.0	--
evaporated at 150	%(v/v)	78	81.9	89.1	86.1	1.44	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	78	2.5	11.2	8.2	1.38	0	18	--	18.0
aromatics	%(v/v)	78	25.6	34.3	30.8	2.77	0	42	--	35.0
benzene	%(v/v)	78	0.1	0.6	0.32	0.15	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	78	1.4	2.6	2	0.28	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	78	0.1	0.3	0.16	0.06	0	3	--	3
Ethanol	%(v/v)	78	0.1	0.1	0.1	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	78	0.1	1	0.12	0.15	0	10	--	10
Tetro-butyl alcohol	%(v/v)	78	0.1	0.7	0.44	0.18	0	7	--	7
Iso-butyl alcohol	%(v/v)	78	0.1	0.2	0.1	0.05	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	78	6.9	13.8	10.4	1.39	0	15	--	15
Other oxygenate	%(v/v)	78	0.1	0.1	0.1	0	0	10	--	10
SULPHUR CONTENT	mg/kg	78	4.5	8	5.9	0.87	0	0	--	50
LEAD CONTENT	g/l	78	0	0.005	0.00013	0	0	0.005	--	0.005

Notes: (6) Petrol in summer period (01.May.-30.Sept.) must comply with Class B specifications

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 95 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	87	93.7	98.4	95.5	0.69	95	0	95	--
MOTOR OCTANE NO.	--	87	84.2	89	86	0.82	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	87	69.2	89.1	81.7	4.9	65	95	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	87	48.2	65.3	58.6	4.1	46	71	46.0	--
evaporated at 150	%(v/v)	87	76.9	89.7	86.6	1.79	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	87	2.4	13.7	5.4	1.57	0	18	--	18.0
aromatics	%(v/v)	87	7.9	34.8	30.9	3.45	0	42	--	35.0
benzene	%(v/v)	87	0.1	0.9	0.3	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	87	1.1	2.9	1.9	0.45	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	87	0.1	0.3	0.2	0.05	0	3	--	3
Ethanol	%(v/v)	87	0.1	0.2	0.1	0.04	0	5	--	5
Iso-propyl alcohol	%(v/v)	87	0.1	0.1	0.1	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	87	0.1	1	0.6	0.26	0	7	--	7
Iso-butyl alcohol	%(v/v)	87	0.1	0.1	0.1	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	87	5	15.6	9.7	2.85	0	15	--	15
Other oxygenate	%(v/v)	87	0.1	0.1	0.1	0	0	10	--	10
SULPHUR CONTENT	mg/kg	87	2.6	18.7	6.5	2.76	0	0	--	50
LEAD CONTENT	g/l	87	0	0.0018	0.0008	0	0	0.005	--	0.005

Notes: \* National specification for winter period minimum 65,0 kPa - maximum 95,0 kPa (EVS-EN 228:2004); (6) Petrol in winter period (01.Dec.-29.Feb.) must comply with Class E/E1 specifications

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 95 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	165	93.7	98.4	95.9				95	--
MOTOR OCTANE NO.	--	165	84.2	89	85.8				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	165	65.1	89.1	76.1				--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	165	47.4	65.3	57.3				46.0	--
evaporated at 150	%(v/v)	165	76.9	89.7	86.4				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	165	2.4	13.7	6.7				--	18.0
aromatics	%(v/v)	165	7.9	34.8	30.9				--	35.0
benzene	%(v/v)	165	0.1	0.9	0.3				--	1.0
OXYGEN CONTENT	%(m/m)	165	1.1	2.9	1.9				--	2.7
OXYGENATES:										
Methanol	%(v/v)	165	0.1	0.3	0.2				--	3
Ethanol	%(v/v)	165	0.1	0.2	0.1				--	5
Iso-propyl alcohol	%(v/v)	165	0.1	1	0.1				--	10
Tetro-butyl alcohol	%(v/v)	165	0.1	1	0.5				--	7
Iso-butyl alcohol	%(v/v)	165	0.1	0.2	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	165	5	15.6	10				--	15
Other oxygenate	%(v/v)	165	0.1	0.1	0.1				--	10
SULPHUR CONTENT	mg/kg	165	2.6	18.7	6.2				--	50
LEAD CONTENT	g/l	165	0	0.005	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 98 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	70	97	98.9	98.5	0.3	98	0	95	--
MOTOR OCTANE NO.	--	70	85.7	89	88.6	0.43	87.4	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	70	45.8	49.6	47.9	0.75	46	71	46.0	--
evaporated at 150	%(v/v)	70	83.1	87.6	85.5	0.79	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	70	1.6	12.5	5.9	3.32	0	18	--	18.0
aromatics	%(v/v)	70	27.1	35	32.5	1.32	0	42	--	35.0
benzene	%(v/v)	70	0.1	0.2	0.2	0.05	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	70	1.8	2.7	2.5	0.16	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	70	0.1	1	0.12	0.14	0	3	--	3
Ethanol	%(v/v)	70	0.1	0.1	0.1	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	70	0.1	0.1	0.1	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	70	0.1	0.7	0.56	0.15	0	7	--	7
Iso-butyl alcohol	%(v/v)	70	0.1	0.3	0.19	0.06	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	70	6.4	14.8	13.1	1.17	0	15	--	15
Other oxygenate	%(v/v)	70	0.1	0.1	0.1	0	0	10	--	10
SULPHUR CONTENT	mg/kg	70	3.5	16.1	4.9	1.9	0	0	--	50
LEAD CONTENT	g/l	70	0	0.0039	0.00143	0.00116	0	0.005	--	0.005

Notes: Petrol in winter period (01.Dec.-29.Feb.) must comply with Class E/E1 specifications; Petrol in summer period (01.May.-30.Sept.) must comply with Class B specifications

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 98 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	65	95.2	98.9	98	0.9	98	0	95	--
MOTOR OCTANE NO.	--	65	85.4	98.3	88.6	1.48	87.4	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	65	57.6	89.1	77.5	6.9	65	95	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	65	43	62.9	49.6	4.44	46	71	46.0	--
evaporated at 150	%(v/v)	65	79	91.1	85.6	2.44	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	65	1.3	9.6	4.1	2.26	0	18	--	18.0
aromatics	%(v/v)	65	8.1	35.7	32.8	3.6	0	42	--	35.0
benzene	%(v/v)	65	0.1	0.9	0.3	0.21	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	65	1.9	2.8	2.4	0.18	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	65	0.1	0.1	0.1	0	0	3	--	3
Ethanol	%(v/v)	65	0.1	0.1	0.1	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	65	0.1	0.1	0.1	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	65	0.3	0.6	0.6	0.08	0	7	--	7
Iso-butyl alcohol	%(v/v)	65	0.1	0.2	0.1	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	65	10.1	15.2	12.4	1.29	0	15	--	15
Other oxygenate	%(v/v)	65	0.1	0.1	0.1	0	0	10	--	10
SULPHUR CONTENT	mg/kg	65	2.6	24.7	5.4	3.37	0	0	--	50
LEAD CONTENT	g/l	65	0	0.002	0.0006	0.0004	0	0.005	--	0.005

Notes: #####  
 #####

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Estonia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 98 EURO

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	135	95.2	98.9	98.3				95	--
MOTOR OCTANE NO.	--	135	85.4	98.3	88.6				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	65	0	89.1	77.5				--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	135	43	62.9	48.7				46.0	--
evaporated at 150	%(v/v)	135	79	91.1	85.5				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	135	1.3	12.5	5				--	18.0
aromatics	%(v/v)	135	8.1	35.7	32.6				--	35.0
benzene	%(v/v)	135	0.1	0.9	0.2				--	1.0
OXYGEN CONTENT	%(m/m)	135	1.8	2.8	2.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	135	0.1	1	0.1				--	3
Ethanol	%(v/v)	135	0.1	0.1	0.1				--	5
Iso-propyl alcohol	%(v/v)	135	0.1	0.1	0.1				--	10
Tetro-butyl alcohol	%(v/v)	135	0.1	0.7	0.6				--	7
Iso-butyl alcohol	%(v/v)	135	0.1	0.3	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	135	6.4	15.2	12.8				--	15
Other oxygenate	%(v/v)	135	0.1	0.1	0.1				--	10
SULPHUR CONTENT	mg/kg	135	2.6	24.7	5.1				--	50
LEAD CONTENT	g/l	135	0	0.0039	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	7	95.6	96.2	96	0.2	0	0	95	--
MOTOR OCTANE NO.	--	7	85.3	86.2	85.7	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	53	58.7	68.7	64.5	2	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	47.7	64.3	56.1	4.5	0	0	46.0	--
evaporated at 150	%(v/v)	53	80.8	92.2	88	3.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	3.9	10	6.1	1.1	0	0	--	18.0
aromatics	%(v/v)	53	27.6	36.7	31.2	1.9	0	0	--	35.0
benzene	%(v/v)	53	0.6	0.9	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	53	2	2.7	2.3	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	53	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	53	0	0.3	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	53	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	53	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	53	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	11.8	15.1	13.3	0.8	0	0	--	15
Other oxygenate	%(v/v)	53	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	53	5.7	9.5	7.2	1	0	0	--	50
LEAD CONTENT	g/l	53	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The highest ethers content 15,1 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v). FN6: The highest aromatics content 36,7 % (v/v) is above the maximum limiting value 35,0 % (v/v) but within the maximum tolerance limit 37,2 % (v/v).



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	95.1	96.9	95.9	0.6	0	0	95	--
MOTOR OCTANE NO.	--	14	85.1	86.3	85.8	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	61	46.7	66	59.2	4.5	0	0	46.0	--
evaporated at 150	%(v/v)	61	78.4	92.2	89.3	3.3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	61	3.3	9.5	6.2	1.5	0	0	--	18.0
aromatics	%(v/v)	61	22.5	33.9	28.5	2.8	0	0	--	35.0
benzene	%(v/v)	61	0.6	0.9	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	61	2	2.6	2.1	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	61	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	61	0	0.4	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	61	11	14.5	12.1	0.8	0	0	--	15
Other oxygenate	%(v/v)	61	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	61	3.8	9.3	6.4	1.2	0	0	--	50
LEAD CONTENT	g/l	61	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	21	95.1	96.9	95.9	0.5	0	0	95	--
MOTOR OCTANE NO.	--	21	85.1	86.3	85.8	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	53	58.7	68.7	64.5	2	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	114	46.7	66	57.8	4.7	0	0	46.0	--
evaporated at 150	%(v/v)	114	78.4	92.2	88.7	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	114	3.3	10	6.2	1.3	0	0	--	18.0
aromatics	%(v/v)	114	22.5	36.7	29.8	2.8	0	0	--	35.0
benzene	%(v/v)	114	0.6	0.9	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	114	2	2.7	2.2	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	114	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	114	0	0.4	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	114	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	114	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	114	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	114	11	15.1	12.7	1	0	0	--	15
Other oxygenate	%(v/v)	114	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	114	3.8	9.5	6.8	1.2	0	0	--	50
LEAD CONTENT	g/l	114	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The highest ethers content 15,1 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v). FN6: The highest aromatics content 36,7 % (v/v) is above the maximum limiting value 35,0 % (v/v) but within the maximum tolerance limit 37,2 % (v/v).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	98.3	99	98.8	0.3	0	0	95	--
MOTOR OCTANE NO.	--	4	86.8	87.6	87.2	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	51	55.2	71.8	62.2	3.9	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	51	49.5	61.6	53.9	1.9	0	0	46.0	--
evaporated at 150	%(v/v)	51	83.2	91.8	89.8	1.2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	51	0.7	8.7	6.3	1.3	0	0	--	18.0
aromatics	%(v/v)	51	29.1	38.5	33.5	1.9	0	0	--	35.0
benzene	%(v/v)	51	0.5	1	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	51	2	2.5	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	51	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	51	0	2.5	0.5	0.9	0	0	--	5
Iso-propyl alcohol	%(v/v)	51	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	51	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	51	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	51	6.8	14.4	11.3	2.1	0	0	--	15
Other oxygenate	%(v/v)	51	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	51	3.4	8.5	5.5	1	0	0	--	50
LEAD CONTENT	g/l	51	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN3: The highest DVPE value 71,8 kPa is above the maximum limiting value 70,0 kPa but within the maximum tolerance limit 71,9 kPa. FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN6: The highest aromatics content 38,5 % (v/v) is above the maximum limiting value 35,0 % (v/v) and also above the maximum tolerance limit 37,2 % (v/v). The expanded relative uncertainty of measurement used in Finnish Customs Laboratory is + - 10 % at the confidence level of 95 %. The true value of aromatics content in this sample (34,6 - 42,4 % (v/v)) may thus also be below limiting value 35,0 % (v/v) or maximum tolerance limit 37,2 % (v/v).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	98.2	99.5	99	0.4	0	0	95	--
MOTOR OCTANE NO.	--	14	87.1	88.4	87.6	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	58	46.6	67	55.7	3.8	0	0	46.0	--
evaporated at 150	%(v/v)	58	79.9	93.5	89.3	3.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	58	3.1	10	6.8	1.4	0	0	--	18.0
aromatics	%(v/v)	58	25.2	34.2	30.1	2.2	0	0	--	35.0
benzene	%(v/v)	58	0.5	0.9	0.6	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	58	2.1	2.7	2.3	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	58	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	58	0	2.7	0.6	1	0	0	--	5
Iso-propyl alcohol	%(v/v)	58	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	58	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	58	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	58	7.5	15.3	11.5	2.2	0	0	--	15
Other oxygenate	%(v/v)	58	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	58	2	8.5	5.1	1.3	0	0	--	50
LEAD CONTENT	g/l	58	0	0	0	0	0	0	--	0.005

Notes: #####  
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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	98.2	99.5	98.9	0.4	0	0	95	--
MOTOR OCTANE NO.	--	18	86.8	88.4	87.5	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	51	55.2	71.8	62.2	3.9	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	109	46.6	67	54.9	3.2	0	0	46.0	--
evaporated at 150	%(v/v)	109	79.9	93.5	89.5	2.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	109	0.7	10	6.6	1.4	0	0	--	18.0
aromatics	%(v/v)	109	25.2	38.5	31.7	2.7	0	0	--	35.0
benzene	%(v/v)	109	0.5	1	0.6	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	109	2	2.7	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	109	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	109	0	2.7	0.6	0.9	0	0	--	5
Iso-propyl alcohol	%(v/v)	109	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	109	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	109	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	109	6.8	15.3	11.4	2.2	0	0	--	15
Other oxygenate	%(v/v)	109	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	109	2	8.5	5.3	1.2	0	0	--	50
LEAD CONTENT	g/l	109	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN3: The highest DVPE value 71,8 kPa is above the maximum limiting value 70,0 kPa but within the maximum tolerance limit 71,9 kPa. FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The highest ethers content 15,3 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v). FN6: The highest aromatics content 38,5 % (v/v) is above the maximum limiting value 35,0 % (v/v) and also above the maximum tolerance limit 37,2 % (v/v). The expanded relative uncertainty of measurement used in Finnish Customs Laboratory is + - 10 % at the confidence level of 95 %. The true value of aromatics content in this sample (34,6 - 42,4 % (v/v)) may thus also be below limiting value 35,0 % (v/v) or maximum tolerance limit 37,2 % (v/v).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: France  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	87	94.7	97.7	96.1	0.7	0	0	95	--
MOTOR OCTANE NO.	--	87	84.2	86.9	85.4	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	87	76	90.5	83.5	3.4	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	87	53.8	69.8	60.7	3.5	0	0	46.0	--
evaporated at 150	%(v/v)	87	86.6	95.4	92.6	1.8	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	87	4.7	19.7	12	3.2	0	0	--	18.0
aromatics	%(v/v)	87	24.9	31.9	28.6	2.1	0	0	--	35.0
benzene	%(v/v)	87	0.4	0.9	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	87	0	2.8	0.9	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	87	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	87	0	4.9	0.3	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	87	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	87	0	0.1	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	87	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	87	3	13.2	5	3.6	0	0	--	15
Other oxygenate	%(v/v)	87	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	87	3.6	43.1	22.5	10.7	0	0	--	50
LEAD CONTENT	g/l	87	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: France  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	88	98	99.4	98.5	0.3	98	0	95	--
MOTOR OCTANE NO.	--	88	86.6	89	87.5	0.5	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	88	65.8	89.4	81.1	5.2	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	88	50.2	67.6	57.8	3.4	46	71	46.0	--
evaporated at 150	%(v/v)	88	88.8	95	92.6	1.1	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	88	1.4	15	9	3	0	18	--	18.0
aromatics	%(v/v)	88	26	36.1	30.9	1.9	0	35	--	35.0
benzene	%(v/v)	88	0.4	0.8	0.6	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	88	0.7	2.8	1.7	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	88	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	88	0	4.8	0.3	0.7	0	5	--	5
Iso-propyl alcohol	%(v/v)	88	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	88	0	0.3	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	88	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	88	4.1	13.4	9.6	2.5	0	15	--	15
Other oxygenate	%(v/v)	88	0	0.2	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	88	4.1	30.3	6.9	3	0	0	--	50
LEAD CONTENT	g/l	88	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Germany  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s  
 National Fuel Grade Normal Benzin

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	52	90.7	95.6	92.21269231	1.07	91	0	91	--
MOTOR OCTANE NO.	--	112	82.4	86	82.51517857	1.26	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	67	54.3	62.5	58.59016393	1.9	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	119	49.3	69.5	60.24588235	5	0	0	46.0	--
evaporated at 150	%(v/v)	119	82.1	97.9	88.43907563	4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	87	1.3	20.3	11.19609195	5.3	0	21	--	21.0
aromatics	%(v/v)	139	14.7	35.9	25.31374	3.3	0	0	--	35.0
benzene	%(v/v)	139	0.1	1	0.691438849	0.27	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	89	0	2.5	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	87	0	0.2	0	0	0	0	--	3
Ethanol	%(v/v)	118	0	4.9	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	72	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	54	0	0.1	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	54	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	108	0	14.6	0	0	0	0	--	15
Other oxygenate	%(v/v)	89	0	6	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	121	0	18	9	0	0	0	--	50
LEAD CONTENT	g/l	23	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Germany  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Superbenzine

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	64	94.4	101	96	0.65	0	0	95	--
MOTOR OCTANE NO.	--	174	82.5	87.1	84.15344828	0.67	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	93	55.5	61.8	58.6952	1.3	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	155	47.9	67	57.77806452	3.1	0	0	46.0	--
evaporated at 150	%(v/v)	155	77.7	94.8	88.78806452	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	139	1.2	19	11.27208633	5.3	0	0	--	18.0
aromatics	%(v/v)	204	23.2	35.6	31.73108	3.76	0	0	--	35.0
benzene	%(v/v)	204	0	1	0.693529412	0.257	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	166	0	2.5	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	124	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	164	0	5	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	124	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	77	0	0.5	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	77	0	0.1	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	160	0	13.8	0	0	0	0	--	15
Other oxygenate	%(v/v)	92	0	13	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	157	0	10.3	5.15	0	0	0	--	50
LEAD CONTENT	g/l	32	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Germany  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	25	98.5	101.4	99.5	0.766383553	98	0	95	--
MOTOR OCTANE NO.	--	55	87.8	89.9	88.45672727	0.7	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	35	53.6	62.3	56.43606061	1.6	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	60	45.7	62	55.01666667	4.2	0	0	46.0	--
evaporated at 150	%(v/v)	60	78.7	94.3	89.46	4.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	58	1.2	15.3	7.817241379	0	0	0	--	18.0
aromatics	%(v/v)	71	24.9	42.4	32.74253	0	0	0	--	35.0
benzene	%(v/v)	71	0	1	0.556478873	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	63	0.5	2.7	2.151111111	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	52	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	62	0	4.8	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	27	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	27	0	0.5	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	27	0	0.2	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	71	0.01	15	0	0	0	0	--	15
Other oxygenate	%(v/v)	32	0	14.7	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	62	0	10.3	5.15	0	0	0	--	50
LEAD CONTENT	g/l	9	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	67	95	96.6	95.70895522	0.58966169	0	0	95	--
MOTOR OCTANE NO.	--	67	85	85.2	85.00746269	0.019062588	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	67	51.2	63	57.84626866	2.380479812	0	0	46.0	--
evaporated at 150	%(v/v)	67	82	92.9	88.6238806	1.720470131	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	67	1	16.5	12.24067797	3.233068139	0	0	--	18.0
aromatics	%(v/v)	67	20.1	34.5	29.05224	2.674529812	0	0	--	35.0
benzene	%(v/v)	67	0.7	1	0.908059701	0.098549225	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0.1	1.8	1.037209302	0.25226249	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	67	0.2	9	5.872413793	1.175450721	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	67	6	50	30.92424242	10.1656455	0	0	--	50
LEAD CONTENT	g/l	67	0.001	0.003	0.001878788	0.000341813	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	95	96.5	95.86585366	0.640550449	0	0	95	--
MOTOR OCTANE NO.	--	41	85	85.2	85.01707317	0.049509792	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	55.3	60	58.3902439	1.743101385	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	47.3	65.2	58.42439024	3.278244994	0	0	46.0	--
evaporated at 150	%(v/v)	41	81.9	93.6	89.07560976	2.575148587	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	2	16	10.96097561	3.39675419	0	0	--	18.0
aromatics	%(v/v)	41	22.5	34.9	30.66341	2.924359425	0	0	--	35.0
benzene	%(v/v)	41	0.63	1	0.89804878	0.101691187	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0.6	2	1.420512821	0.424995038	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	41	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	4	11.4	7.765853659	2.239264361	0	0	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	41	1	41	23.24390244	11.86966825	0	0	--	50
LEAD CONTENT	g/l	41	0.002	0.003	0.00202439	0.000156174	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade UNLEADED PETROL

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	108	95	96.6	95.76851852	0.593838794	0	0	95	--
MOTOR OCTANE NO.	--	108	85	85.2	85.011111111	0.039466852	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	108	55.3	60	58.3902439	1.743101385	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	108	47.3	65.2	58.06574074	2.839085085	0	0	46.0	--
evaporated at 150	%(v/v)	108	81.9	93.6	88.79537037	2.193336734	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	108	1	16.5	11.716	3.45381417	0	0	--	18.0
aromatics	%(v/v)	108	20.1	34.9	29.66389	3.106172881	0	0	--	35.0
benzene	%(v/v)	108	0.63	1	0.904259259	0.097761905	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	108	0.1	2	1.219512195	0.408985201	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	108	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	108	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	108	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	108	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	108	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	108	0.2	11.4	6.656565657	2.003882029	0	0	--	15
Other oxygenate	%(v/v)	108	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	108	1	50	27.98130841	11.32369473	0	0	--	50
LEAD CONTENT	g/l	108	0.001	0.003	0.001934579	0.000343979	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	96	97.1	96.4	0.332689266	96	0	95	--
MOTOR OCTANE NO.	--	53	85	86	85.04528302	0.140830009	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	46.8	64.1	56.85660377	4.829775812	0	0	46.0	--
evaporated at 150	%(v/v)	53	81.9	93.2	87.9509434	2.931632693	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	1	16	12.674	3.309590887	0	0	--	18.0
aromatics	%(v/v)	53	23.6	34.9	30.11132	2.512787326	0	0	--	35.0
benzene	%(v/v)	53	0.7	1	0.910377358	0.082274453	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	3	10	6.492	1.524204711	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	53	4	48	30.0754717	10.76648835	0	0	--	50
LEAD CONTENT	g/l	53	0.001	0.002	0.001867925	0.000341813	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	40	96	97.4	96.425	0.358594121	0	0	95	--
MOTOR OCTANE NO.	--	40	85	85.2	85.0475	0.071566716	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	40	54.8	60	58.99487179	1.361684081	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	40	54.6	64.5	59.2675	2.514000541	0	0	46.0	--
evaporated at 150	%(v/v)	40	86.8	93.7	89.7975	1.897297336	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	40	2	15	11.1	3.600900788	0	0	--	18.0
aromatics	%(v/v)	40	23.4	35	30.9325	3.146947035	0	0	--	35.0
benzene	%(v/v)	40	0.75	1	0.90325	0.085975175	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	40	5	12.3	8.492105263	2.45041437	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	3	50	25.475	12.39724432	0	0	--	50
LEAD CONTENT	g/l	40	0.001	0.003	0.001975	0.000276192	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	93	96	97.4	96.4	0.343332948	0	0	95	--
MOTOR OCTANE NO.	--	93	85	86	85.04623656	0.115682417	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	93	54.8	60	58.99487179	1.361684081	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	93	46.8	64.5	57.89354839	4.159818308	0	0	46.0	--
evaporated at 150	%(v/v)	93	81.9	93.7	88.74516129	2.688603813	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	93	1	16	11.99431818	3.506917891	0	0	--	18.0
aromatics	%(v/v)	93	23.4	35	30.46452	2.81674516	0	0	--	35.0
benzene	%(v/v)	93	0.7	1	0.907311828	0.083498761	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	93	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	93	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	93	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	93	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	93	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	93	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	93	3	12.3	7.355681818	2.203386002	0	0	--	15
Other oxygenate	%(v/v)	93	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	93	3	50	28.09677419	11.65823512	0	0	--	50
LEAD CONTENT	g/l	93	0.001	0.003	0.001913978	0.000318144	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	45	100	100.8	100.2977778	0.241669279	0	0	95	--
MOTOR OCTANE NO.	--	45	87.7	89.7	89.07555556	0.434404271	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	45	48	67	52.53111111	3.314350493	0	0	46.0	--
evaporated at 150	%(v/v)	45	85.3	90.2	88.04	1.176358016	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	45	2.3	13	5.213953488	2.080931728	0	0	--	18.0
aromatics	%(v/v)	45	22.2	34.3	31.94889	2.490493035	0	0	--	35.0
benzene	%(v/v)	45	0.56	1	0.886	0.094590024	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	45	12.5	15	13.84418605	0.719557511	0	0	--	15
Other oxygenate	%(v/v)	45	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	45	3	18	8.393333333	2.294103113	0	0	--	50
LEAD CONTENT	g/l	45	0.001	0.003	0.001955556	0.000298142	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	43	100	101.5	100.3511628	0.33761918	0	0	95	--
MOTOR OCTANE NO.	--	43	87	90.5	89.59069767	0.66612381	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	43	57.9	60	59.60465116	0.643633099	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	43	46	62	51.0627907	2.808407722	0	0	46.0	--
evaporated at 150	%(v/v)	43	86.1	90.4	88.26744186	0.987233009	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	43	1.3	14	3.697560976	3.431361815	0	0	--	18.0
aromatics	%(v/v)	43	26	34.8	32.15116	2.03801632	0	0	--	35.0
benzene	%(v/v)	43	0.46	1	0.805813953	0.135492621	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	43	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	43	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	43	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	43	10	15	13.96341463	1.310869196	0	0	--	15
Other oxygenate	%(v/v)	43	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	43	2.8	25	7.218604651	3.396795115	0	0	--	50
LEAD CONTENT	g/l	43	0.001	0.003	0.002071429	0.000406823	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	88	100	101.5	100.3	0.292037755	0	0	95	--
MOTOR OCTANE NO.	--	88	87	90.5	89.32727273	0.613774318	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	88	57.9	60	59.60465116	0.643633099	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	88	46	67	51.81363636	3.147711514	0	0	46.0	--
evaporated at 150	%(v/v)	88	85.3	90.4	88.15113636	1.087863489	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	88	1.3	14	4.473809524	2.906375172	0	0	--	18.0
aromatics	%(v/v)	88	22.2	34.8	32.04773	2.269891753	0	0	--	35.0
benzene	%(v/v)	88	0.46	1	0.846818182	0.12252652	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	88	1.7	2.7	2.461333333	0.212382453	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	88	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	88	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	88	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	88	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	88	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	88	10	15	13.90238095	1.04581509	0	0	--	15
Other oxygenate	%(v/v)	88	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	88	2.8	25	7.819318182	2.929275849	0	0	--	50
LEAD CONTENT	g/l	88	0.001	0.003	0.002011494	0.000357454	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Premium unleaded ESZ 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	95	98.6	96.4	0.75	95	0	95	--
MOTOR OCTANE NO.	--	50	85	87.9	86.29	0.59	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	54	77.9	57.55	3.4	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	45.2	57.1	49.44	3.25	46	71	46.0	--
evaporated at 150	%(v/v)	50	81.6	87.3	84.04	1.34	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	3.4	9.8	8.27	1.12	0	18	--	18.0
aromatics	%(v/v)	50	26.7	35.5	29.87	2.45	0	35	--	35.0
benzene	%(v/v)	50	0.1	0.69	0.44	0.13	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.5	1.9	1.24	0.25	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	2.8	10.6	7.26	1.28	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	3.2	8.3	4.67	1.41	0	50	--	50
LEAD CONTENT	g/l	50	0.0001	0.0001	0.0001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Premium unleaded ESZ 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	95	96.9	95.87	0.37	95	0	95	--
MOTOR OCTANE NO.	--	50	85.1	86.3	85.82	0.28	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	46.3	55.3	49.84	2.19	46	71	46.0	--
evaporated at 150	%(v/v)	50	77.8	87	82.84	1.62	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	3.3	12.7	8.62	2.16	0	18	--	18.0
aromatics	%(v/v)	50	26.1	36.4	30.01	3.01	0	35	--	35.0
benzene	%(v/v)	50	0.25	0.66	0.43	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.3	1.3	0.9	0.22	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	1.6	8.2	5.51	1.45	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	2.7	7	4.37	1.02	0	50	--	50
LEAD CONTENT	g/l	50	0.0001	0.0001	0.0001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Premium unleaded ESZ 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	95	98.6	96.1	0.65	95	0	95	--
MOTOR OCTANE NO.	--	100	85	87.9	57.55	3.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	54	77.9	57.55	3.4	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	45.2	57.1	49.6	2.77	0	0	46.0	--
evaporated at 150	%(v/v)	100	77.8	87.3	83.4	1.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	3.3	12.7	8.44	1.72	0	0	--	18.0
aromatics	%(v/v)	100	26.1	36.4	29.9	2.73	0	0	--	35.0
benzene	%(v/v)	100	0.1	0.69	0.44	0.12	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	100	0.3	1.9	1.07	0.29	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	100	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	1.6	10.6	6.38	1.62	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	100	2.7	8.3	4.52	1.23	0	0	--	50
LEAD CONTENT	g/l	100	0.0001	0.0001	0.0001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded ESZ 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	99.1	100.6	99.8	0.241660919	0	0	95	--
MOTOR OCTANE NO.	--	10	88.4	90	89.07	0.546910515	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	10	55	66.6	59.16	3.477994313	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	49	63.2	54.02	2.197705875	46	71	46.0	--
evaporated at 150	%(v/v)	10	82.9	89.5	86.02	2.171625096	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	1.8	7.6	4.28	1.702873389	0	0	--	18.0
aromatics	%(v/v)	10	26.6	34	29.94	1.488817577	0	0	--	35.0
benzene	%(v/v)	10	0.07	0.7	0.335	0.206774166	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	10	2.3	2.6	2.44	0.042687495	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	13.1	14.4	13.72	0.227547309	0	0	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	10	0	4	2.47	1.129050732	0	0	--	50
LEAD CONTENT	g/l	10	0.0001	0.0001	0.0001	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded ESZ 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	98.9	100.4	99.58	0.4159594	0	0	95	--
MOTOR OCTANE NO.	--	10	88.2	90.4	88.96	0.740030029	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	47	58.9	53	1.595340437	46	71	46.0	--
evaporated at 150	%(v/v)	10	81.3	89.9	84.37	2.768786337	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	3.6	9.6	5.78	1.930918032	0	0	--	18.0
aromatics	%(v/v)	10	27.7	37.3	32.36	3.146588982	0	0	--	35.0
benzene	%(v/v)	10	0.1	0.69	0.355	0.207632153	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	10	1.8	2.5	2.2	0.140633487	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	10	14	12.49	0.915884515	0	0	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	10	1	8.7	3.01	2.279703928	0	0	--	50
LEAD CONTENT	g/l	10	0.0001	0.0001	0.0001	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded ESZ 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	20	98.9	100.6	99.7				95	--
MOTOR OCTANE NO.	--	20	88.2	90.4	89				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	10	0	66.6	59.2				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	20	47	63.2	53.5				46.0	--
evaporated at 150	%(v/v)	20	81.3	89.9	85.2				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	20	1.8	9.6	5				--	18.0
aromatics	%(v/v)	20	26.6	37.3	31.2				--	35.0
benzene	%(v/v)	20	0.07	0.7	0.3				--	1.0
OXYGEN CONTENT	%(m/m)	20	1.8	2.6	2.3				--	2.7
OXYGENATES:										
Methanol	%(v/v)	20	0	0	0				--	3
Ethanol	%(v/v)	20	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	20	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	20	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	20	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	20	10	14.4	13.1				--	15
Other oxygenate	%(v/v)	20	0	0	0				--	10
SULPHUR CONTENT	mg/kg	20	0	8.7	2.7				--	50
LEAD CONTENT	g/l	20	0.0001	0.0001	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Ireland  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	94.7	96.5	95.4	0.4	0	0	95	--
MOTOR OCTANE NO.	--	41	84.7	87.1	85.6	0.6	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	25	62.3	73.6	68.8	2.3	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	49.3	66.6	59.1	4.3	0	0	46.0	--
evaporated at 150	%(v/v)	41	87.8	95.6	91.8	2.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	0.5	15.3	6.6	3.9	0	0	--	18.0
aromatics	%(v/v)	41	25	35.4	31.4	3	0	0	--	35.0
benzene	%(v/v)	41	0.5	1	0.8	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	41	0	2.78	0.8	0.9	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	41	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	0	15.3	4.6	4.7	0	0	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	41	0	51	15.7	13.2	0	0	--	50
LEAD CONTENT	g/l	41	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Ireland  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	74	94.2	96.5	95.4	0.4	0	0	95	--
MOTOR OCTANE NO.	--	74	83.5	88.8	85.8	0.9	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	24	85.5	96.2	93.4	3	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	74	44.2	68.1	58.8	5.3	0	0	46.0	--
evaporated at 150	%(v/v)	74	86	97	91.5	3.3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	74	0.3	21.4	9.2	5.4	0	0	--	18.0
aromatics	%(v/v)	73	22.5	39	28.9	3.9	0	0	--	35.0
benzene	%(v/v)	74	0.4	1	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	74	0	2.77	0.5	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	74	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	74	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	74	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	74	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	74	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	74	0	15.3	2.5	3.3	0	0	--	15
Other oxygenate	%(v/v)	74	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	74	0	56.2	18.3	15.8	0	0	--	50
LEAD CONTENT	g/l	74	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Ireland  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	115	94.2	96.5	95.4	0.4	0	0	95	--
MOTOR OCTANE NO.	--	115	83.5	88.8	85.7	0.8	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	49	62.3	96.2	80.9	12.7	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	115	44.2	68.1	59	4.9	0	0	46.0	--
evaporated at 150	%(v/v)	115	86	97	91.6	3.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	115	0.3	21.4	8.3	5.1	0	0	--	18.0
aromatics	%(v/v)	114	22.5	39	29.8	3.8	0	0	--	35.0
benzene	%(v/v)	115	0.4	1	0.8	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	115	0	2.78	0.6	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	115	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	115	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	115	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	115	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	115	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	115	0	15.3	3.2	4	0	0	--	15
Other oxygenate	%(v/v)	115	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	115	0	56.2	17.3	14.9	0	0	--	50
LEAD CONTENT	g/l	115	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded Petrol minimum RON = 95 (≤ 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	161	94.1	96.3	95.2	0.3	95	0	95	--
MOTOR OCTANE NO.	--	60	83.9	87.2	85.7	0.6	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	65	52.2	62.4	57.7	2.3	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	179	44	70	54.7	5.6	46	0	46.0	--
evaporated at 150	%(v/v)	179	80	93	86.3	3.1	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	70	0.3	18.7	7.9	4.8	0	18	--	18.0
aromatics	%(v/v)	70	25.5	34.8	31.5	2.6	0	35	--	35.0
benzene	%(v/v)	161	0.44	0.94	0.77	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	70	0	2.6	1	0.7	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	70	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	70	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	70	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	70	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	70	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	70	0	14.4	5.7	3.8	0	15	--	15
Other oxygenate	%(v/v)	70	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	189	0.3	45	22.2	11.5	0	50	--	50
LEAD CONTENT	g/l	28	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content).

Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy

Year: 2006

Period: Winter

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Unleaded Petrol minimum RON = 95 (≤ 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	94.9	98.3	95.6	0.5	95	0	95	--
MOTOR OCTANE NO.	--	35	84.8	88.5	85.8	0.8	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	35	47.3	68.8	56.2	5.5	46	0	46.0	--
evaporated at 150	%(v/v)	35	83.4	93	88.6	2.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	0.3	16.6	7.7	5.3	0	18	--	18.0
aromatics	%(v/v)	41	22.8	34.9	29.3	2.9	0	35	--	35.0
benzene	%(v/v)	41	0.56	0.94	0.76	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	41	0.05	2.15	0.7	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	41	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	0	12.3	3.7	2.9	0	15	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	41	4.9	35.2	16.7	10	0	50	--	50
LEAD CONTENT	g/l	27	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content).

Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded Petrol minimum RON = 95 (≤ 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	202	94.1	98.3	95.3				95	--
MOTOR OCTANE NO.	--	95	83.9	88.5	85.7				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	65	0	62.4	57.7				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	214	44	70	54.9				46.0	--
evaporated at 150	%(v/v)	214	80	93	86.7				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	111	0.3	18.7	7.8				--	18.0
aromatics	%(v/v)	111	22.8	34.9	30.7				--	35.0
benzene	%(v/v)	202	0.44	0.94	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	111	0	2.6	0.9				--	2.7
OXYGENATES:										
Methanol	%(v/v)	111	0	0	0				--	3
Ethanol	%(v/v)	111	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	111	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	111	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	111	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	111	0	14.4	5				--	15
Other oxygenate	%(v/v)	111	0	0	0				--	10
SULPHUR CONTENT	mg/kg	230	0.3	45	21.2				--	50
LEAD CONTENT	g/l	55	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Unleaded Petrol minimum RON = 95 & ≤ 10 ppm Sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	38	94.8	100.2	97	1.4	95	0	95	--
MOTOR OCTANE NO.	--	11	85.1	88.8	87.2	1.6	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	24	54.2	64.1	57.7	2.1	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	25	47.8	59.6	54.9	3.4	46	0	46.0	--
evaporated at 150	%(v/v)	25	79.9	90.6	85.1	2.1	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	24	0.3	12	5.8	4	0	18	--	18.0
aromatics	%(v/v)	24	29	35.3	32.1	1.7	0	35	--	35.0
benzene	%(v/v)	23	0.62	0.94	0.75	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	24	0	2.45	1.6	0.7	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	24	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	24	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	24	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	24	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	24	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	24	0	13.6	8.8	4	0	15	--	15
Other oxygenate	%(v/v)	24	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	38	1.2	11.5	6.2	2.6	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content).

Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy

Year: 2006

Period: Winter

FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)

National Fuel Grade Unleaded Petrol minimum RON = 95 & ≤ 10 ppm Sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	15	95	99.9	95.8	1.4	95	0	95	--
MOTOR OCTANE NO.	--	15	85	88	86	1	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	15	55	65	60.7	3.6	46	0	46.0	--
evaporated at 150	%(v/v)	15	87	93	90.5	2.4	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	3	1.8	14.7	6.1	7.4	0	18	--	18.0
aromatics	%(v/v)	29	32.4	34	33	9	0	35	--	35.0
benzene	%(v/v)	22	0.52	0.97	0.77	0.14	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	3	1.7	2.2	2	0.25	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	3	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	3	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	3	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	3	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	3	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	3	9.4	12.6	11.5	1.8	0	15	--	15
Other oxygenate	%(v/v)	3	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	15	3.8	8.8	5.3	1.2	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes: The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content).

Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Italy  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95 (<10 ppm sulphur)  
**National Fuel Grade** Unleaded Petrol minimum RON = 95 & ≤ 10 ppm Sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	94.8	100.2	96.7				95	--
MOTOR OCTANE NO.	--	26	85	88.8	86.5				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	24	0	64.1	57.7				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	40	47.8	65	57.1				46.0	--
evaporated at 150	%(v/v)	40	79.9	93	87.1				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	27	0.3	14.7	5.8				--	18.0
aromatics	%(v/v)	53	29	35.3	32.6				--	35.0
benzene	%(v/v)	45	0.52	0.97	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	27	0	2.45	1.6				--	2.7
OXYGENATES:										
Methanol	%(v/v)	27	0	0	0				--	3
Ethanol	%(v/v)	27	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	27	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	27	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	27	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	27	0	13.6	9.1				--	15
Other oxygenate	%(v/v)	27	0	0	0				--	10
SULPHUR CONTENT	mg/kg	53	1.2	11.5	5.9				--	50
LEAD CONTENT	g/l	0	0	0					--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	149	92.2	92.8	92.5	0.2	0	0	91	--
MOTOR OCTANE NO.	--	149	82.7	83.1	83	0.2	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	149	63.8	68.9	66.3	1.9	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	149	51.9	55.9	54.3	1.8	0	0	46.0	--
evaporated at 150	%(v/v)	149	83.3	89.2	84.7	1.3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	149	5.7	18.2	13.8	4.4	0	0	--	21.0
aromatics	%(v/v)	149	27.4	33.6	31.3	2.1	0	0	--	35.0
benzene	%(v/v)	149	0.51	0.61	0.6	0.06	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	149	0.02	1.76	0.04	0.04	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	149	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	149	0	4.6	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	149	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	149	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	149	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	149	0	0.6	0.2	0.2	0	0	--	15
Other oxygenate	%(v/v)	149	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	149	35.4	48	43	4.8	0	0	--	50
LEAD CONTENT	g/l	149	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	128	92.3	92.8	92.5	0.2	0	0	91	--
MOTOR OCTANE NO.	--	128	82.3	83.5	83	0.4	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	128	54.5	60.5	57.1	2.3	0	0	46.0	--
evaporated at 150	%(v/v)	128	84.8	90.5	85.5	1.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	128	8.8	15.9	12.1	3	0	0	--	21.0
aromatics	%(v/v)	128	25.2	35	30.1	3.1	0	0	--	35.0
benzene	%(v/v)	128	0.52	0.69	0.59	0.06	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	128	0	0.12	0.04	0.05	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	128	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	128	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	128	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	128	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	128	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	128	0	0.6	0.2	0.3	0	0	--	15
Other oxygenate	%(v/v)	128	0	0	39.7	7.8	0	0	--	10
SULPHUR CONTENT	mg/kg	128	25.6	48.5	0	0	0	0	--	50
LEAD CONTENT	g/l	128	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	273	92.2	92.8	92.5	0.2	92	0	91	--
MOTOR OCTANE NO.	--	273	82.3	83.5	83	0.3	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	273	63.8	68.9	66.3	1.9	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	273	51.9	60.5	56	2.5	0	0	46.0	--
evaporated at 150	%(v/v)	273	83.3	90.5	85.2	1.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	273	5.7	18.2	12.8	3.6	0	0	--	21.0
aromatics	%(v/v)	273	25.2	35	30.6	2.7	0	0	--	35.0
benzene	%(v/v)	273	0.51	0.69	0.6	0.05	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	273	0	1.76	0.04	0.05	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	273	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	273	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	273	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	273	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	273	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	273	0	0.6	0.22	0.24	0	0	--	15
Other oxygenate	%(v/v)	273	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	273	25.6	48.5	41	6.8	0	0	--	50
LEAD CONTENT	g/l	273	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	414	95	96.4	95.7	0.5	95	0	95	--
MOTOR OCTANE NO.	--	414	84.9	85.5	85.2	0.2	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	414	62.7	71.7	67.4	3.2	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	414	54.2	67.1	57.6	5.5	46	0	46.0	--
evaporated at 150	%(v/v)	414	84.4	90.6	87.2	1.9	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	414	5.9	16.5	9.4	3.6	0	18	--	18.0
aromatics	%(v/v)	414	23.3	33.9	31.3	3.6	0	42	--	35.0
benzene	%(v/v)	414	0.17	0.62	0.34	0.14	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	414	0	2.55	1.39	0.35	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	414	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	414	0	4.5	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	414	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	414	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	414	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	414	0	13.9	7.7	4.1	0	15	--	15
Other oxygenate	%(v/v)	414	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	414	0	47.8	18.3	15.4	0	50	--	50
LEAD CONTENT	g/l	414	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	316	95	97.6	95.7	0.7	95	0	95	--
MOTOR OCTANE NO.	--	316	85	87.7	85.4	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	316	49	71.7	59.1	5.5	46	0	46.0	--
evaporated at 150	%(v/v)	316	79.8	94.3	82.4	11	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	316	0.1	14	8	3.3	0	18	--	18.0
aromatics	%(v/v)	316	23.2	36.8	29.9	4	0	42	--	35.0
benzene	%(v/v)	316	0.27	0.9	0.5	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	316	0.82	3.2	1.7	0.6	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	316	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	316	0	5	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	316	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	316	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	316	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	316	1.6	13.7	8.2	3.1	0	15	--	15
Other oxygenate	%(v/v)	316	0	0	34.1	15.8	0	0	--	10
SULPHUR CONTENT	mg/kg	316	0	50.7	0	0	0	50	--	50
LEAD CONTENT	g/l	316	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	730	95	97.6	95.7	0.6	95	0	95	--
MOTOR OCTANE NO.	--	730	84.9	87.7	0	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	730	62.7	71.7	67.4	3.2	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	730	49	71.7	58.6	5.1	46	0	46.0	--
evaporated at 150	%(v/v)	730	79.8	94.3	84.2	9	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	730	0.1	16.5	8.6	3.4	0	18	--	18.0
aromatics	%(v/v)	730	23.2	36.8	30.4	3.8	0	42	--	35.0
benzene	%(v/v)	730	0.17	0.9	0.44	0.19	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	730	0	3.2	1.59	0.6	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	730	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	730	0	5	0.5	1.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	730	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	730	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	730	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	730	0	13.9	8	3.4	0	15	--	15
Other oxygenate	%(v/v)	730	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	1460	0	50.7	14.15	12.09152596	0	50	--	50
LEAD CONTENT	g/l	730	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	209	98	99.1	98.4	0.4	98	0	95	--
MOTOR OCTANE NO.	--	209	85.8	89	87.9	1.1	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	209	63.1	73.1	64.9	8.2	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	209	47.4	63.2	52.1	5.6	46	0	46.0	--
evaporated at 150	%(v/v)	209	84.9	89.1	87.2	1.6	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	209	1.2	13.4	4.9	5	0	18	--	18.0
aromatics	%(v/v)	209	23	34.8	30.9	3.8	0	42	--	35.0
benzene	%(v/v)	209	0.1	0.53	0.23	0.16	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	1.1	2.68	2	0.6	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	209	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	209	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	209	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	209	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	209	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	209	6.2	14.9	10.9	3.2	0	15	--	15
Other oxygenate	%(v/v)	209	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	209	0	32.1	11	13.1	0	50	--	50
LEAD CONTENT	g/l	209	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	170	98	99.3	98.4	0.3	98	0	95	--
MOTOR OCTANE NO.	--	170	86.9	88.7	88	0.7	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	170	47.7	63.8	55.3	5.1	46	0	46.0	--
evaporated at 150	%(v/v)	170	85.2	89.5	88	1.2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	170	0.5	11	4.6	3.9	0	18	--	18.0
aromatics	%(v/v)	170	29	40.7	31.9	2.8	0	42	--	35.0
benzene	%(v/v)	170	0.14	0.55	0.28	0.15	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	170	0.93	2.46	1.8	0.48	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	170	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	170	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	170	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	170	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	170	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	170	5.1	13.7	9.9	2.7	0	15	--	15
Other oxygenate	%(v/v)	170	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	170	0	47.5	17.4	16	0	50	--	50
LEAD CONTENT	g/l	170	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Latvia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	379	98	99.3	98.4	0.3	98	0	95	--
MOTOR OCTANE NO.	--	379	85.8	89	88	0.8	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	379	63.1	73.1	64.9	8.2	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	379	47.4	63.8	54.2	5.4	46	0	46.0	--
evaporated at 150	%(v/v)	379	84.9	89.5	87.8	1.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	379	0.5	13.4	4.7	4.2	0	18	--	18.0
aromatics	%(v/v)	379	23	40.7	31.5	3.1	0	42	--	35.0
benzene	%(v/v)	379	0.1	0.55	0.26	0.15	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	379	0.93	2.68	1.86	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	379	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	379	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	379	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	379	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	379	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	379	5.1	14.9	10.2	2.8	0	15	--	15
Other oxygenate	%(v/v)	379	0	0	15.3	15.1	0	0	--	10
SULPHUR CONTENT	mg/kg	379	0	47.5	0	0	0	50	--	50
LEAD CONTENT	g/l	379	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade A-92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	92	92.4	92.24	0.181659	92	0	91	--
MOTOR OCTANE NO.	--	5	82	82.6	82.32	0.294958	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	52	59.2	70	65.92115	2.522397	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	52	46	61	52.15385	2.725224	46	0	46.0	--
evaporated at 150	%(v/v)	52	76	86	83.11538	1.800369	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	52	8.1	15.5	13.25	1.184624	0	21	--	21.0
aromatics	%(v/v)	52	28.6	34.8	32.37115	1.438591	0	35	--	35.0
benzene	%(v/v)	52	0.41	0.81	0.616538	0.070901	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	52	0	0.9	0.04	0.14007	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	52	0	0.1	0.006923	0.018947	0	3	--	3
Ethanol	%(v/v)	52	0	2.5	0.088462	0.370391	0	5	--	5
Iso-propyl alcohol	%(v/v)	52	0	0.2	0.020769	0.04265	0	10	--	10
Tetro-butyl alcohol	%(v/v)	52	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	52	0	0.2	0.009615	0.035753	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	52	0	3.9	0.092115	0.539776	0	15	--	15
Other oxygenate	%(v/v)	52	0	0.2	0.007692	0.033409	0	10	--	10
SULPHUR CONTENT	mg/kg	52	16	49.6	36.47096	8.049657	0	50	--	50
LEAD CONTENT	g/l	52	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade A-92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	13	92	92.6	92.26923	0.209701	92	0	91	--
MOTOR OCTANE NO.	--	13	82.4	83.8	83.26154	0.419401	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	51	47	60	54.07843	3.180208	46	0	46.0	--
evaporated at 150	%(v/v)	51	77	89	84.80392	2.297996	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	51	6.2	13.1	10.53333	1.663089	0	21	--	21.0
aromatics	%(v/v)	51	24.7	32.8	29.82549	2.156	0	35	--	35.0
benzene	%(v/v)	51	0.42	0.68	0.557647	0.05305	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	51	0	0.35	0.062745	0.081635	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	51	0	0.01	0.000196	0.0014	0	3	--	3
Ethanol	%(v/v)	51	0	0.12	0.027843	0.031894	0	5	--	5
Iso-propyl alcohol	%(v/v)	51	0	0.35	0.072157	0.098149	0	10	--	10
Tetro-butyl alcohol	%(v/v)	51	0	0.13	0.019412	0.03083	0	7	--	7
Iso-butyl alcohol	%(v/v)	51	0	0.37	0.02	0.055172	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	51	0	1.23	0.110588	0.200034	0	15	--	15
Other oxygenate	%(v/v)	51	0	0.07	0.01549	0.022347	0	10	--	10
SULPHUR CONTENT	mg/kg	51	11.5	49.9	24.18824	13.81989	0	50	--	50
LEAD CONTENT	g/l	51	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade A-92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	92	92.6	92.3				91	--
MOTOR OCTANE NO.	--	18	82	83.8	83				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	52	0	70	65.9				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	103	46	61	53.1				46.0	--
evaporated at 150	%(v/v)	103	76	89	84				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	103	6.2	15.5	11.9				--	21.0
aromatics	%(v/v)	103	24.7	34.8	31.1				--	35.0
benzene	%(v/v)	103	0.41	0.81	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	103	0	0.9	0.1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	103	0	0.1	0				--	3
Ethanol	%(v/v)	103	0	2.5	0.1				--	5
Iso-propyl alcohol	%(v/v)	103	0	0.35	0				--	10
Tetro-butyl alcohol	%(v/v)	103	0	0.13	0				--	7
Iso-butyl alcohol	%(v/v)	103	0	0.37	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	103	0	3.9	0.1				--	15
Other oxygenate	%(v/v)	103	0	0.2	0				--	10
SULPHUR CONTENT	mg/kg	103	11.5	49.9	30.4				--	50
LEAD CONTENT	g/l	103	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	9	94.5	97.2	95.4	0.75185	95	0	95	--
MOTOR OCTANE NO.	--	9	85.1	86	85.48889	0.340751	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	44	60	69.9	66.25227	1.645358	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	44	50	63	56.88636	3.505583	46	0	46.0	--
evaporated at 150	%(v/v)	44	82	89	85.25	1.432594	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	44	6.8	10.8	8.522727	0.771547	0	18	--	18.0
aromatics	%(v/v)	44	26.1	35	31.18636	2.776026	0	35	--	35.0
benzene	%(v/v)	44	0.34	0.58	0.452955	0.054882	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	44	0.8	2	1.4559091	0.298304	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	44	0	0.03	0.008364	0.010246	0	3	--	3
Ethanol	%(v/v)	44	0.04	3.98	0.4125	0.599694	0	5	--	5
Iso-propyl alcohol	%(v/v)	44	0	0.3	0.048477	0.091994	0	10	--	10
Tetro-butyl alcohol	%(v/v)	44	0	0.07	0.008636	0.01534	0	7	--	7
Iso-butyl alcohol	%(v/v)	44	0	0.06	0.005682	0.012275	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	44	3.98	9.04	6.320909	1.087055	0	15	--	15
Other oxygenate	%(v/v)	44	0	0.03	0.006409	0.009146	0	10	--	10
SULPHUR CONTENT	mg/kg	44	14.3	50	23.68932	6.369882	0	50	--	50
LEAD CONTENT	g/l	44	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	9	95	95.8	95.24444	0.255495	95	0	95	--
MOTOR OCTANE NO.	--	9	85.1	86.2	85.47778	0.349205	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	35	48	59	54.68571	3.305712	46	0	46.0	--
evaporated at 150	%(v/v)	35	80	87	84.37143	2.087578	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	35	4.2	11.1	8.622857	1.135286	0	18	--	18.0
aromatics	%(v/v)	35	29.6	34.8	31.49714	1.799753	0	35	--	35.0
benzene	%(v/v)	35	0.24	0.87	0.523714	0.146651	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	35	0.74	1.8	1.310286	0.228762	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	35	0	0.5	0.166	0.091304	0	3	--	3
Ethanol	%(v/v)	35	0.02	0.15	0.052857	0.030154	0	5	--	5
Iso-propyl alcohol	%(v/v)	35	0.1	0.5	0.175714	0.079937	0	10	--	10
Tetro-butyl alcohol	%(v/v)	35	0	0.41	0.095143	0.092271	0	7	--	7
Iso-butyl alcohol	%(v/v)	35	0	0.1	0.051143	0.021797	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	35	4.6	9.03	6.677143	1.178707	0	15	--	15
Other oxygenate	%(v/v)	35	0	0.73	0.135429	0.183917	0	10	--	10
SULPHUR CONTENT	mg/kg	35	10.1	49.8	23.61257	13.86	0	50	--	50
LEAD CONTENT	g/l	35	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	94.5	97.2	95.3				95	--
MOTOR OCTANE NO.	--	18	85.1	86.2	85.5				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	44	0	69.9	66.3				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	79	48	63	55.9				46.0	--
evaporated at 150	%(v/v)	79	80	89	84.9				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	79	4.2	11.1	8.6				--	18.0
aromatics	%(v/v)	79	26.1	35	31.3				--	35.0
benzene	%(v/v)	79	0.24	0.87	0.5				--	1.0
OXYGEN CONTENT	%(m/m)	79	0.74	2	1.4				--	2.7
OXYGENATES:										
Methanol	%(v/v)	79	0	0.5	0.1				--	3
Ethanol	%(v/v)	79	0.02	3.98	0.3				--	5
Iso-propyl alcohol	%(v/v)	79	0	0.5	0.1				--	10
Tetro-butyl alcohol	%(v/v)	79	0	0.41	0				--	7
Iso-butyl alcohol	%(v/v)	79	0	0.1	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	79	3.98	9.04	6.5				--	15
Other oxygenate	%(v/v)	79	0	0.73	0.1				--	10
SULPHUR CONTENT	mg/kg	79	10.1	50	23.7				--	50
LEAD CONTENT	g/l	79	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (<10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	95.5	96.9	96.3	0.72111	95	0	95	--
MOTOR OCTANE NO.	--	3	85.2	85.5	85.3333	0.152753	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	7	62.2	69.7	66.25714	2.18545	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	7	50	57	52	2.380476	46	0	46.0	--
evaporated at 150	%(v/v)	7	84	87	86.14286	1.214986	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	8.7	12.2	10.78571	1.320894	0	18	--	18.0
aromatics	%(v/v)	7	34	34.6	34.32857	0.236039	0	35	--	35.0
benzene	%(v/v)	7	0.7	0.84	0.792857	0.04957	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	7	1.7	2.3	2.085714	0.186445	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	7	0.15	0.5	0.302857	0.143261	0	3	--	3
Ethanol	%(v/v)	7	0.5	3.95	1.515714	1.489282	0	5	--	5
Iso-propyl alcohol	%(v/v)	7	0	0.5	0.142857	0.214221	0	10	--	10
Tetro-butyl alcohol	%(v/v)	7	0	0.5	0.12857	0.176325	0	7	--	7
Iso-butyl alcohol	%(v/v)	7	0	0.4	0.135714	0.172613	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	4	8.76	5.882857	1.511817	0	15	--	15
Other oxygenate	%(v/v)	7	0.02	0.5	0.134286	0.167019	0	10	--	10
SULPHUR CONTENT	mg/kg	7	4.4	8.7	6.442857	1.670187	0	0	--	50
LEAD CONTENT	g/l	7	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (<10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	7	95	95.4	95.2	0.11547	95	0	95	--
MOTOR OCTANE NO.	--	7	85	85.1	85.02857	0.048795	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	16	48	59	53.25	3.193744	46	0	46.0	--
evaporated at 150	%(v/v)	16	81	89	85	1.966384	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	16	8.3	11.2	10.00625	0.88353	0	18	--	18.0
aromatics	%(v/v)	16	24	32.3	29.5125	2.559134	0	35	--	35.0
benzene	%(v/v)	16	0.31	0.98	0.74	0.216826	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	16	0.72	1.91	1.229375	0.340734	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	16	0	0.8	0.095	0.209093	0	3	--	3
Ethanol	%(v/v)	16	0	4.9	0.3895	1.20474	0	5	--	5
Iso-propyl alcohol	%(v/v)	16	0	0.23	0.03875	0.073655	0	10	--	10
Tetro-butyl alcohol	%(v/v)	16	0	0.44	0.108125	0.165659	0	7	--	7
Iso-butyl alcohol	%(v/v)	16	0	0.03	0.006875	0.010782	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	16	4.31	8.8	6.138125	1.142863	0	15	--	15
Other oxygenate	%(v/v)	16	0	0.05	0.01	0.017127	0	10	--	10
SULPHUR CONTENT	mg/kg	16	5.8	9.9	8.338125	1.263773	0	0	--	50
LEAD CONTENT	g/l	16	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (<10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	95	96.9	95.5				95	--
MOTOR OCTANE NO.	--	10	85	85.5	85.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	7	0	69.7	66.3				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	23	48	59	52.9				46.0	--
evaporated at 150	%(v/v)	23	81	89	85.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	23	8.3	12.2	10.2				--	18.0
aromatics	%(v/v)	23	24	34.6	31				--	35.0
benzene	%(v/v)	23	0.31	0.98	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	23	0.72	2.3	1.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	23	0	0.8	0.2				--	3
Ethanol	%(v/v)	23	0	4.9	0.7				--	5
Iso-propyl alcohol	%(v/v)	23	0	0.5	0.1				--	10
Tetro-butyl alcohol	%(v/v)	23	0	0.5	0.1				--	7
Iso-butyl alcohol	%(v/v)	23	0	0.4	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	23	4	8.8	6.1				--	15
Other oxygenate	%(v/v)	23	0	0.5	0				--	10
SULPHUR CONTENT	mg/kg	23	4.4	9.9	7.8				--	50
LEAD CONTENT	g/l	23	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	98.1	98.3	98.2	0.141421	98	0	95	--
MOTOR OCTANE NO.	--	2	88	88.3	88.15	0.212132	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	64.2	70	66.15	2.385582	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	47	49	48.16667	0.752773	46	0	46.0	--
evaporated at 150	%(v/v)	6	83	87	85.16667	1.47196	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	3.5	4.6	4.0833	0.507609	0	18	--	18.0
aromatics	%(v/v)	6	34.4	34.9	34.66667	0.258199	0	35	--	35.0
benzene	%(v/v)	6	0	0	0	0	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	6	1.9	2.2	2.083333	0.147196	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	6	0	0.02	0.006667	0.008165	0	3	--	3
Ethanol	%(v/v)	6	0.012	0.16	0.073	0.064709	0	5	--	5
Iso-propyl alcohol	%(v/v)	6	0	0.22	0.125	0.071764	0	10	--	10
Tetro-butyl alcohol	%(v/v)	6	0	0.04	0.01	0.016733	0	7	--	7
Iso-butyl alcohol	%(v/v)	6	0	0.06	0.23333	0.027325	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	11.9	14.7	12.765	1.151881	0	15	--	15
Other oxygenate	%(v/v)	6	0	0.09	0.04	0.039497	0	10	--	10
SULPHUR CONTENT	mg/kg	12	4.7	7.3	2.8165	0.797078341	0	0	--	50
LEAD CONTENT	g/l	6	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	98	98.5	98.166667	0.288675	98	0	95	--
MOTOR OCTANE NO.	--	3	88	88.4	88.23333	0.208167	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	7	44	50	47.57143	2.070197	0	46	46.0	--
evaporated at 150	%(v/v)	7	81	87	85	2.081666	0	75	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	0.7	2.3	1.58714	0.601189	0	18	--	18.0
aromatics	%(v/v)	7	30.6	35	32.4	1.480991	0	35	--	35.0
benzene	%(v/v)	7	0.09	0.31	0.185714	0.080593	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	7	1.98	2.4	2.174286	0.146499	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	7	0	0.01	0.004286	0.005345	0	3	--	3
Ethanol	%(v/v)	7	0.01	0.3	0.097143	0.097076	0	5	--	5
Iso-propyl alcohol	%(v/v)	7	0.01	0.08	0.041429	0.026095	0	10	--	10
Tetro-butyl alcohol	%(v/v)	7	0	0.06	0.015714	0.024398	0	7	--	7
Iso-butyl alcohol	%(v/v)	7	0	0.05	0.011429	0.018645	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	10.92	13.2	12.09143	0.905012	0	15	--	15
Other oxygenate	%(v/v)	7	0	0.01	0.001429	0.00378	0	10	--	10
SULPHUR CONTENT	mg/kg	14	4.4	9.5	3.3142855	1.444365303	0	0	--	50
LEAD CONTENT	g/l	7	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	98	98.5	98.2				95	--
MOTOR OCTANE NO.	--	5	88	88.4	88.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	0	70	66.2				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	13	44	50	47.8				46.0	--
evaporated at 150	%(v/v)	13	81	87	85.1				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	13	0.7	4.6	2.7				--	18.0
aromatics	%(v/v)	13	30.6	35	33.4				--	35.0
benzene	%(v/v)	13	0	0.31	0.1				--	1.0
OXYGEN CONTENT	%(m/m)	13	1.9	2.4	2.1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	13	0	0.02	0				--	3
Ethanol	%(v/v)	13	0.01	0.3	0.1				--	5
Iso-propyl alcohol	%(v/v)	13	0	0.22	0.1				--	10
Tetro-butyl alcohol	%(v/v)	13	0	0.06	0				--	7
Iso-butyl alcohol	%(v/v)	13	0	0.06	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	10.92	14.7	12.4				--	15
Other oxygenate	%(v/v)	13	0	0.09	0				--	10
SULPHUR CONTENT	mg/kg	26	4.4	9.5	3.1				--	50
LEAD CONTENT	g/l	13	0	0	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Luxembourg  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade: Essence sans plomb

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	95	95.7	95.23333333	0.404145188	0	0	95	--
MOTOR OCTANE NO.	--	4	85	85.5	85.2	0.21602469	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	2	57.8	58.8	58.3	0.707106781	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2	49.1	61.7	55.4	8.909545443	0	0	46.0	--
evaporated at 150	%(v/v)	2	81.2	92	86.6	7.636753237	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	4	9	16.7	12.5	3.329664648	0	0	--	18.0
aromatics	%(v/v)	4	22.2	35	29.85	5.638853311	0	0	--	35.0
benzene	%(v/v)	4	0.5	0.64	0.555	0.068068593	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	4	3.3	9.7	5.875	2.718302166	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Luxembourg  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Essence sans plomb

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	98	99	98.3	0.577350269	0	0	95	--
MOTOR OCTANE NO.	--	3	88	88.5	88.33333333	0.288675135	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	1	57	57	57	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	1	55	55	55	0	0	0	46.0	--
evaporated at 150	%(v/v)	1	91.2	91.2	91.2	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	3	6.5	9.5	8	1.5	0	0	--	18.0
aromatics	%(v/v)	3	20	25.1	21.93333	2.764657905	0	0	--	35.0
benzene	%(v/v)	3	0.33	0.5	0.443333333	0.098149546	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	3	4.2	6.3	5.166666667	1.059874206	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Malta

Year: 2006

Period:

FuelID:

National Fuel Grade

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	0	0	0	0	0	0	0	91	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa	0	0	0	0	0	0	0	--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa	0	0	0	0	0	0	0	--	--
DISTILLATION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	21.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	35.0
benzene	%(v/v)	0	0	0	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0	0	0	0	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Netherlands  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	95	96.5	95.74	0.2	0	0	95	--
MOTOR OCTANE NO.	--	100	84.8	86.7	85.28	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	53.6	60	58.7	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	51.74	67.6	64.7	0.5	0	0	46.0	--
evaporated at 150	%(v/v)	0	84.5	96.7	91	1.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	4.1	16.1	10.4	0.4	0	0	--	18.0
aromatics	%(v/v)	100	21.3	35.6	28.58	2.1	0	0	--	35.0
benzene	%(v/v)	100	0.36	0.94	0.72	0.04	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	100	1.2	2.4	1.6	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0	0.04	0	0	--	3
Ethanol	%(v/v)	100	0	0	0	0.04	0	0	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	3.3	13.6	9.52	0.14	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0.04	0	0	--	10
SULPHUR CONTENT	mg/kg	100	5	47	22.02	1.77	0	0	--	50
LEAD CONTENT	g/l	100	0	0	0	0.0007	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	108	93.8	98.1	95.73	0.59	0	0	95	--
MOTOR OCTANE NO.	--	108	84	88.1	85.52	0.64	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	108	53	69	57.39	2.23	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	108	41.3	59	50.51	2.5	0	0	46.0	--
evaporated at 150	%(v/v)	108	74.9	89.8	82.87	2.46	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	108	0.6	15.9	7.39	4.13	0	0	--	18.0
aromatics	%(v/v)	108	28.3	36.8	33.1	1.54	0	0	--	35.0
benzene	%(v/v)	108	0.33	0.85	0.63	0.09	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	108	0.04	2.8	1.23	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	108	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	108	0.17	5.1	1.37	1.66	0	0	--	5
Iso-propyl alcohol	%(v/v)	108	0.17	0.4	0.17	0.03	0	0	--	10
Tetro-butyl alcohol	%(v/v)	108	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	108	0.17	0.4	0.17	0.03	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	108	0.17	10.7	4.38	2.68	0	0	--	15
Other oxygenate	%(v/v)	107	0.17	6.2	0.29	0.78	0	0	--	10
SULPHUR CONTENT	mg/kg	107	1	42.68	19.5	10.78	0	0	--	50
LEAD CONTENT	g/l	74	0.0025	0.005	0.00429	0.00113	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	111	94.3	97.1	95.87	0.54	0	0	95	--
MOTOR OCTANE NO.	--	111	84.1	87.4	85.65	0.61	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	111	55.5	84.6	72.49	8.57	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	111	47.4	61.6	52.62	2.56	0	0	46.0	--
evaporated at 150	%(v/v)	111	75.5	93	83.77	2.63	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	111	0.5	17.9	8.02	5.27	0	0	--	18.0
aromatics	%(v/v)	111	26.6	37	33.19	2.1	0	0	--	35.0
benzene	%(v/v)	111	0.4	0.96	0.68	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	111	0.09	3.5	1.11	0.62	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	111	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	111	0.17	4.7	1.01	1.48	0	0	--	5
Iso-propyl alcohol	%(v/v)	111	0.17	0.5	0.17	0.03	0	0	--	10
Tetro-butyl alcohol	%(v/v)	111	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	111	0.17	0.5	0.17	0.03	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	111	0.17	10	4.3	2.09	0	0	--	15
Other oxygenate	%(v/v)	111	0.17	8.5	0.31	0.95	0	0	--	10
SULPHUR CONTENT	mg/kg	111	2	110	22.27	17.96	0	0	--	50
LEAD CONTENT	g/l	67	0.005	0.005	0.005	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	219	93.8	98.1	95.8	0.57	0	0	95	--
MOTOR OCTANE NO.	--	219	84	88.1	85.59	0.62	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	219	53	84.6	65.05	9.83	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	219	41.3	61.6	51.58	2.74	0	0	46.0	--
evaporated at 150	%(v/v)	219	74.9	93	83.33	2.58	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	219	0.5	17.9	7.71	4.74	0	0	--	18.0
aromatics	%(v/v)	219	26.6	37	33.15	1.84	0	0	--	35.0
benzene	%(v/v)	219	0.33	0.96	0.65	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	219	0.04	3.5	1.17	0.61	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	219	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	219	0.17	5.1	1.19	1.58	0	0	--	5
Iso-propyl alcohol	%(v/v)	219	0.17	0.5	0.17	0.03	0	0	--	10
Tetro-butyl alcohol	%(v/v)	219	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	219	0.17	0.5	0.17	0.03	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	219	0.17	10.7	4.34	2.39	0	0	--	15
Other oxygenate	%(v/v)	218	0.17	8.5	0.3	0.87	0	0	--	10
SULPHUR CONTENT	mg/kg	218	1	110	20.91	14.9	0	0	--	50
LEAD CONTENT	g/l	141	0.0025	0.005	0.00463	0.00089	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade RON 98 <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	138	95.5	101.3	98.7	0.66	0	0	95	--
MOTOR OCTANE NO.	--	138	85.7	90	88.65	0.6	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	138	50.5	81.6	57.85	3.58	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	138	48	60	52.99	2.77	0	0	46.0	--
evaporated at 150	%(v/v)	138	80.4	93.5	84.14	2.08	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	138	0.6	6.8	3.15	1.4	0	0	--	18.0
aromatics	%(v/v)	138	24.5	36.9	33.49	1.8	0	0	--	35.0
benzene	%(v/v)	138	0.3	0.9	0.57	0.12	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	138	0.8	2.63	1.83	0.41	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	134	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	134	0.17	1.9	0.18	0.15	0	0	--	5
Iso-propyl alcohol	%(v/v)	134	0.17	0.2	0.17	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	134	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	133	0.17	0.17	0.17	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	137	1.4	14.9	10.91	1.95	0	0	--	15
Other oxygenate	%(v/v)	134	0.17	0.17	0.17	0	0	0	--	10
SULPHUR CONTENT	mg/kg	138	1	44.2	8.11	5.11	0	0	--	50
LEAD CONTENT	g/l	77	0.0025	0.005	0.00464	0.00088	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade RON 98 <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	135	96.3	100.8	98.6	0.56	0	0	95	--
MOTOR OCTANE NO.	--	135	85.2	89.4	88.47	0.55	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	135	52.9	86.6	71.3	10.17	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	135	48.4	59.8	53.1	2.83	0	0	46.0	--
evaporated at 150	%(v/v)	135	81.3	90.9	84.4	1.38	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	135	0.5	9.8	3.33	1.94	0	0	--	18.0
aromatics	%(v/v)	135	26.1	37.1	33.88	1.64	0	0	--	35.0
benzene	%(v/v)	135	0.38	0.83	0.54	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	135	0.8	3.1	1.62	0.47	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	135	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	135	0.17	3.7	0.2	0.3	0	0	--	5
Iso-propyl alcohol	%(v/v)	135	0.17	0.2	0.17	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	135	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	135	0.17	0.2	0.17	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	135	4.5	14.6	9.45	2.27	0	0	--	15
Other oxygenate	%(v/v)	135	0.17	4.7	0.21	0.39	0	0	--	10
SULPHUR CONTENT	mg/kg	135	1	24	7.3	4.04	0	0	--	50
LEAD CONTENT	g/l	91	0.0025	0.005	0.00497	0.00026	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade RON 98 <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	273	95.5	101.3	98.7	0.61	0	0	95	--
MOTOR OCTANE NO.	--	273	85.2	90	88.56	0.59	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	273	50.5	86.6	64.5	10.14	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	273	48	60	53.04	2.8	0	0	46.0	--
evaporated at 150	%(v/v)	273	80.4	93.5	84.27	1.77	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	273	0.5	9.8	3.24	1.69	0	0	--	18.0
aromatics	%(v/v)	273	24.5	37.1	33.68	1.73	0	0	--	35.0
benzene	%(v/v)	273	0.3	0.9	0.56	0.11	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	273	0.8	3.1	1.72	0.45	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	269	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	269	0.17	3.7	0.19	0.24	0	0	--	5
Iso-propyl alcohol	%(v/v)	269	0.17	0.2	0.17	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	269	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	268	0.17	0.2	0.17	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	272	1.4	14.9	10.19	2.23	0	0	--	15
Other oxygenate	%(v/v)	269	0.17	4.7	0.19	0.28	0	0	--	10
SULPHUR CONTENT	mg/kg	273	1	44.2	7.71	4.62	0	0	--	50
LEAD CONTENT	g/l	168	0	0	0	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade EuroSuper

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	95	97	95.89285714	0.788829986	95	0	95	--
MOTOR OCTANE NO.	--	14	85	86	85.14285714	0.34354327	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	14	52.06	61.7	58.07214286	2.532150739	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	14	50.3	62.6	55.2	3.701558923	46	71	46.0	--
evaporated at 150	%(v/v)	14	78.3	89.7	85.62142857	2.854464404	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	14	5.1	11.8	8.214285714	2.421651421	0	18	--	18.0
aromatics	%(v/v)	14	28	34.9	32.31429	1.866241448	0	42	--	35.0
benzene	%(v/v)	14	0.7	0.97	0.845	0.093129356	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	1.1	2.6	2.0725	0.425315391	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	5.13	14.2	10.93333333	2.987185764	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	13	17.8	44	28.88461538	8.914580393	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal

Year: 2006

Period: Winter

FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu

National Fuel Grade EuroSuper

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	15	95	97	95.56666667	0.618369592	95	0	95	--
MOTOR OCTANE NO.	--	15	84.5	86	85.04	0.297129121	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	14	52.06	61.7	58.07214286	2.532150739	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	15	50.9	66.3	59.78666667	4.749115206	46	71	46.0	--
evaporated at 150	%(v/v)	15	80.9	92.6	88.56666667	3.211067172	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	15	3.9	13.9	10.38666667	3.460360565	0	18	--	18.0
aromatics	%(v/v)	15	19.7	34.4	27.38	4.327189784	0	42	--	35.0
benzene	%(v/v)	15	0.5	1	0.761333333	0.138092447	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	13	0.4	2.7	1.782307692	0.721158256	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	2.14	14.4	9.606923077	3.945785483	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	15	16	46.5	23.58	7.570921816	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade EuroSuper

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	29	95	97	95.72413793	0.712468131	95	0	95	--
MOTOR OCTANE NO.	--	29	84.5	86	85.08965517	0.318864982	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	13	52.06	61.7	58.03153846	2.630797871	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	29	50.3	66.3	57.57241379	4.804082828	46	71	46.0	--
evaporated at 150	%(v/v)	29	78.3	92.6	87.14482759	3.343926927	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	29	3.9	13.9	9.337931034	3.151237149	0	18	--	18.0
aromatics	%(v/v)	29	19.7	34.9	29.76207	4.15644197	0	42	--	35.0
benzene	%(v/v)	29	0.5	1	0.801724138	0.123983552	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	25	0.4	2.7	1.9216	0.604019039	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	25	2.14	14.4	10.2436	3.511677994	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	28	16	46.5	26.04285714	8.502872219	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	97.6	99.2	98.2	0.508661247	98	0	95	--
MOTOR OCTANE NO.	--	14	86.6	88	87.12857143	0.425040399	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	14	45.85	61.7	57.17571429	4.653239921	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	14	46	55.8	50.75714286	2.526997089	46	71	46.0	--
evaporated at 150	%(v/v)	14	78	90.9	84.91428571	4.276925053	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	14	1.6	12.1	7.392857143	2.620470975	0	18	--	18.0
aromatics	%(v/v)	14	29.4	34.9	32.4	1.817013611	0	42	--	35.0
benzene	%(v/v)	14	0.6	1	0.790714286	0.109577109	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	1.8	2.7	2.308333333	0.29063671	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	10.1	14.8	12.7	1.499242233	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	13	3	9.4	6.707692308	1.971658159	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	97.8	100	98.25714286	0.629669371	98	0	95	--
MOTOR OCTANE NO.	--	14	86.6	89	87.26428571	0.743802231	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	14	45.85	61.7	57.17571429	4.653239921	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	14	50.8	61.4	55.31428571	3.764379026	46	71	46.0	--
evaporated at 150	%(v/v)	14	82.5	91.7	87.34285714	2.777302035	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	14	1.4	14	7.414285714	3.8165343	0	18	--	18.0
aromatics	%(v/v)	14	27.4	34.6	31.22143	2.417302556	0	42	--	35.0
benzene	%(v/v)	14	0.3	0.8	0.59	0.16929719	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	10	1.8	2.7	2.24	0.347051069	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	9.58	15	12.278	1.995092869	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	11	5.6	10	8.372727273	1.829803765	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	28	97.6	100	98.2	0.561966973	98	0	95	--
MOTOR OCTANE NO.	--	28	86.6	89	87.19642857	0.598443749	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	13	45.85	61.7	56.96615385	4.773989489	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	28	46	61.4	53.03571429	3.909173853	46	71	46.0	--
evaporated at 150	%(v/v)	28	78	91.7	86.12857143	3.748368252	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	28	1.4	14	7.403571429	3.212415976	0	18	--	18.0
aromatics	%(v/v)	28	27.4	34.9	31.81071	2.182478931	0	42	--	35.0
benzene	%(v/v)	28	0.3	1	0.690357143	0.173279525	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	22	1.8	2.7	2.277272727	0.311573301	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	22	9.58	15	12.50818182	1.711584163	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	24	3	10	7.470833333	2.049916046	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade Unleaded RON 95 with lead substitute

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	28	95	96.8	95.9	0.56	0	0	95	--
MOTOR OCTANE NO.	--	28	85	85.7	85.3	0.19	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	28	46	59.8	53.5	3.2	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	28	37	49	45.8	3.02	0	0	46.0	--
evaporated at 150	%(v/v)	28	76.9	81	78.7	1.18	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	28	7.9	12.6	10.4	1.12	0	0	--	18.0
aromatics	%(v/v)	28	36.8	43.3	38.8	1.99	0	0	--	35.0
benzene	%(v/v)	28	0.4	1	0.6	0.14	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	28	0	1.6	0.4	0.45	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	28	0	0.11	0.01	0.03	0	0	--	3
Ethanol	%(v/v)	28	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	28	0	0.01	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	28	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	28	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	28	0.15	9.33	2.61	2.72	0	0	--	15
Other oxygenate	%(v/v)	28	0	0.01	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	28	22	120	64	20	0	0	--	50
LEAD CONTENT	g/l	28	0.0002	0.0011	0.0006	0.0003	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade: Unleaded RON 95 with lead substitute

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	25	84	96.1	94.5	2.78	0	0	95	--
MOTOR OCTANE NO.	--	25	75	85.6	84.3	2.48	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	25	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	25	44	55	48	2.63	0	0	46.0	--
evaporated at 150	%(v/v)	25	76	85	79.1	2.21	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	25	7.6	14	10.8	1.47	0	0	--	18.0
aromatics	%(v/v)	25	25	37.5	34	3.31	0	0	--	35.0
benzene	%(v/v)	25	0.6	0.9	0.7	0.07	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	25	0.2	1.7	0.8	0.38	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	25	0	0.15	0.04	0.05	0	0	--	3
Ethanol	%(v/v)	25	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	25	0	0.03	0	0.01	0	0	--	10
Tetro-butyl alcohol	%(v/v)	25	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	25	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	25	1.16	9.2	4.8	2.27	0	0	--	15
Other oxygenate	%(v/v)	25	0	0.03	0.01	0.01	0	0	--	10
SULPHUR CONTENT	mg/kg	25	27	68	39	11	0	0	--	50
LEAD CONTENT	g/l	25	0.0003	0.0022	0.0014	0.0006	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade: Unleaded RON 95 with lead substitute

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	84	96.8	95.2	2.11	0	0	95	--
MOTOR OCTANE NO.	--	53	75	85.7	84.8	1.8	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	53	46	59.8	53.505	3.202104777	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	37	55	46.9	3.05	0	0	46.0	--
evaporated at 150	%(v/v)	53	76	85	78.9	1.77	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	7.6	14	10.6	1.32	0	0	--	18.0
aromatics	%(v/v)	53	25	43.3	36.5	3.62	0	0	--	35.0
benzene	%(v/v)	53	0.4	1	0.7	0.12	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	53	0	1.7	0.6	0.45	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	53	0	0.15	0.03	0.04	0	0	--	3
Ethanol	%(v/v)	53	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	53	0	0.03	0	0.01	0	0	--	10
Tetro-butyl alcohol	%(v/v)	53	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	53	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	0.15	9.33	3.68	2.74	0	0	--	15
Other oxygenate	%(v/v)	53	0	0.03	0.01	0.01	0	0	--	10
SULPHUR CONTENT	mg/kg	53	22	120	52	20	0	0	--	50
LEAD CONTENT	g/l	53	0.0002	0.0022	0.001	0.0006	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Romania  
**Year:** 2006  
**Period:** Summer  
**FuelID:** Unleaded petrol min. RON=95 (<50 ppm sulphur)  
**National Fuel Grade** Unleaded RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	20	95	99	96.5	0.91	0	0	95	--
MOTOR OCTANE NO.	--	20	85	87.2	85.5	0.44	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	20	51.5	59	55.5	2.29	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	20	46	51	47.2	1.14	0	0	46.0	--
evaporated at 150	%(v/v)	20	77	81	79.3	1.04	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	20	7.8	14.2	10.6	1.54	0	0	--	18.0
aromatics	%(v/v)	20	34.8	41.8	37.6	1.43	0	0	--	35.0
benzene	%(v/v)	20	0.4	0.9	0.6	0.15	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	20	0.4	1.9	0.9	0.34	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	20	0	0.26	0.04	0.06	0	0	--	3
Ethanol	%(v/v)	20	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	20	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	20	0.77	10.99	5.66	2.15	0	0	--	15
Other oxygenate	%(v/v)	20	0	0.05	0	0.01	0	0	--	10
SULPHUR CONTENT	mg/kg	20	31	103	66	16	0	0	--	50
LEAD CONTENT	g/l	20	0.0002	0.0017	0.0007	0.0005	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	19	88.1	100	95.8	1.83	0	0	95	--
MOTOR OCTANE NO.	--	19	81.5	91.8	85.4	1.52	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	19	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	19	45	51.7	49.1	1.9	0	0	46.0	--
evaporated at 150	%(v/v)	19	76	83	79.1	1.42	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	19	3.3	14.7	11.2	2.3	0	0	--	18.0
aromatics	%(v/v)	19	26.6	39.3	34	2.32	0	0	--	35.0
benzene	%(v/v)	19	0.5	1	0.7	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	19	0.7	2.4	1.2	0.34	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	19	0	0.14	0.03	0.05	0	0	--	3
Ethanol	%(v/v)	19	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	19	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	19	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	19	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	19	2.29	13.32	7.02	2.02	0	0	--	15
Other oxygenate	%(v/v)	19	0	0.03	0.01	0.01	0	0	--	10
SULPHUR CONTENT	mg/kg	19	14	50	35	9	0	0	--	50
LEAD CONTENT	g/l	19	0.0002	0.0024	0.001	0.0007	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	39	88.1	100	96.2	1.47	0	0	95	--
MOTOR OCTANE NO.	--	39	81.5	91.8	85.4	1.09	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	39	51.5	59	55.47142857	2.288458174	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	39	45	51.7	48.1	1.8	0	0	46.0	--
evaporated at 150	%(v/v)	39	76	83	79.2	1.24	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	39	3.3	14.7	10.9	1.96	0	0	--	18.0
aromatics	%(v/v)	39	26.6	41.8	35.9	2.61	0	0	--	35.0
benzene	%(v/v)	39	0.4	1	0.7	0.15	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	39	0.4	2.4	1.1	0.36	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	39	0	0.26	0.03	0.05	0	0	--	3
Ethanol	%(v/v)	39	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	39	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	39	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	39	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	39	0.77	13.32	6.3	2.2	0	0	--	15
Other oxygenate	%(v/v)	39	0	0.05	0	0.01	0	0	--	10
SULPHUR CONTENT	mg/kg	39	14	103	51	20	0	0	--	50
LEAD CONTENT	g/l	39	0.0002	0.0024	0.0008	0.0006	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	3	98.4	99.3	98.7	0.42	0	0	95	--
MOTOR OCTANE NO.	--	3	87	87.5	87.3	0.22	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	57.5	59.8	59	1.06	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	3	48	49.6	48.9	0.66	0	0	46.0	--
evaporated at 150	%(v/v)	3	81.2	83	82.1	0.74	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	3	5.6	10.7	8.5	2.15	0	0	--	18.0
aromatics	%(v/v)	3	29.1	35	33	2.78	0	0	--	35.0
benzene	%(v/v)	3	0.2	0.5	0.4	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	3	1.7	2.5	2.1	0.33	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	3	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	3	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	3	0	0.01	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	3	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	3	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	3	12.07	13.8	12.72	0.77	0	0	--	15
Other oxygenate	%(v/v)	3	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	0.0003	37	12.0003	9.899494938	0	0	--	50
LEAD CONTENT	g/l	3	0	0	0	0	0	0	--	0.005

Notes: 0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	6	98.2	100	99.2	0.58	0	0	95	--
MOTOR OCTANE NO.	--	6	86.8	89.4	88.4	1.08	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	47	52	48.6	1.61	0	0	46.0	--
evaporated at 150	%(v/v)	6	80	85	83.6	1.63	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	5.3	15.4	7.4	3.59	0	0	--	18.0
aromatics	%(v/v)	6	26.8	34.8	30.6	2.41	0	0	--	35.0
benzene	%(v/v)	6	0.2	0.9	0.4	0.26	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	6	1.6	2.3	1.8	0.25	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	6	0	0.23	0.04	0.09	0	0	--	3
Ethanol	%(v/v)	6	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	6	0	0.02	0	0.01	0	0	--	10
Tetro-butyl alcohol	%(v/v)	6	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	6	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	7.65	13.1	10.14	1.82	0	0	--	15
Other oxygenate	%(v/v)	6	0	0.01	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	12	0.0003	48	6.5	11.3137085	0	0	--	50
LEAD CONTENT	g/l	6	0	0.0006	0.0005	0.0001	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	9	98.2	100	99.0	59	0	0	95	--
MOTOR OCTANE NO.	--	9	86.8	89.4	88.0	104	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	9	57.5	59.8	59	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	9	47	52	48.7	1.38	0	0	46.0	--
evaporated at 150	%(v/v)	9	80	85	83.1	1.57	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	9	5.3	15.4	7.8	3.23	0	0	--	18.0
aromatics	%(v/v)	9	26.8	35	31.4	2.78	0	0	--	35.0
benzene	%(v/v)	9	0.2	0.9	0.4	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	9	1.6	2.5	1.9	0.33	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	9	0	0.23	0.03	0.07	0	0	--	3
Ethanol	%(v/v)	9	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	9	0	0	0	0.01	0	0	--	10
Tetra-butyl alcohol	%(v/v)	9	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	9	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	9	7.65	13.8	11	1.97	0	0	--	15
Other oxygenate	%(v/v)	9	0	0.01	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	9	1	48	17	16	0	0	--	50
LEAD CONTENT	g/l	9	0.0003	0.0009	0.0005	0.0002	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Romania  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Unleaded RON 98 low sulphur (<10ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	1	100	100	100	0	0	0	95	--
MOTOR OCTANE NO.	--	1	88	88	88	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	1	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	1	61.3	61.3	61.3	0	0	0	46.0	--
evaporated at 150	%(v/v)	1	87.8	87.8	87.8	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	1	13.2	13.2	13.2	0	0	0	--	18.0
aromatics	%(v/v)	1	33.7	33.7	33.7	0	0	0	--	35.0
benzene	%(v/v)	1	0.6	0.6	0.6	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	1	2.5	2.5	2.5	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	1	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	1	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	1	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	1	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	1	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	1	14	14	14	0	0	0	--	15
Other oxygenate	%(v/v)	1	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	1	6	6	6	0	0	0	--	50
LEAD CONTENT	g/l	1	0.0003	0.0003	0.0003	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	82.7	96.3	93.572	1.883830141	91	0	91	--
MOTOR OCTANE NO.	--	50	77.4	86.2	84.056	1.45053921	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	40.2	75	53.643	6.127902822	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	47.5	61.9	52.41	2.564858671	46	0	46.0	--
evaporated at 150	%(v/v)	50	77.8	88.6	81.448	2.425798013	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	6.5	17.2	13.678	1.989099294	0	21	--	21.0
aromatics	%(v/v)	50	22.3	35.1	30.518	2.916346344	0	35	--	35.0
benzene	%(v/v)	50	0.3	1	0.772	0.124963995	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.02	1.28	0.1738	0.235192602	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0.1	0.002	0.014	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0.1	0.002	0.014	0	7	--	7
Iso-butyl alcohol	%(v/v)	50	0	0.1	0.006	0.023748684	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0.1	7.1	0.93	1.304032208	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	3.5	37.5	11.51	4.232585689	0	50	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	92.5	96.6	94.136	1.297961479	91	0	91	--
MOTOR OCTANE NO.	--	50	83	87.1	84.792	1.161178711	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	48.1	57.8	53.714	2.409482102	46	0	46.0	--
evaporated at 150	%(v/v)	50	78.2	87.5	81.64	2.619312887	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	5.3	17.1	12.2488	3.062358333	0	21	--	21.0
aromatics	%(v/v)	50	28.4	37.5	33.0866	2.243553975	0	35	--	35.0
benzene	%(v/v)	50	0.4	1.1	0.732	0.188085087	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.01	1.46	0.371	0.399691131	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0.1	0.012	0.032496154	0	3	--	3
Ethanol	%(v/v)	50	0	0.1	0.002	0.014	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0.1	0.002	0.014	0	7	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0.1	7.9	2.04	2.20771375	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	3.1	45.1	14.474	6.710973493	0	50	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	82.7	96.6	93.854	1.64203654	91	0	91	--
MOTOR OCTANE NO.	--	100	77.4	87.1	84.424	1.364413427	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	40.2	75	53.643	6.127902822	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	47.5	61.9	53.062	2.572383331	46	0	46.0	--
evaporated at 150	%(v/v)	100	77.8	88.6	81.544	2.526235143	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	5.3	17.2	12.9634	2.679165997	0	21	--	21.0
aromatics	%(v/v)	100	22.3	37.5	31.8023	2.901505077	0	35	--	35.0
benzene	%(v/v)	100	0.3	1.1	0.752	0.160922342	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	100	0.01	1.46	0.2724	0.342426985	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0.1	0.006	0.023748684	0	3	--	3
Ethanol	%(v/v)	100	0	0.1	0.001	0.009949874	0	5	--	5
Iso-propyl alcohol	%(v/v)	100	0	0.1	0.001	0.009949874	0	10	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0.1	0.002	0.014	0	7	--	7
Iso-butyl alcohol	%(v/v)	100	0	0.1	0.003	0.017058722	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0.1	7.9	1.485	1.89612104	0	15	--	15
Other oxygenate	%(v/v)	100	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	100	3.1	45.1	12.992	5.703191433	0	50	--	50
LEAD CONTENT	g/l	100	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade SUPER 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	59	90.4	97.8	95.7	0.914808429	95	0	95	--
MOTOR OCTANE NO.	--	59	80.8	87.8	85.65084746	0.866000525	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	59	44.2	62.8	52.12644068	3.283766834	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	59	46.4	55.3	50.04576271	2.075631171	46	0	46.0	--
evaporated at 150	%(v/v)	59	76.9	87.3	80.74745763	2.621317817	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	59	6.7	17.1	10.97457627	1.730150696	0	18	--	18.0
aromatics	%(v/v)	59	25.6	47.5	33.74407	2.495573789	0	35	--	35.0
benzene	%(v/v)	59	0.4	12	0.803389831	1.473145614	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	59	0.01	2.02	0.617457627	0.440121683	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	59	0	0.1	0.005084746	0.021968613	0	3	--	3
Ethanol	%(v/v)	59	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	59	0	0.1	0.001694915	0.01290809	0	10	--	10
Tetro-butyl alcohol	%(v/v)	59	0	0.1	0.006779661	0.025139656	0	7	--	7
Iso-butyl alcohol	%(v/v)	59	0	0.1	0.006779661	0.025139656	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	59	0	11.3	3.33220339	2.37082841	0	15	--	15
Other oxygenate	%(v/v)	59	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	59	3.1	35.4	8.884745763	3.289613427	0	50	--	50
LEAD CONTENT	g/l	59	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade SUPER 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	92.8	97.4	95.834	0.717386925	95	0	95	--
MOTOR OCTANE NO.	--	50	85.1	87.1	86.19	0.521248501	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	47.8	55.4	51.798	2.107177259	46	0	46.0	--
evaporated at 150	%(v/v)	50	76.9	88	81.198	2.939897277	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	4.8	16.9	11.4232	3.209536066	0	18	--	18.0
aromatics	%(v/v)	50	32.1	39.4	34.4292	1.29024004	0	35	--	35.0
benzene	%(v/v)	50	0.4	1	0.646	0.148606864	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.01	1.79	0.646	0.54201476	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0.2	0.02	0.048989795	0	3	--	3
Ethanol	%(v/v)	50	0	0.1	0.002	0.014	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	9.4	3.55	2.914120794	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	2.6	33.9	10.51529529	4.280241909	0	50	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade SUPER 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	109	90.4	97.8	95.8	0.83202765	95	0	95	--
MOTOR OCTANE NO.	--	109	80.8	87.8	85.89816514	0.776369066	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	59	44.2	62.8	52.12644068	3.283766834	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	109	46.4	55.4	50.84954128	2.265198367	46	0	46.0	--
evaporated at 150	%(v/v)	109	76.9	88	80.95412844	2.781080646	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	109	4.8	17.1	11.18036697	2.528942531	0	18	--	18.0
aromatics	%(v/v)	109	25.6	47.5	34.05835	2.061854298	0	35	--	35.0
benzene	%(v/v)	109	0.4	12	0.731192661	1.091308217	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	109	0.01	2.02	0.630550459	0.48970846	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	109	0	0.2	0.011926606	0.037648228	0	3	--	3
Ethanol	%(v/v)	109	0	0.1	0.000917431	0.009534225	0	5	--	5
Iso-propyl alcohol	%(v/v)	109	0	0.1	0.000917431	0.009534225	0	10	--	10
Tetro-butyl alcohol	%(v/v)	109	0	0.1	0.003669725	0.018801745	0	7	--	7
Iso-butyl alcohol	%(v/v)	109	0	0.1	0.003669725	0.018801745	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	109	0	11.3	3.432110092	2.636228914	0	15	--	15
Other oxygenate	%(v/v)	109	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	109	2.6	35.4	9.596633028	3.831511112	0	50	--	50
LEAD CONTENT	g/l	109	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade SUPER PLUS 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	16	95.8	100.5	98.65625	0.961098818	98	0	95	--
MOTOR OCTANE NO.	--	16	85.2	90.4	88.78125	1.043562857	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	16	45.6	59.8	53.3875	4.335013697	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	16	48.6	62.6	53.45625	3.970668827	46	0	46.0	--
evaporated at 150	%(v/v)	16	78.5	89.3	82.475	3.013614939	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	16	2.6	10.5	5.9625	2.478627392	0	18	--	18.0
aromatics	%(v/v)	16	23.9	34.9	32.44375	2.489972076	0	35	--	35.0
benzene	%(v/v)	16	0.3	0.7	0.45	0.111803399	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	16	0.54	2.8	2.140625	0.507056071	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	16	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	16	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	16	0	0.1	0.00625	0.024206146	0	10	--	10
Tetro-butyl alcohol	%(v/v)	16	0	0.1	0.0375	0.048412292	0	7	--	7
Iso-butyl alcohol	%(v/v)	16	0	0.1	0.00625	0.024206146	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	16	3	15.4	11.725	2.647758486	0	15	--	15
Other oxygenate	%(v/v)	16	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	16	2.7	8	3.975	1.266639254	0	50	--	50
LEAD CONTENT	g/l	16	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade SUPER PLUS 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	98.2	99.6	98.55833333	0.423198798	98	0	95	--
MOTOR OCTANE NO.	--	12	88.6	89.4	89.075	0.234964536	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	12	50.7	62	53.30833333	3.881034727	46	0	46.0	--
evaporated at 150	%(v/v)	12	79.7	89.5	81.96666667	3.241227477	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	0.8	8.3	4.7	2.039199189	0	18	--	18.0
aromatics	%(v/v)	12	31.6	36	33.64167	1.236566708	0	35	--	35.0
benzene	%(v/v)	12	0.3	0.6	0.425	0.08291562	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	1.87	2.78	2.129166667	0.247132162	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	12	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	12	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	12	0	0.1	0.058333333	0.049300665	0	7	--	7
Iso-butyl alcohol	%(v/v)	12	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	10.5	15.3	11.83333333	1.301494867	0	15	--	15
Other oxygenate	%(v/v)	12	0	0.1	0.016666667	0.0372678	0	10	--	10
SULPHUR CONTENT	mg/kg	12	2	5.8	3.358333333	0.895784882	0	50	--	50
LEAD CONTENT	g/l	12	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade SUPER PLUS 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	28	95.8	100.5	98.6	0.779062755	98	0	95	--
MOTOR OCTANE NO.	--	28	85.2	90.4	88.90714286	0.816756902	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	16	45.6	59.8	53.3875	4.335013697	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	28	48.6	62.6	53.39285714	3.933185602	46	0	46.0	--
evaporated at 150	%(v/v)	28	78.5	89.5	82.25714286	3.123348543	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	28	0.8	10.5	5.421428571	2.383927903	0	18	--	18.0
aromatics	%(v/v)	28	23.9	36	32.95714	2.132977224	0	35	--	35.0
benzene	%(v/v)	28	0.3	0.7	0.439285714	0.101204481	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	28	0.54	2.8	2.135714286	0.416082311	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	28	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	28	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	28	0	0.1	0.003571429	0.018557687	0	10	--	10
Tetro-butyl alcohol	%(v/v)	28	0	0.1	0.046428571	0.049872286	0	7	--	7
Iso-butyl alcohol	%(v/v)	28	0	0.1	0.003571429	0.018557687	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	28	3	15.4	11.77142857	2.175982068	0	15	--	15
Other oxygenate	%(v/v)	28	0	0.1	0.007142857	0.025753938	0	10	--	10
SULPHUR CONTENT	mg/kg	28	2	8	3.710714286	1.163535034	0	50	--	50
LEAD CONTENT	g/l	28	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	95	96.7	95.6	0.36	95	0	95	--
MOTOR OCTANE NO.	--	53	85	86.5	85.4	0.38	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	53	55	70.6	59.2	3.07	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	46.7	58.8	53.4	3.32	46	0	46.0	--
evaporated at 150	%(v/v)	53	82.3	92.1	87.9	2.86	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	3.1	13.1	8.22	2.12	0	18	--	18.0
aromatics	%(v/v)	53	24.8	35.4	30.6	2.65	0	42	--	35.0
benzene	%(v/v)	53	0.43	0.91	0.72	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	53	0.25	1.55	0.58	0.24	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	53	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	53	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	53	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	53	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	53	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	1.4	8.5	3.22	1.32	0	15	--	15
Other oxygenate	%(v/v)	53	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	53	7	36.6	26.9	6.11	0	50	--	50
LEAD CONTENT	g/l	53	0	0.002	0	0.47	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	57	95	96.8	95.7	0.45	95	0	95	--
MOTOR OCTANE NO.	--	57	85	86.4	85.3	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	57	58.1	82.2	70.5	6.03	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	57	47.3	61.8	52.9	3.63	46	0	46.0	--
evaporated at 150	%(v/v)	57	81.2	91.6	87.4	2.31	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	57	1.1	14.5	7.9	2.6	0	18	--	18.0
aromatics	%(v/v)	57	25.8	37	30.6	1.95	0	42	--	35.0
benzene	%(v/v)	57	0.46	0.99	0.77	0.11	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	57	0.1	1.45	0.43	0.95	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	57	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	57	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	57	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	57	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	57	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	57	0.6	8	2.4	1.63	0	15	--	15
Other oxygenate	%(v/v)	57	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	57	5.4	51.2	28	6.8	0	50	--	50
LEAD CONTENT	g/l	57	0	0.002	0	0.5	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	110	95	96.8	95.7				95	--
MOTOR OCTANE NO.	--	110	85	86.5	85.3				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	110	55	82.2	65.1				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	110	46.7	61.8	53.1				46.0	--
evaporated at 150	%(v/v)	110	81.2	92.1	87.6				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	110	1.1	14.5	8.1				--	18.0
aromatics	%(v/v)	110	24.8	37	30.6				--	35.0
benzene	%(v/v)	110	0.43	0.99	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	110	0.1	1.55	0.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	110	0	0	0				--	3
Ethanol	%(v/v)	110	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	110	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	110	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	110	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	110	0.6	8.5	2.8				--	15
Other oxygenate	%(v/v)	110	0	0	0				--	10
SULPHUR CONTENT	mg/kg	110	5.4	51.2	27.5				--	50
LEAD CONTENT	g/l	110	0	0.002	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	8	98	100	98.5	0.88	98	0	95	--
MOTOR OCTANE NO.	--	8	87.8	98	89.7	3.44	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	8	57.3	60.4	58.4	1.1	46	0	46.0	--
evaporated at 150	%(v/v)	8	86.8	90.8	89.1	1.7	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	8	0.6	7.7	2.3	2.87	0	18	--	18.0
aromatics	%(v/v)	8	33.6	39	35.3	2	0	42	--	35.0
benzene	%(v/v)	8	0.58	0.79	0.7	0.07	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	8	2.33	2.66	2.49	1.1	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	8	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	8	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	8	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	8	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	8	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	8	10.7	14.9	13.5	1.2	0	15	--	15
Other oxygenate	%(v/v)	8	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	8	0	12.8	6.9	2.93	0	50	--	50
LEAD CONTENT	g/l	8	0	0.002	0	0.52	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia

Year: 2006

Period: Winter

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade Unleaded petrol NMB 98 EURO SUPER PLUS

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	89	100	97.5	3.23	98	0	95	--
MOTOR OCTANE NO.	--	18	87.6	89.2	88.4	0.55	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	18	48.6	62.6	59.4	3.36	46	0	46.0	--
evaporated at 150	%(v/v)	18	82.7	91.9	88.9	1.93	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	18	0.6	8.9	2.8	2.83	0	18	--	18.0
aromatics	%(v/v)	18	31.2	38.4	33.6	1.52	0	42	--	35.0
benzene	%(v/v)	18	0.33	0.8	0.64	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	18	0.66	2.69	2.33	0.47	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	18	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	18	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	18	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	18	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	18	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	18	13	14.9	14.1	0.63	0	15	--	15
Other oxygenate	%(v/v)	18	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	18	0	7.9	5	0.68	0	50	--	50
LEAD CONTENT	g/l	18	0	0.001	0	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	26	89	100	97.8				95	--
MOTOR OCTANE NO.	--	26	87.6	98	88.8				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0					--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	26	48.6	62.6	59.1				46.0	--
evaporated at 150	%(v/v)	26	82.7	91.9	89				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	26	0.6	8.9	2.6				--	18.0
aromatics	%(v/v)	26	31.2	39	34.1				--	35.0
benzene	%(v/v)	26	0.33	0.8	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	26	0.66	2.69	2.4				--	2.7
OXYGENATES:										
Methanol	%(v/v)	26	0	0	0				--	3
Ethanol	%(v/v)	26	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	26	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	26	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	26	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	26	10.7	14.9	13.9				--	15
Other oxygenate	%(v/v)	26	0	0	0				--	10
SULPHUR CONTENT	mg/kg	26	0	12.8	5.6				--	50
LEAD CONTENT	g/l	26	0	0.002	0				--	0.005

Notes:



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Gasolina sin plomo (95 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	96	95	96.9	95.95	0.5	95	0	95	--
MOTOR OCTANE NO.	--	96	85	87.9	86.45	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	96	51.7	60	56.9	4.7	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	96	48.1	69.6	57.3	3.2	46	71	46.0	--
evaporated at 150	%(v/v)	96	82.2	95.9	91	0	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	96	3.7	17.7	12.5	2.7	0	18	--	18.0
aromatics	%(v/v)	96	3.2	34.7	30.3	3.9	0	35	--	35.0
benzene	%(v/v)	96	0.5	1	0.7	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	96	0.4	2.3	1.5	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	96	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	96	0	0.7	0.2	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	96	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	96	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	96	0	0.2	0.1	0.1	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	96	2.1	13.6	8.4	2.7	0	15	--	15
Other oxygenate	%(v/v)	96	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	192	5.8	48.4	13.05	7.14177849	0	50	--	50
LEAD CONTENT	g/l	96	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Gasolina sin plomo (95 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	159	95	96.9	96	0.5	95	0	95	--
MOTOR OCTANE NO.	--	159	85	86	85.3	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	159	59.7	79.9	73.4	3.5	50	80	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	159	46.2	68.9	59.7	4.5	46	71	46.0	--
evaporated at 150	%(v/v)	159	82.9	96	92.1	2.7	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	159	4.7	18	13.3	3	0	18	--	18.0
aromatics	%(v/v)	159	18.9	34.7	27.5	3.8	0	35	--	35.0
benzene	%(v/v)	159	0.4	1	0.7	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	159	0.1	2.5	1.1	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	159	0	0.2	0	0	0	3	--	3
Ethanol	%(v/v)	159	0	0.4	0.2	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	159	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	159	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	159	0	0.2	0.1	0.1	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	159	0.5	34	6.4	2.8	0	15	--	15
Other oxygenate	%(v/v)	159	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	159	3	47	25.1	11.8	0	50	--	50
LEAD CONTENT	g/l	159	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Spain  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95 (<50 ppm sulphur)  
**National Fuel Grade** Gasolina sin plomo (95 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	255	95	96.9	96				95	--
MOTOR OCTANE NO.	--	255	85	87.9	85.7				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	255	51.7	79.9	67.2				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	255	46.2	69.6	58.8				46.0	--
evaporated at 150	%(v/v)	255	82.2	96	91.7				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	255	3.7	18	13				--	18.0
aromatics	%(v/v)	255	3.2	34.7	28.6				--	35.0
benzene	%(v/v)	255	0.4	1	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	255	0.1	2.5	1.3				--	2.7
OXYGENATES:										
Methanol	%(v/v)	255	0	0.2	0				--	3
Ethanol	%(v/v)	255	0	0.7	0.2				--	5
Iso-propyl alcohol	%(v/v)	255	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	255	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	255	0	0.2	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	255	0.5	34	7.2				--	15
Other oxygenate	%(v/v)	255	0	0	0				--	10
SULPHUR CONTENT	mg/kg	351	3	48.4	18.5				--	50
LEAD CONTENT	g/l	255	0.001	0.001	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Gasolina sin plomo (98 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	88	98	99.5	98.6	0.4	95	0	95	--
MOTOR OCTANE NO.	--	88	87.2	89.1	87.9	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	88	49.3	60	57.2	2.6	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	88	46	64.8	55.7	4	46	71	46.0	--
evaporated at 150	%(v/v)	88	85.3	96	91.2	2.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	88	1.7	13.9	7.6	2.8	0	18	--	18.0
aromatics	%(v/v)	88	23.1	35	32	2.9	0	35	--	35.0
benzene	%(v/v)	88	0.4	1	0.7	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	88	1.7	2.7	2.3	0.2	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	88	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	88	0	0.6	0.3	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	88	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	88	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	88	0	0.3	0.1	0.1	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	88	9.5	15	13.2	1.4	0	15	--	15
Other oxygenate	%(v/v)	88	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	176	2.3	10	3.45	1.555634919	0	50	--	50
LEAD CONTENT	g/l	88	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Gasolina sin plomo (98 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	149	98	99.6	98.7	0.4	95	0	95	--
MOTOR OCTANE NO.	--	149	87	89.2	87.8	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	149	51.2	79.9	70.2	6.6	50	80	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	149	46.3	71	58	3.8	46	71	46.0	--
evaporated at 150	%(v/v)	149	80.2	95.7	91.3	2.7	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	149	0.7	18	9.1	3.9	0	18	--	18.0
aromatics	%(v/v)	149	14.5	35	30.1	4.1	0	35	--	35.0
benzene	%(v/v)	149	0.4	1	0.7	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	149	0.2	2.6	2.1	0.3	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	149	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	149	0	0.8	0.3	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	149	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	149	0	0	0	0	0	10	--	7
Iso-butyl alcohol	%(v/v)	149	0	0.4	0	0.1	0	7	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	149	0.5	14.9	12.2	2	0	15	--	15
Other oxygenate	%(v/v)	149	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	298	2	10	3.55	1.272792206	0	50	--	50
LEAD CONTENT	g/l	149	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Gasolina sin plomo (98 I.O.)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	237	98	99.6	98.7				95	--
MOTOR OCTANE NO.	--	237	87	89.2	87.8				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	237	49.3	79.9	65.4				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	237	46	71	57.1				46.0	--
evaporated at 150	%(v/v)	237	80.2	96	91.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	237	0.7	18	8.5				--	18.0
aromatics	%(v/v)	237	14.5	35	30.8				--	35.0
benzene	%(v/v)	237	0.4	1	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	237	0.2	2.7	2.2				--	2.7
OXYGENATES:										
Methanol	%(v/v)	237	0	0	0				--	3
Ethanol	%(v/v)	237	0	0.8	0.3				--	5
Iso-propyl alcohol	%(v/v)	237	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	237	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	237	0	0.4	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	237	0.5	15	12.6				--	15
Other oxygenate	%(v/v)	237	0	0	0				--	10
SULPHUR CONTENT	mg/kg	474	2	10	3.5				--	50
LEAD CONTENT	g/l	237	0.001	0.001	0				--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded petrol 95 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	345	95	96.1	95.2	0	0	0	95	--
MOTOR OCTANE NO.	--	345	85	87.1	85.4	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	345	56.4	70	63.4	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	345	48.7	65	56.4	0	47	71	46.0	--
evaporated at 150	%(v/v)	345	81.4	93.4	88.7	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	345	0.2	12.9	5.3	0	0	13	--	18.0
aromatics	%(v/v)	345	28.1	35	33.8	0	0	0	--	35.0
benzene	%(v/v)	345	0.28	1	0.71	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	4.6	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	345	0	4.9	2.6	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	345	0.1	7.3	3	0	0	0	--	50
LEAD CONTENT	g/l	345	0.0003	0.003	0.002	0	0	0	--	0.005

Notes: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	330	95	96.1	95.2	0	0	0	95	--
MOTOR OCTANE NO.	--	330	85	88.2	85.6	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	330	73.2	95	88.5	0	65	95	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	330	51.7	65.8	58.6	0	50	71	46.0	--
evaporated at 150	%(v/v)	330	77.9	96.3	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	330	0.1	12.8	4.9	0	0	13	--	18.0
aromatics	%(v/v)	330	28.4	35	33.1	0	0	0	--	35.0
benzene	%(v/v)	330	0.3	1	0.72	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	4.6	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	330	0	4.9	2.2	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	330	0	9.8	3.1	0	0	0	--	50
LEAD CONTENT	g/l	330	0.0003	0.003	0.002	0	0	0	--	0.005

Notes: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded petrol 95 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	675	95	96.1	95.2	0	0	0	95	--
MOTOR OCTANE NO.	--	675	85	88.2	85.5	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	345	56.4	70	63.4	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	675	48.7	65.8	57.5	0	0	71	46.0	--
evaporated at 150	%(v/v)	675	80.1	96.3	89	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	675	0.1	12.9	5.1	0	0	13	--	18.0
aromatics	%(v/v)	675	28.1	35	33.5	0	0	0	--	35.0
benzene	%(v/v)	675	0.28	1	0.71	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	4.6	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	675	0	4.9	2.4	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	675	0.1	9.8	3.1	0	0	0	--	50
LEAD CONTENT	g/l	675	0.0003	0.003	0.002	0	0	0	--	0.005

Notes: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded petrol 98 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	98	98	100	98.6	0	98	0	95	--
MOTOR OCTANE NO.	--	98	87.5	88.5	87.7	0	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	98	55.3	70	67.6	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	98	51.6	68	61.2	0	47	71	46.0	--
evaporated at 150	%(v/v)	98	75	91.9	89.7	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	98	0.5	10.7	4	0	0	13	--	18.0
aromatics	%(v/v)	98	24.9	35	33.5	0	0	0	--	35.0
benzene	%(v/v)	98	0.3	1	0.72	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	98	1.9	2.6	2.3	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	98	0.1	14.7	12.2	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	98	0	10	3.3	0	0	0	--	50
LEAD CONTENT	g/l	98	0.0003	0.003	0.002	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	98	99.4	98.4	0	98	0	95	--
MOTOR OCTANE NO.	--	53	87.5	88.5	87.8	0	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	53	69.2	95	89	0	65	95	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	59.7	69.6	63.7	0	50	71	46.0	--
evaporated at 150	%(v/v)	53	75	95.3	90.1	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	0.6	11.5	3.6	0	0	13	--	18.0
aromatics	%(v/v)	53	27.8	34.9	32.3	0	0	0	--	35.0
benzene	%(v/v)	53	0.37	0.94	0.73	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	53	1.9	2.7	2.3	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	10.4	14.8	12.6	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	53	0.3	8.4	3	0	0	0	--	50
LEAD CONTENT	g/l	53	0.0003	0.003	0.002	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded petrol 98 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	151	98	100	98.5	0	98	0	95	--
MOTOR OCTANE NO.	--	151	87.5	88.5	87.8	0	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	98	56.4	70	63.4	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	151	59.7	69.6	62.2	0	0	71	46.0	--
evaporated at 150	%(v/v)	151	75	95.3	89.8	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	151	0.5	11.5	3.9	0	0	13	--	18.0
aromatics	%(v/v)	151	24.9	35	33.1	0	0	0	--	35.0
benzene	%(v/v)	151	0.3	1	0.73	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	151	1.9	2.7	2.3	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	151	0.1	14.8	12.4	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	151	0.1	9.8	3.1	0	0	0	--	50
LEAD CONTENT	g/l	151	0.0003	0.003	0.002	0	0	0	--	0.005

Notes: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: UK  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Premium Unleaded

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	1692	94.9	98.6	95.43	0.36	95	0	95	--
MOTOR OCTANE NO.	--	1692	84.5	88.3	85.37	0.34	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	644	55.8	70	68.15	2.28	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	1692	44.2	71	58.75	3.03	46	0	46.0	--
evaporated at 150	%(v/v)	1442	94.9	98.6	90.2	2.1	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	1681	1	18.1	12.22	2.01	0	18	--	18.0
aromatics	%(v/v)	1684	11.1	35	29.07	2.34	0	35	--	35.0
benzene	%(v/v)	1681	0.2	1	0.665	0.13	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	689	0	1.8	0.25	0.16	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	27	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	19	0	5	0.38	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	19	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	19	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	19	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	546	0	9.6	1.17	0.68	0	15	--	15
Other oxygenate	%(v/v)	330	0	2.1	0.01	0.08	0	10	--	10
SULPHUR CONTENT	mg/kg	1692	2.9	50	34.57	9.69	0	50	--	50
LEAD CONTENT	g/l	235	0	0	0.002	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: UK  
 Year: 2006  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Super Unleaded and LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	209	96.7	99.8	97.6	0.48	97	0	95	--
MOTOR OCTANE NO.	--	209	85.5	88.7	86.75	0.55	86	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	86	59	70.7	68.09	2.27	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	209	45	69.9	55.21	4.07	46	0	46.0	--
evaporated at 150	%(v/v)	209	84.7	98.8	91.45	1.79	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	194	1.5	17.9	11.3	2.25	0	18	--	18.0
aromatics	%(v/v)	194	22.9	35	31.79	2.17	0	35	--	35.0
benzene	%(v/v)	207	0.2	1	0.67	4.83	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	194	0	1.9	0.26	0.15	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	14	0	1.6	0.01	0	0	3	--	3
Ethanol	%(v/v)	14	0	5	0.38	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	14	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	14	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	14	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	80	0	9.6	1.34	1.07	0	15	--	15
Other oxygenate	%(v/v)	52	0	1.3	0.02	0.02	0	10	--	10
SULPHUR CONTENT	mg/kg	204	5	50.1	31.68	9.41	0	50	--	50
LEAD CONTENT	g/l	18	0	0	0	0	0	0.005	--	0.005

Notes:

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## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Austria  
**Year:** 2006  
**Period:** Summer  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	51	58.6	53.25	1.886282382	51	0	51	--
DENSITY AT 15 C	kg/m3	50	829	841	836.04	2.695120307	820	845	--	845
DISTILLATION - 95 oC POIN	oC	50	336.3	358.7	353.256	4.00266034	0	360	--	360
PAHs	%(m/m)	50	2.6	5.4	3.608	0.819616635	0	11	--	11
SULPHUR CONTENT	mg/kg	50	4.544762282	25.6662232	8.913206274	3.773708093	0	50	--	50

**Notes:** All parameters were tested. Empty cells represent that the substance was not detectable

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Austria  
**Year:** 2006  
**Period:** Winter  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	50.9	58.3	52.946	1.595044622	51	0	51	--
DENSITY AT 15 C	kg/m3	50	825	840	835.5	2.581330143	820	845	--	845
DISTILLATION - 95 oC POIN	oC	50	328.3	354.8	347.092	3.771203456	0	360	--	360
PAHs	%(m/m)	50	2.1	5.6	2.974124481	0.751585483	0	11	--	11
SULPHUR CONTENT	mg/kg	50	6.43	22.48435949	10.185489	3.821810425	0	50	--	50

**Notes:** All parameters were tested. Empty cells represent that the substance was not detectable



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Austria  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	50.9	58.6	53.1				51	--
DENSITY AT 15 C	kg/m3	100	825	841	835.8				--	845
DISTILLATION - 95 oC POIN	oC	100	328.3	358.7	350.2				--	360
PAHs	%(m/m)	100	2.1	5.6	3.3				--	11
SULPHUR CONTENT	mg/kg	100	4.544762282	25.6662232	9.5				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Belgium  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel 10S

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	34	47.6	53.5	51.4	1.33	46	0	51	--
DENSITY AT 15 C	kg/m3	34	825.4	839.9	833.4	3.94	820	845	--	845
DISTILLATION - 95 oC POIN	oC	34	337.6	350.7	344.1	3	0	360	--	360
PAHs	%(m/m)	34	1.4	3.2	2.2	0.46	0	11	--	11
SULPHUR CONTENT	mg/kg	34	5.2	16.9	8.2	2.06	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Belgium  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel 50S

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	5242	23.6	66.8	52.1	1.95	46	0	51	--
DENSITY AT 15 C	kg/m3	5242	809.2	857.8	834.5	3.75	820	845	--	845
DISTILLATION - 95 oC POIN	oC	5242	236.8	366.9	347.3	9.18	0	360	--	360
PAHs	%(m/m)	5242	0.05	24.1	2.7	1.05	0	11	--	11
SULPHUR CONTENT	mg/kg	5242	4.4	121.9	25.7	12.27	0	50	--	50

**Notes:** Cetane index shown was calculated, not measured

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Bulgaria  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	0	0	0	0	0	0	0	51	--
DENSITY AT 15 C	kg/m3	16	813	845.5	833.58	7.45	820	845	--	845
DISTILLATION - 95 oC POIN	oC	16	334.5	362	349.38	7.45	0	360	--	360
PAHs	%(m/m)	0	0	0	0	0	0	0	--	11
SULPHUR CONTENT	mg/kg	16	91	1504	468.38	409.48	0	350	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Cyprus  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	44	53.8	57.1	55.8	0.8	51	0	51	--
DENSITY AT 15 C	kg/m3	43	828.7	841.8	835.5	0.0043	820	845	--	845
DISTILLATION - 95 oC POIN	oC	43	349.4	363	356.7	2.7	0	360	--	360
PAHs	%(m/m)	41	0.1	2.8	1.2	0.7	0	11	--	11
SULPHUR CONTENT	mg/kg	44	9.5	49.8	23.8	10.1	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Czech Republic  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Motorová nafta

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	462	50.7	77	64.1	7	0	0	51	--
DENSITY AT 15 C	kg/m3	462	828.2	844.3	837.5	3	0	0	--	845
DISTILLATION - 95 oC POIN	oC	462	335.2	365	350.4	6.5	0	0	--	360
PAHs	%(m/m)	462	1.6	10.6	3.7	1.6	0	0	--	11
SULPHUR CONTENT	mg/kg	462	0	48.8	16.3	10.3	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Czech Republic  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Motorová nafta

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	602	50.5	59.1	53.2	0.9	0	0	51	--
DENSITY AT 15 C	kg/m3	602	821.8	847.6	835	3.4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	602	318	400	341.3	8.9	0	0	--	360
PAHs	%(m/m)	602	0.9	8.1	3.4	1.5	0	0	--	11
SULPHUR CONTENT	mg/kg	602	0	1517	23.1	79.8	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Czech Republic  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Motorová nafta

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	1064	50.5	59.1	53.2	1	0	0	51	--
DENSITY AT 15 C	kg/m3	1064	821.8	847.6	836.1	3.4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	1064	318	400	345.3	9.1	0	0	--	360
PAHs	%(m/m)	1064	0.9	10.6	3.5	1.6	0	0	--	11
SULPHUR CONTENT	mg/kg	1064	0	1517	20.2	60.9	0	0	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Denmark  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Sulphur-free diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	50.9	57.1	53.03	1.759216333	0	0	51	--
DENSITY AT 15 C	kg/m3	20	830.4	844.6	841.4	3.280725209	0	0	--	845
DISTILLATION - 95 oC POIN	oC	20	342.2	360.8	354.08	5.618259704	0	0	--	360
PAHs	%(m/m)	20	1.8	4.3	2.895	0.639469352	0	0	--	11
SULPHUR CONTENT	mg/kg	20	4	11	7.46	1.785143367	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	47.1	53.6	51.4	1.1	51	0	51	--
DENSITY AT 15 C	kg/m3	50	824.3	843	840	3.4	820	845	--	845
DISTILLATION - 95 oC POIN	oC	50	320.5	353.5	334.4	8	0	360	--	360
PAHs	%(m/m)	50	0.7	4.5	2.48	0.75	0	11	--	11
SULPHUR CONTENT	mg/kg	50	3.9	35.3	11.35	7.543208866	0	50	--	50

**Notes:** (5) Diesel fuel in summer period (01.May.-30.Sept.) must comply with Mark C specifications

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Estonia  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	47.1	53.6	51.3	0.97	0	0	51	--
DENSITY AT 15 C	kg/m3	100	821.4	843	835.6	6	0	845	--	845
DISTILLATION - 95 oC POIN	oC	100	290.3	353.5	324.1	15.9	0	360	--	360
PAHs	%(m/m)	100	0.7	4.5	2.49	0.72	0	11	--	11
SULPHUR CONTENT	mg/kg	100	3.3	35.3	11.385	6.589208981	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel - Winter

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	50	52.9	51.2	0.8	49	0	51	--
DENSITY AT 15 C	kg/m3	50	821.4	838	831.1	4.6	800	845	--	845
DISTILLATION - 95 oC POIN	oC	50	290.3	348.7	313.4	14.9	0	360	--	360
PAHs	%(m/m)	50	1.2	3.6	2.5	0.7	0	11	--	11
SULPHUR CONTENT	mg/kg	50	3.3	33	11.4	5.610882284	0	50	--	50

**Notes:** (5) Diesel fuel in winter period (01.Dec.-29.Feb.) must comply with Class 1 specifications

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	18	46.7	56.5	53.7	2.8	0	0	51	--
DENSITY AT 15 C	kg/m3	51	830	840	839	3	0	0	--	845
DISTILLATION - 95 oC POIN	oC	51	308.8	356.8	347.1	9.4	0	0	--	360
PAHs	%(m/m)	51	0.2	4.1	1.5	1.1	0	0	--	11
SULPHUR CONTENT	mg/kg	51	1.9	11.2	5.9	1.9	0	0	--	50

**Notes:** FN7: Two cetane numbers 46,7 and 47,0 are below the minimum tolerance limit 48,5. Samples for cetane analysis were taken from refineries/terminals. According to the owner of products the fuel concerned has been mixed with other diesel oils in order to raise the cetane number and to meet the quality criteria in the final product. This procedure is in line with Article 87 of the Environmental Protection Law (2000/86). FN8: The R value of 95 % -distillation point value has been changed due to the results of Round Robin proficiency test done in 2005. In the 2004 R value was 10,4. FN9: The highest sulphur content 11,2 mg/kg is above the limiting value 10,0 mg/kg but within the maximum tolerance limit 11,3

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	30	50.7	57.2	53.6	1.3	0	0	51	--
DENSITY AT 15 C	kg/m3	59	820	840	831	5	0	0	--	845
DISTILLATION - 95 oC POIN	oC	59	295.1	357.1	323.3	16.4	0	0	--	360
PAHs	%(m/m)	59	0.5	3.9	1.6	0.5	0	0	--	11
SULPHUR CONTENT	mg/kg	59	3.7	9.9	7.8	1.5	0	0	--	50

**Notes:** FN9: The lowest cetane number 50,7 is below the minimum limit 51,0, but within the minimum tolerance limit 48,5. FN8: The R value of 95 % - distillation point value has been changed due to the results of Round Robin proficiency test done in 2005. In the 2004 R value was 10,4.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	48	46.7	57.2	53.7	2	0	0	51	--
DENSITY AT 15 C	kg/m3	110	820	840	835	6	0	0	--	845
DISTILLATION - 95 oC POIN	oC	110	295.1	357.1	334.3	18	0	0	--	360
PAHs	%(m/m)	110	0.2	4.1	1.6	0.8	0	0	--	11
SULPHUR CONTENT	mg/kg	110	1.9	11.2	6.9	1.9	0	0	--	50

**Notes:** FN7: Two cetane numbers 46,7 and 47,0 are below the minimum tolerance limit 48,5. Samples for cetane analysis were taken from refineries/terminals. According to the owner of products the fuel concerned has been mixed with other diesel oils in order to raise the cetane number and to meet the quality criteria in the final product. This procedure is in line with Article 87 of the Environmental Protection Law (2000/86). FN8: The R value of 95 % -distillation point value has been changed due to the results of Round Robin proficiency test done in 2005. In the 2004 R value was 10,4. FN9: The highest sulphur content 11,2 mg/kg is above the limiting value 10,0 mg/kg but within the maximum tolerance limit 11,3 mg/kg.

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** France  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Gazole 10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	7	49.6	54.4	52.5	1.7	0	0	51	--
DENSITY AT 15 C	kg/m3	7	821.6	834.2	826.6	5.2	820	845	--	845
DISTILLATION - 95 oC POIN	oC	7	331.4	347.1	340.9	5	0	0	--	360
PAHs	%(m/m)	7	1.9	3.1	2.6	0.4	0	0	--	11
SULPHUR CONTENT	mg/kg	7	6	9.6	8	1.3	0	0	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: France  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gazole 50 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	115	49.8	59	52.7	1.9	51	0	51	--
DENSITY AT 15 C	kg/m3	115	824.4	842.7	827.1	4.4	820	845	--	845
DISTILLATION - 95 oC POIN	oC	115	327.3	358.7	344.6	4.5	0	360	--	360
PAHs	%(m/m)	115	1.8	5.8	3.8	0.7	0	11	--	11
SULPHUR CONTENT	mg/kg	115	30.1	55.8	38.2	3.7	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Germany  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Dieselmkraftstoff

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	243	49.5	59	51.63633745	1.2	0	0	51	--
DENSITY AT 15 C	kg/m3	243	821.4	843.6	817.9648971	4.6	0	0	--	845
DISTILLATION - 95 oC POIN	oC	243	250.4	363.2	347.8821193	11.5	0	0	--	360
PAHs	%(m/m)	186	0.4	0.4	3.114946237	1.1	0	0	--	11
SULPHUR CONTENT	mg/kg	243	3	39	7.685349794	4.7	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Automotive Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	65	51.8	61.8	56.10645161	1.841139256	0	0	51	--
DENSITY AT 15 C	kg/m3	65	824.4	843.4	831.5215385	4.979598764	0	0	--	845
DISTILLATION - 95 oC POIN	oC	65	307.9	360	354.8769231	6.958330646	0	0	--	360
PAHs	%(m/m)	65	1.3	4.3	2.324782609	0.51810226	0	0	--	11
SULPHUR CONTENT	mg/kg	65	12	50	34.29230769	9.894321409	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Automotive Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	55	52.9	60.7	55.63090909	1.375294275	0	0	51	--
DENSITY AT 15 C	kg/m3	55	824.9	844.9	834.2345455	6.325615712	0	0	--	845
DISTILLATION - 95 oC POIN	oC	55	344.4	360	357.6054545	2.842365876	0	0	--	360
PAHs	%(m/m)	55	1.8	3.4	2.435294118	0.349789853	0	0	--	11
SULPHUR CONTENT	mg/kg	55	25	50	38.68181818	5.89519864	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: DIESEL

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	120	51.8	61.8	55.88290598	1.841139256	0	0	51	--
DENSITY AT 15 C	kg/m3	120	824.4	844.9	832.765	5.773725622	0	0	--	845
DISTILLATION - 95 oC POIN	oC	120	307.9	360	356.1275	5.618725632	0	0	--	360
PAHs	%(m/m)	120	1.3	4.3	2.37175	0.45501085	0	0	--	11
SULPHUR CONTENT	mg/kg	120	12	50	36.30416667	8.558325799	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	60	51.9	58.6	54.51666667	1.548738689	0	0	51	--
DENSITY AT 15 C	kg/m3	60	829.7	841.3	837.1033333	3.308869693	0	0	--	845
DISTILLATION - 95 oC POIN	oC	60	320.1	359.7	352.3883333	5.38721808	0	0	--	360
PAHs	%(m/m)	60	2.1	6.3	3.41	0.869609302	0	0	--	11
SULPHUR CONTENT	mg/kg	60	3.7	23.2	7.568333333	2.724028983	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	60	51.5	58	53.54	1.150869973	0	0	51	--
DENSITY AT 15 C	kg/m3	60	826.2	841.6	837.1733333	3.3034512	0	0	--	845
DISTILLATION - 95 oC POIN	oC	60	315.3	358.3	349.2866667	7.696269953	0	0	--	360
PAHs	%(m/m)	60	1.2	5.5	2.805	0.848265429	0	0	--	11
SULPHUR CONTENT	mg/kg	60	5.2	10	7.686666667	1.097097094	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	120	51.5	58.6	54				51	--
DENSITY AT 15 C	kg/m3	120	826.2	841.6	837.1				--	845
DISTILLATION - 95 oC POIN	oC	120	315.3	359.7	350.8				--	360
PAHs	%(m/m)	120	1.2	6.3	3.1				--	11
SULPHUR CONTENT	mg/kg	120	3.7	23.2	7.6				--	50

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	28	51.1	54.9	52.3	1.3	0	0	51	--
DENSITY AT 15 C	kg/m3	37	829.7	843.3	838.1	2.9	0	0	--	845
DISTILLATION - 95 oC POIN	oC	37	327	362	351.7	8.3	0	0	--	360
PAHs	%(m/m)	37	1.78	6.3	3.7	1	0	0	--	11
SULPHUR CONTENT	mg/kg	37	0	38	13.2	9.1	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	33	51.5	58.3	54.2	1.7	0	0	51	--
DENSITY AT 15 C	kg/m3	58	826	844.3	836	3.9	0	0	--	845
DISTILLATION - 95 oC POIN	oC	58	340	363	352.1	5.3	0	0	--	360
PAHs	%(m/m)	58	1.2	5.86	2.5	1	0	0	--	11
SULPHUR CONTENT	mg/kg	58	0	45	14.6	12.4	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	61	51.1	58.3	53.3	1.8	0	0	51	--
DENSITY AT 15 C	kg/m3	95	826	844.3	836.8	3.7	0	0	--	845
DISTILLATION - 95 oC POIN	oC	95	327	363	352	6.6	0	0	--	360
PAHs	%(m/m)	95	1.2	6.3	3	1.2	0	0	--	11
SULPHUR CONTENT	mg/kg	95	0	45	14.1	11.2	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2006  
**Period:** Summer  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Diesel fuel ( $\leq 10$  ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	13	50.3	58.6	53.8	2.4	51	0	51	--
DENSITY AT 15 C	kg/m3	73	824	841.1	832.7	5.2	0	845	--	845
DISTILLATION - 95 oC POIN	oC	13	341.2	361.6	352.5	6.3	0	360	--	360
PAHs	%(m/m)	13	2.5	6.2	4.3	1.1	0	11	--	11
SULPHUR CONTENT	mg/kg	72	2.6	9.7	6.5	1.9	0	0	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2006  
**Period:** Winter  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Diesel fuel ( $\leq$  10 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	24	50	57.3	54.2	2.5	51	0	51	--
DENSITY AT 15 C	kg/m3	24	824.3	842	833.4	4.7	0	845	--	845
DISTILLATION - 95 oC POIN	oC	24	335.1	363.8	355	6	0	360	--	360
PAHs	%(m/m)	8	3.2	4.8	3.9	0.7	0	11	--	11
SULPHUR CONTENT	mg/kg	24	1	11.2	4.1	3.2	0	0	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel fuel ( $\leq 10$  ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	37	50	58.6	54.1				51	--
DENSITY AT 15 C	kg/m3	97	824	842	832.9				--	845
DISTILLATION - 95 oC POIN	oC	37	335.1	363.8	354.1				--	360
PAHs	%(m/m)	21	2.5	6.2	4.1				--	11
SULPHUR CONTENT	mg/kg	96	1	11.2	5.9				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2006  
**Period:** Summer  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel fuel ( $\leq$  50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	174	49.9	58.6	52.6	1.4	51	0	51	--
DENSITY AT 15 C	kg/m3	204	820.2	843.6	833.1	5.2	0	845	--	845
DISTILLATION - 95 oC POIN	oC	194	336	365	354.8	4.9	0	360	--	360
PAHs	%(m/m)	34	3	6.5	4.5	1.1	0	11	--	11
SULPHUR CONTENT	mg/kg	204	5	52.9	35.2	9.6	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2006  
**Period:** Winter  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel fuel ( $\leq 50$  ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	79	49.5	58	53.3	1.8	51	0	51	--
DENSITY AT 15 C	kg/m3	79	822	842.7	833.2	4.3	0	845	--	845
DISTILLATION - 95 oC POIN	oC	79	330.2	365.5	355	5.1	0	360	--	360
PAHs	%(m/m)	11	3	5.7	4.5	1	0	11	--	11
SULPHUR CONTENT	mg/kg	79	5	51.6	30.6	9.7	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).



## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel fuel ( $\leq$  50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	253	49.5	58.6	52.8				51	--
DENSITY AT 15 C	kg/m3	283	820.2	843.6	833.1				--	845
DISTILLATION - 95 oC POIN	oC	273	330.2	365.5	354.9				--	360
PAHs	%(m/m)	45	3	6.5	4.5				--	11
SULPHUR CONTENT	mg/kg	283	5	52.9	33.9				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	652	49.9	53.9	51.8	1	51	0	51	--
DENSITY AT 15 C	kg/m3	652	821.2	844.3	833.2	7.1	0	845	--	845
DISTILLATION - 95 oC POIN	oC	310	290.7	357.5	338.1	27.6	0	360	--	360
PAHs	%(m/m)	652	1.6	6.8	3.6	1.6	0	11	--	11
SULPHUR CONTENT	mg/kg	962	0	50.2	18.77380457	11.60794588	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	544	47.9	53.7	51.8	1.1	51	0	51	--
DENSITY AT 15 C	kg/m3	544	815.1	844.3	833.6	6.2	0	845	--	845
DISTILLATION - 95 oC POIN	oC	544	293.5	357.2	339.5	19	0	380	--	360
PAHs	%(m/m)	544	0.9	6.8	3.6	1.3	0	11	--	11
SULPHUR CONTENT	mg/kg	1088	0	83.5	13.4	12.58650071	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	1196	47.9	53.9	51.8				51	--
DENSITY AT 15 C	kg/m3	1196	815.1	844.3	833.4				--	845
DISTILLATION - 95 oC POIN	oC	854	290.7	357.5	339				--	360
PAHs	%(m/m)	1196	0.9	6.8	3.6				--	11
SULPHUR CONTENT	mg/kg	2050	0	83.5	15.9				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel (<10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	10	49	50.2	49.21	0.395671	51	0	51	--
DENSITY AT 15 C	kg/m3	14	837.5	841.2	839.4714	0.931854	0	854	--	845
DISTILLATION - 95 oC POIN	oC	14	331	340	335.8571	3.759238	0	360	--	360
PAHs	%(m/m)	14	4.2	5.4	4.664286	0.371291	0	11	--	11
SULPHUR CONTENT	mg/kg	14	2.5	9.75	6.792143	2.715953	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	17	51.5	53.9	52.51176	0.677202	51	0	51	--
DENSITY AT 15 C	kg/m3	52	836	844.7	842.8115	1.892157	0	845	--	845
DISTILLATION - 95 oC POIN	oC	52	333	356	349.6538	3.905173	0	360	--	360
PAHs	%(m/m)	52	2	8	4.819231	1.226351	0	11	--	11
SULPHUR CONTENT	mg/kg	52	22.6	46.7	34.62885	5.927051	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	14	48	52.5	50.42143	1.081437	51	0	51	--
DENSITY AT 15 C	kg/m3	37	829.9	841.7	833.8027	2.571153	0	845	--	845
DISTILLATION - 95 oC POIN	oC	37	296	340	307.8649	8.916782	0	360	--	360
PAHs	%(m/m)	37	3	5	3.862162	0.70212	0	11	--	11
SULPHUR CONTENT	mg/kg	37	11.2	22.7	17.34054	2.971855	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	31	48	53.9	51.6				51	--
DENSITY AT 15 C	kg/m3	89	829.9	844.7	839.1				--	845
DISTILLATION - 95 oC POIN	oC	89	296	356	332.3				--	360
PAHs	%(m/m)	89	2	8	4.4				--	11
SULPHUR CONTENT	mg/kg	89	11.2	46.7	27.4				--	50

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Luxembourg  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel < 50 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	3	49.2	51.3	50.3	1.053565375	0	0	51	--
DENSITY AT 15 C	kg/m3	4	831	841.7	835.9	4.866894972	0	0	--	845
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	0	--	360
PAHs	%(m/m)	0	0	0	0	0	0	0	--	11
SULPHUR CONTENT	mg/kg	3	7.2	11.6	9.266666667	2.212088003	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta

Year: 2006

Period:

FuelID:

National Fuel Grade:

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	0	0	0	0	0	0	0	51	--
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	0	--	845
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	0	--	360
PAHs	%(m/m)	0	0	0	0	0	0	0	--	11
SULPHUR CONTENT	mg/kg	0	0	0	0	0	0	0	--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Netherlands  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	51	58.8	55.56	1.52	0	0	51	--
DENSITY AT 15 C	kg/m3	100	822.7	841.5	833.08	0.42	0	0	--	845
DISTILLATION - 95 oC POIN	oC	100	336.3	358.6	349.16	3.22	0	0	--	360
PAHs	%(m/m)	100	2.4	7	4.55	0.54	0	0	--	11
SULPHUR CONTENT	mg/kg	100	5	55	10.72	10	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Poland  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	71	49.7	55.7	52.32	1.08	0	0	51	--
DENSITY AT 15 C	kg/m3	114	829.4	842.2	834.05	2.4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	114	302	362.9	346.28	9.33	0	0	--	360
PAHs	%(m/m)	71	1.6	5.4	2.34	0.61	0	0	--	11
SULPHUR CONTENT	mg/kg	114	6.1	368	16.09	34.47	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Poland  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	48	50.4	56.4	52.52	1.4	0	0	51	--
DENSITY AT 15 C	kg/m3	106	827.8	841.9	834.06	2.65	0	0	--	845
DISTILLATION - 95 oC POIN	oC	104	326.4	362.5	342.84	7.71	0	0	--	360
PAHs	%(m/m)	48	0.4	5.7	2.54	0.84	0	0	--	11
SULPHUR CONTENT	mg/kg	105	6.5	74	12.6	9.54	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Poland  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	119	49.7	56.4	52.4	1.22	0	0	51	--
DENSITY AT 15 C	kg/m3	220	827.8	842.2	834.05	2.52	0	0	--	845
DISTILLATION - 95 oC POIN	oC	218	302	362.9	344.64	8.75	0	0	--	360
PAHs	%(m/m)	119	0.4	5.7	2.42	0.72	0	0	--	11
SULPHUR CONTENT	mg/kg	219	6.1	368	14.42	25.74	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Portugal  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	21	51.2	54.2	52.4	0.888819442	51	0	51	--
DENSITY AT 15 C	kg/m3	22	826.9	844.4	835.8045455	6.005907986	820	845	--	845
DISTILLATION - 95 oC POIN	oC	22	350.6	365.1	358.0181818	3.339038408	0	360	--	360
PAHs	%(m/m)	12	3	5.7	4.05	0.712868724	0	11	--	11
SULPHUR CONTENT	mg/kg	22	12	39.8	26.75454545	7.862129075	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Portugal  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	51	52.8	51.665	0.676893057	51	0	51	--
DENSITY AT 15 C	kg/m3	20	820	845.2	836.64	8.559537617	820	845	--	845
DISTILLATION - 95 oC POIN	oC	20	349	361.1	358.44	2.761464143	0	360	--	360
PAHs	%(m/m)	12	3	4	3.7	0.430644338	0	11	--	11
SULPHUR CONTENT	mg/kg	20	17.7	41.1	28.85	7.027801932	0	50	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Portugal  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	41	51	54.2	52.04146341	0.866595526	51	0	51	--
DENSITY AT 15 C	kg/m3	42	820	845.2	836.202381	7.253005705	820	845	--	845
DISTILLATION - 95 oC POIN	oC	42	349	365.1	358.2190476	3.047929173	0	360	--	360
PAHs	%(m/m)	24	3	5.7	3.875	0.603071847	0	11	--	11
SULPHUR CONTENT	mg/kg	42	12	41.1	27.75238095	7.46125727	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Romania  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel <10ppm sulphur (Euro 5)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	3	51	51	51	0	0	0	51	--
DENSITY AT 15 C	kg/m3	3	838.7	843.5	841.3	1.98	0	0	--	845
DISTILLATION - 95 oC POIN	oC	3	335	354	343.3	7.93	0	0	--	360
PAHs	%(m/m)	3	3.6	9.6	7.2	2.58	0	0	--	11
SULPHUR CONTENT	mg/kg	3	4	9	7	2.1	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Romania

Year: 2006

Period: Full-year

FuelID: Diesel fuel

National Fuel Grade: Diesel <150ppm sulphur (Euro 3)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	56	48	55.9	51.4	1.14	0	0	51	--
DENSITY AT 15 C	kg/m3	56	822.3	852	841.4	4.13	0	0	--	845
DISTILLATION - 95 oC POIN	oC	56	278	377	348.2	12.18	0	0	--	360
PAHs	%(m/m)	56	1.7	9.1	6.9	1.41	0	0	--	11
SULPHUR CONTENT	mg/kg	56	26	1300	205	204	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Romania  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel <50ppm sulphur (Euro 4)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	42	51	53.6	51.5	0.74	0	0	51	--
DENSITY AT 15 C	kg/m3	42	822.3	846.4	840.5	3.67	0	0	--	845
DISTILLATION - 95 oC POIN	oC	42	307	358	338.6	11.55	0	0	--	360
PAHs	%(m/m)	42	2	9.1	5.7	2.05	0	0	--	11
SULPHUR CONTENT	mg/kg	42	8	620	62	109.8	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Romania  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel  
 National Fuel Grade: Regular (Euro 3)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	40	49.2	53.3	51.3	0.79	0	0	51	--
DENSITY AT 15 C	kg/m3	40	832.6	844.5	841.3	2.22	0	0	--	845
DISTILLATION - 95 oC POIN	oC	40	278	377	348.7	13.12	0	0	--	360
PAHs	%(m/m)	40	2.4	8.5	6.9	1.16	0	0	--	11
SULPHUR CONTENT	mg/kg	40	34	836	224	142.2	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Romania  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: Regular (Euro 3)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	15	48	55.9	51.7	1.75	0	0	51	--
DENSITY AT 15 C	kg/m3	15	822.3	852	841.1	6.82	0	0	--	845
DISTILLATION - 95 oC POIN	oC	15	331.1	357	344.9	6.12	0	0	--	360
PAHs	%(m/m)	15	1.7	9.1	6.9	1.87	0	0	--	11
SULPHUR CONTENT	mg/kg	15	26	294	81	71.5	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Romania  
**Year:** 2006  
**Period:** Summer  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Regular (Euro 4)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	10	51	52.9	51.5	0.67	0	0	51	--
DENSITY AT 15 C	kg/m3	10	835.7	845	840.9	2.72	0	0	--	845
DISTILLATION - 95 oC POIN	oC	10	319	351	341.2	9.78	0	0	--	360
PAHs	%(m/m)	10	2	8.3	4.5	2.29	0	0	--	11
SULPHUR CONTENT	mg/kg	20	21	48	19.5	5.868986284	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Romania  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Regular (Euro 4)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	32	51	53.6	51.4	0.76	0	0	51	--
DENSITY AT 15 C	kg/m3	32	822.3	849	840.7	4.13	0	0	--	845
DISTILLATION - 95 oC POIN	oC	32	307	373	338.8	13.21	0	0	--	360
PAHs	%(m/m)	32	2.1	9.1	6.1	1.79	0	0	--	11
SULPHUR CONTENT	mg/kg	32	8	1300	106	244.3	0	0	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	52	49.8	59	52.75769231	1.455935617	51	0	51	--
DENSITY AT 15 C	kg/m3	52	816.8	843.3	836.5846154	4.339150245	0	845	--	845
DISTILLATION - 95 oC POIN	oC	52	321.5	366.7	353.2923077	6.912359225	0	360	--	360
PAHs	%(m/m)	52	1.3	5.4	2.976923077	0.792662355	0	11	--	11
SULPHUR CONTENT	mg/kg	52	5.5	31.6	14.06730769	4.149345086	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	50.4	55.8	52.216	0.995461702	51	0	51	--
DENSITY AT 15 C	kg/m3	50	825.7	839.8	833.336	3.683029188	0	845	--	845
DISTILLATION - 95 oC POIN	oC	50	330.9	357.2	343.63	4.296894227	0	360	--	360
PAHs	%(m/m)	50	0.7	3.8	2.26	0.826801064	0	11	--	11
SULPHUR CONTENT	mg/kg	50	6.2	66.4	15.552	9.391646466	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	102	49.8	59	52.49215686	1.28052427	51	0	51	--
DENSITY AT 15 C	kg/m3	102	816.8	843.3	834.9921569	4.34573684	0	845	--	845
DISTILLATION - 95 oC POIN	oC	102	321.5	366.7	348.5558824	7.532629329	0	360	--	360
PAHs	%(m/m)	102	0.7	5.4	2.625490196	0.885358715	0	11	--	11
SULPHUR CONTENT	mg/kg	102	5.5	66.4	14.79509804	7.337427217	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovenia  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	68	50.5	56.1	53.1	1.02	51	0	51	--
DENSITY AT 15 C	kg/m3	68	825.6	836.9	831.8	3.2	0	845	--	845
DISTILLATION - 95 oC POIN	oC	68	333.5	357.6	345.4	5.56	0	360	--	360
PAHs	%(m/m)	68	1.3	4.4	2.8	0.8	0	11	--	11
SULPHUR CONTENT	mg/kg	68	6.1	54.1	37.9	10.68	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovenia  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	83	49.4	55	52.5	1.05	51	0	51	--
DENSITY AT 15 C	kg/m3	83	821.3	840.3	833.5	3.79	0	845	--	845
DISTILLATION - 95 oC POIN	oC	83	326.8	361.6	346.7	4.75	0	360	--	360
PAHs	%(m/m)	83	0	7.3	3	1.48	0	11	--	11
SULPHUR CONTENT	mg/kg	83	5.4	1490	47.4	158.52	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovenia  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	151	49.4	56.1	52.8				51	--
DENSITY AT 15 C	kg/m3	151	821.3	840.3	832.7				--	845
DISTILLATION - 95 oC POIN	oC	151	326.8	361.6	346.1				--	360
PAHs	%(m/m)	151	0	7.3	2.9				--	11
SULPHUR CONTENT	mg/kg	151	5.4	1490	43.1				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo de automoción

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	88	51	57.5	52.7	1.5	51	0	51	--
DENSITY AT 15 C	kg/m3	88	823.5	844.4	837.2	4.8	820	845	--	845
DISTILLATION - 95 oC POIN	oC	88	347.4	360	356.7	2.8	0	360	--	360
PAHs	%(m/m)	88	2.5	7.1	4.3	1.3	0	11	--	11
SULPHUR CONTENT	mg/kg	176	10	50	17.4	6.081118318	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo de automoción

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	155	51	57	52.5	1.3	51	0	51	--
DENSITY AT 15 C	kg/m3	155	822.1	845	838.1	5	820	845	--	845
DISTILLATION - 95 oC POIN	oC	155	339.3	360	355.8	3.5	0	360	--	360
PAHs	%(m/m)	155	2.2	6.7	4.2	1	0	11	--	11
SULPHUR CONTENT	mg/kg	155	3	50	36.4	8.7	0	50	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo de automoción

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	243	51	57.5	52.6				51	--
DENSITY AT 15 C	kg/m3	243	822.1	845	837.8				--	845
DISTILLATION - 95 oC POIN	oC	243	339.3	360	356.1				--	360
PAHs	%(m/m)	243	2.2	7.1	4.2				--	11
SULPHUR CONTENT	mg/kg	331	3	50	26.3				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2006  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Gasóleo de automoción sin azufre

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	37	51	59.4	52.7	2.2	51	0	51	--
DENSITY AT 15 C	kg/m3	37	823.1	843.7	834.8	5.2	820	845	--	845
DISTILLATION - 95 oC POIN	oC	37	340	359.4	354.6	3.4	0	360	--	360
PAHs	%(m/m)	37	1.8	8	3.8	1.7	0	11	--	11
SULPHUR CONTENT	mg/kg	74	1.9	10	3.7	1.414213562	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2006  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Gasóleo de automoción sin azufre

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	53	51	61.4	52.9	2	51	0	51	--
DENSITY AT 15 C	kg/m3	53	822.1	843.7	834.2	6.2	820	845	--	845
DISTILLATION - 95 oC POIN	oC	53	324.5	360	354.3	4.4	0	360	--	360
PAHs	%(m/m)	53	1.6	5.9	3.6	1.3	0	11	--	11
SULPHUR CONTENT	mg/kg	106	2.3	10	3.55	1.272792206	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Spain  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Gasóleo de automoción sin azufre

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	74	51	59.4	52.7				51	--
DENSITY AT 15 C	kg/m3	74	823.1	843.7	834.8				--	845
DISTILLATION - 95 oC POIN	oC	74	340	359.4	354.6				--	360
PAHs	%(m/m)	74	1.8	8	3.8				--	11
SULPHUR CONTENT	mg/kg	180	1.9	10	3.6				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Sweden  
**Year:** 2006  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Class 1 diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	645	50	57.1	53.7	0	50	0	51	--
DENSITY AT 15 C	kg/m3	645	807.9	819.7	813.2	0	800	820	--	845
DISTILLATION - 95 oC POIN	oC	645	208.5	318	281	0	0	320	--	360
PAHs	%(m/m)	645	0.02	0.02	0.02	0	0	0	--	11
SULPHUR CONTENT	mg/kg	645	0	5	1.7	0	0	0	--	50

**Notes:** Same grade during the full year. PAH is defined as tri aromatics and heavier

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: UK  
 Year: 2006  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	1236	50.9	60	52.98	1.39	51	0	51	--
DENSITY AT 15 C	kg/m3	2161	824.4	845	834.9	2.73	0	845	--	845
DISTILLATION - 95 oC POIN	oC	2138	257	360	341.8	6.4	0	360	--	360
PAHs	%(m/m)	441	0.1	7.9	2.99	1.08	0	11	--	11
SULPHUR CONTENT	mg/kg	1666	2	50	19.33	6.12	0	50	--	50

Notes: 0

## **Appendix 4: Fuel Quality Monitoring Reporting Format from 2004**





# Common Format for the Submission of Summaries of National Fuel Quality Data for Petrol and Diesel from 2004

## 1. INTRODUCTION

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC<sup>24</sup>, as last amended by Directive 2003/17/EC<sup>25</sup>, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive.

By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report was to be made by 30 June 2002, in the format specified under Commission Decision 2002/159/EC<sup>26</sup>.

From 2004 Member States are required to report according to the requirements of the European Standard EN 14274: 2003<sup>27</sup>, unless they are using national fuel quality monitoring systems of equivalent confidence. In addition from 2005 Member States are required to phase in "sulphur free" petrol and diesel fuels on an appropriately balanced geographical basis.

This reporting format for 2004 reporting onwards contained herein is proposed to attempt to harmonise reporting submissions across the Member States whether they are using either the European Standard or their own national systems. This optional format essentially summarises information already required or requested under the Directive and European Standard. Text and fields in red are additional information requested beyond the mandatory requirements outlined in the Directive.

## 2. DETAILS OF THOSE COMPILING THE FUEL QUALITY MONITORING REPORT

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

<b>Reporting Year:</b>	
<b>Country:</b>	
<b>Date Report Completed:</b>	
<b>Organisation Responsible for Report:</b>	
<b>Address of Organisation:</b>	
<b>Person Responsible for Report:</b>	
<b>Telephone Number:</b>	
<b>Email:</b>	

## 3. DEFINITIONS AND EXPLANATION

<sup>24</sup> OJ L 350, 28.12.1998, p. 58.

<sup>25</sup> OJ L76/10, 22.3.2003, p. 10

<sup>26</sup> O.J. L 53 of 23.2.2002, p.30

<sup>27</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

*Parent fuel grade:* Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade:* Member States may, of course, define 'national' fuel grades, which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, <50 ppm sulphur petrol, zero sulphur diesel, <50 ppm sulphur diesel, etc.

*Zero sulphur or sulphur-free fuels* are petrol and diesel fuels that contain less than 10 mg/kg (ppm) of sulphur.

#### 4. DESCRIPTION OF FUEL QUALITY MONITORING SYSTEM

Member States should provide details on the operation of their national fuel quality monitoring systems.

Directive 98/70/EC requires the vapour pressure of petrol to be less than 60.0 kPa during the summer period, which spans 1 May until 30 September. However, for those Member States that experience 'arctic or severe weather conditions' the summer period covers the period 1 June to 31 August and the vapour pressure must not exceed 70 kPa. Member States are requested to define the Summer/Winter periods implemented in their territories and also applying to their fuel quality monitoring system reporting.

<b>Summer Period</b>		
	<i>Start</i>	
	<i>End</i>	
<b>Winter Period</b>		
	<i>Start</i>	
	<i>End</i>	

Member States should indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C and whether it is based on the large or small country framework. Alternatively, the Member State should indicate if they are using their own nationally defined system.

<b>Country Size (L = Large, S = Small):</b>	
---	--

<b>Fuel Quality Monitoring System model:</b>	<b>Yes/No</b>	<b>Minimum number of samples (Petrol, per grade; Diesel)</b>	
		<b>Small Country</b>	<b>Large Country</b>
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--

If Member States **are** using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in Annex I (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States **are not** using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries and distribution terminals):

- Organisations responsible for sampling, analysis and reporting;
- Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
- Frequency of sampling and selection of sampling points;
- Assessment that shows the monitoring system's equivalency to the CEN system.

<b>Description of National Fuel Quality Monitoring System (give once and up-date if necessary):</b>

## 5. TOTAL SALES OF PETROL & DIESEL

Member States are requested to complete the following table detailing the quantities of each type and grade of petrol and diesel fuel marketed in their territory.

Parent or National Fuel Grade	National Sales Total (Litres/Tonnes)	No. Samples Taken
Regular unleaded petrol (minimum RON=91) <sup>(1)</sup>		
Regular unleaded petrol (minimum RON=91 & <50 ppm sulphur)		
Regular unleaded petrol (minimum RON=91 & <10 ppm sulphur)		
Unleaded petrol (minimum RON=95) <sup>(1)</sup>		
Unleaded petrol (minimum RON=95 & <50 ppm sulphur) <sup>(2)</sup>		
Unleaded petrol (minimum RON=95 & <10 ppm sulphur) <sup>(3)</sup>		
Unleaded petrol (minimum 95=<RON<98)		
Unleaded petrol (minimum 95=<RON<98 & <50 ppm sulphur)		
Unleaded petrol (minimum 95=<RON<98 & <10 ppm sulphur)		
Unleaded petrol (minimum RON>=98)		
Unleaded petrol (minimum RON>=98 & <50 ppm sulphur)		
Unleaded petrol (minimum RON>=98 & <10 ppm sulphur)		
Diesel fuel <sup>(4)</sup>		
Diesel fuel (<50 ppm sulphur) <sup>(5)</sup>		
Diesel fuel (<10 ppm sulphur) <sup>(6)</sup>		

(1) as specified in Annex I of Directive 98/70/EC

(2) as specified in Annex III of Directive 98/70/EC

(3) as specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10ppm

(4) as specified in Annex II of Directive 98/70/EC

(5) as specified in Annex IV of Directive 98/70/EC

(6) as specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10ppm

## 6. GEOGRAPHICAL AVAILABILITY OF SULPHUR-FREE FUELS

Member States are requested to complete the following tables with basic information on the geographical availability of sulphur free petrol and diesel sold in their territories.

	<b>(Litres/Tonnes)</b>	<b>% Total Petrol/Diesel Sales</b>
<b>Total National sales &lt;10 ppm sulphur petrol</b>		
<b>Total National sales &lt;10 ppm sulphur diesel</b>		

<b>Details of petrol RON grades available with &lt;10 ppm sulphur:</b>
<b>Are &lt;10 ppm sulphur fuels (petrol and/or diesel) labelled differently from regular grades (i.e. can they be easily distinguished from regular/higher sulphur fuels by the consumer)?</b>

Where Member States choose to apply the measures in their national territories, they are also requested to complete, as far as possible, the following tables with detailed information (Options A to D) on the geographical availability of sulphur free petrol and diesel in their territories, as outlined in the Commission Guidance note<sup>28</sup>. Member States should also take into account any specific provisions made for special cases in the Commission Guidance.

Where the more detailed information is not available, or additional notes/clarifications are needed or other guidance than that given by the Commission is used, the Member States are requested to provide a description on the extent to which sulphur free fuels are marketed in their territory (i.e. geographical availability). This free form text box should also be used to provide any additional information such as the special cases outlined in the Commission Guidance note.

<b>Description of the geographical availability of sulphur free fuels or additional notes:</b>

Option (A): Proportion of refuelling stations with sulphur free grades available by region

See Annex II for reporting table format.

<sup>28</sup> The more detailed reporting on geographical availability is not needed until the 2005 monitoring reports, but would be useful if Member States were also able to provide it from 2004.

Option (B): Average distance between refuelling stations with sulphur free grades available

	No. Refuelling Stations		Distance between refuelling stations (km)			
	<10 ppm Number	All Number	With <10 ppm grades available			All Mean
			Min.	Max.	Mean	
<b>Petrol</b>						
<b>Diesel</b>						

Option (C): Availability of sulphur free fuels at large refuelling stations

	Petrol	Diesel
National criteria for definition of "large refuelling stations" in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

## 7. SUMMARY REPORTING FORMAT FOR PETROL & DIESEL

Member States are requested to provide a brief general summary of the results of the year's monitoring, including information on any:

- other parameters measured;
- exclusions;
- further details on breaches of parameter tolerance limits (i.e. number of samples, values);
- enforcement actions taken as a result of breaches of the limit values/tolerance limits; and
- additional information deemed relevant.

In particular, Member States should provide additional explanatory information on reasoning for exceptional cases where exclusions are made, such as:

- fuel grades marketed in very small quantities;
- mandatory fuel parameters that are not measured;
- geographical areas that are left outside the monitoring programme;
- exceptionally high or low values of analytical results (i.e. outliers).

<b>General Summary of Analysis and Additional Information:</b>

#### 8. REPORTING FORMAT FOR PETROL

Member States should also submit a detailed summary report for petrol quality monitoring data (for both nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table format is attached as Appendix III for 2004 and Appendix V for 2005 onwards. Test methods shall be those included in EN 228: 1999 or later versions as appropriate.

#### 9. REPORTING FORMAT FOR DIESEL

Member States should also submit a detailed summary report for diesel quality monitoring data (for both nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table format is attached as Appendix IV for 2004 and Appendix VI for 2005 onwards. Test methods shall be those included in EN 590: 1999 or later versions as appropriate.

#### 10. SUBMISSION OF FUEL QUALITY MONITORING REPORT

The fuel quality monitoring report should be submitted formally to the following person:  
The Secretary General  
The European Commission  
Rue de la Loi/Wetstraat 200  
B-1049 Brussels.

In addition, the report should be submitted in electronic form to the following email address:  
env-report-98-70@cec.eu.int

**ANNEX I: Fuel Quality Monitoring System Regional Sampling of Petrol and Diesel <sup>(1)</sup>**

Country:	
Fuel type (petrol or diesel):	
Statistical Model (A, B or C) <sup>(2)</sup>	
Period and Year	

	Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability Factor <sup>(3)</sup>	Proportion of total samples	Min. number of Samples per grade	Actual number of samples taken					
						Grade:	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
						Name/ID:					
1											
2											
3											
4											
5											
6											
7											
8											
9											
1											
0											
1											
1											
1											
2											
1											
3											
1											
4											
1											
5											
	<b>Total</b>										

- (1) As defined in Annexes B and C of EN 14274:2003
- (2) Definitions according to those provided in EN 14274:2003.
- (3) Only for statistical Model A

**ANNEX II: Options (A) - Proportion of Refuelling Stations with Sulphur Free Grade Available by Region <sup>(1)</sup>**

<b>Country:</b>	
<b>Fuel type (petrol or diesel):</b>	
<b>Period and Year</b>	

<b>Regional Parameters</b>			<b>Regional availability (NUTS Level 3) of sulphur free fuel at refuelling stations <sup>(2)</sup></b>			
<b>NUTS Region Description <sup>(2)</sup></b>		<b>NUTS Code <sup>(2)</sup></b>	<b>No. of refuelling stations</b>	<b>Minimum %</b>	<b>Maximum %</b>	<b>Mean %</b>
<b>LEVEL 2 Regions</b>			--	--	--	--
<b>Region 1</b>		E.g. XX11				
<b>Region 2</b>		E.g. XX12				
<b>Region 3</b>		E.g. XX13				
<b>Etc.</b>		E.g. XX21				
		E.g. XX22				
		E.g. XX31				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>LEVEL 1 Regions</b>			--	--	--	--
<b>Region 1</b>		E.g. XX1				
<b>Region 2</b>		E.g. XX2				
<b>Etc.</b>		E.g. XX3				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>National Total</b>		<b>E.g. XX</b>				

(1) According to the Eurostat Nomenclature of territorial units for statistics – NUTS Statistical Regions of Europe (see: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html))

(2) Additional information on NUTS, including full country code listings, may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

<b>Additional Comments:</b>
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### ANNEX III: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) in 2004

Country	
Fuel grade:	
National specification:	
Period and Year:	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
							Min.	Max.	Min.	Max.		
Research Octane Number	--							--	95 <sup>(2)</sup>	--	EN 25164	1993
Motor Octane Number	--							--	85 <sup>(3)</sup>	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 <sup>(4)</sup>	PrEN 13016-1	1997
Distillation:												
- evaporated at 100 °C	%(V/V)								46.0	--	PrEN ISO 3405	1999
- evaporated at 150 °C	%(V/V)								75.0	--		
Hydrocarbon Analysis:												
- olefins	%(V/V)								--	18.0 <sup>(5)</sup>	ASTM D 1319	1995
- aromatics	%(V/V)									42.0	ASTM D 1319	1995
- benzene	%(V/V)									1.0	EN 238	1996
Oxygen content	%(m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates:												
- Methanol	%(V/V)								--	3		
- Ethanol	%(V/V)								--	5		
- Iso-propyl alcohol	%(V/V)								--	10	EN 1601	1997
- Tert-butyl alcohol	%(V/V)								--	7	Or	
- Iso-butyl alcohol	%(V/V)								--	10	prEN 13132	1998
-Ethers containing 5 or more carbon atoms per molecule	%(V/V)								--	15		
- other oxygenates	%(V/V)								--	10		
Sulphur content	mg/kg								--	150	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						Total:	
January		April		July		October	
February		May		August		November	
March		June		September		December	

**Comments**

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 and 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

## ANNEX IV: Market Fuels Used in Vehicles with Compression Ignition Engines (Diesel) in 2004

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
						Min.	Max.	Min.	Max.			
Cetane number	--							51.0	--	EN ISO 5165	1998	
Density at 15 °C <sup>(2)</sup>	Kg/m <sup>3</sup>							--	865	EN ISO 3575 EN ISO 12185	1998 1996	
Distillation, 95% Point	°C							--	360	PrEN ISO 3405	1998	
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	%(m/m)							--	11	IP 391	1995	
Sulphur content <sup>(4)</sup>	mg/kg							--	350	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994	

Sample Numbers in Month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
Total:			

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

**Comments**

<p><b>Comments</b></p>
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**ANNEX V: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
							Min.	Max.	Min.	Max.		
Research Octane Number	--							--	95 <sup>(2)</sup>	--	EN 25164	1993
Motor Octane Number	--							--	85 <sup>(3)</sup>	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 <sup>(4)</sup>	PrEN 13016-1	1997
Distillation: - evaporated at 100 °C - evaporated at 150 °C	%(V/V) %(V/V)								46.0 75.0	-- --	PrEN ISO 3405	1999
Hydrocarbon Analysis: - olefins - aromatics - benzene	%(V/V) %(V/V) %(V/V)								--	18.0 <sup>(5)</sup> 35.0 1.0	ASTM D 1319 ASTM D 1319 EN 238	1995 1995 1996
Oxygen content	% (m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates: - Methanol - Ethanol - Iso-propyl alcohol - Tert-butyl alcohol - Iso-butyl alcohol -Ethers containing 5 or more carbon atoms per molecule - other oxygenates	%(V/V) %(V/V) %(V/V) %(V/V) %(V/V) %(V/V) %(V/V)								-- -- -- -- -- -- --	3 5 10 7 10 15 10	EN 1601 Or prEN 13132	1997 1998
Sulphur content	mg/kg								--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						Total:
January		April		July		October
February		May		August		November
March		June		September		December

**Comments**

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 and 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

## ANNEX VI: Market Fuels Used in Vehicles with Compression Ignition Engines (Diesel) from 2005

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC		Method	Date
		No. of Samples	Min.	Max.	Mean	Standard Deviation	Min.	Max.	Min.	Max.		
Cetane number	--							51.0	--	EN ISO 5165	1998	
Density at 15 °C <sup>(2)</sup>	Kg/m <sup>3</sup>							--	865	EN ISO 3575 EN ISO 12185	1998 1996	
Distillation, 95% Point	°C							--	360	PrEN ISO 3405	1998	
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	%(m/m)							--	11	IP 391	1995	
Sulphur content <sup>(4)</sup>	mg/kg							--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994	

Sample Numbers in Month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
Total:			

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

**Comments**

<p><b>Comments</b></p>
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## **Appendix 5: Commission Recommendation 2005/27/EC**



# COMMISSION

## COMMISSION RECOMMENDATION

of 12 January 2005

**on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis**

(Text with EEA relevance)

(2005/27/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community, and in particular Article 211 thereof,

Whereas:

- (1) Under Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC<sup>(1)</sup>, the Member States are to ensure that unleaded petrol and diesel fuel of a fixed maximum sulphur content are available within their territories on an appropriately balanced geographical basis.
- (2) Directive 98/70/EC also provides that the Commission is to develop guidance for recommending what constitutes, for those purposes, availability of 10 mg/kg sulphur unleaded petrol on an appropriately balanced geographical basis.
- (3) It seems appropriate to develop this type of guidance also for diesel fuel with a maximum sulphur content of 10 mg/kg.

- (4) The Commission has assessed several options. As a result of that work, and after consultation with Member States, experts from the industrial and commercial sectors concerned, and other non-governmental organisations, the Commission has developed such guidance,

HEREBY RECOMMENDS:

For the purposes of Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC, and specifically as regards availability of sulphur-free fuels on an appropriately balanced geographical basis, Member States should apply the principles set out in the Annex.

Done at Brussels, 12 January 2005.

*For the Commission*  
Stavros DIMAS  
*Member of the Commission*

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<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58. Directive as last amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

## ANNEX

**Guidance on what constitutes availability on an appropriately balanced geographical basis for the purposes of Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC**

## 1. EXPLANATION OF TERMS USED IN THIS GUIDANCE

*Zero sulphur* or *sulphur-free fuels* are unleaded petrol and diesel fuels that contain equal to or less than 10 mg/kg (ppm) of sulphur.

*Refuelling stations* or *fuel dispensing sites* are sites, retail or commercial, where fuel is dispensed into road vehicles for propulsion (as defined in EN 14274:2003).

## 2. INFLUENCING FACTORS

To ensure availability of sulphur-free fuels, Member States need a certain level of flexibility according to different national market and supply infrastructure situations. The following factors should be taken into account:

1. *Low population density*

Large areas of low population density are likely to have fewer, smaller refuelling stations (in terms of volume throughput or number of dispensing pumps), with larger stations focused on more densely populated areas. The greater distances to travel between refuelling points and potentially the inability of existing infrastructure to support more than one sulphur level of fuel should be taken into account.

2. *High population density*

In areas of high population density, refuelling stations are likely to be larger on average (in volume throughput, as well as in the number of dispensing pumps), more numerous and hence more closely located. In this case the infrastructure is more likely to be able to support multiple fuel grades and a more gradual introduction of refuelling station coverage may also be possible.

3. *Small island markets*

Small island markets are likely to experience similar issues to low population density areas, with the added possibility of a smaller (or single) supplier market or a limited number of (or single) major terminals.

## 3. GENERAL GUIDANCE

Member States are already required under Article 8 of Directive 98/70/EC to provide the basic information on national sales volumes of sulphur-free unleaded petrol and diesel.

This guidance presents four evaluation criteria that the Commission has identified as being particularly useful in defining the geographically balanced availability of sulphur-free fuels for the purposes of Articles 3(2)(d) and 4(1)(d) of the Directive. Two detailed primary options, A and B, provide clearer and more precise information on the geographical availability of sulphur-free fuels. As a rule, it can be assumed that Member States could select either option A or B, but would not apply both of them at the same time.

And two less detailed secondary options, C and D, provide information on availability in specific areas.

It should be mentioned that the options proposed may lose their meaningfulness if a high availability, e.g. in the range of 60 to 80% of all stations, is achieved. In such cases, further evaluation of the success of the national policy may not be needed on a detailed regional basis. For option D the percentage number might be somewhat higher, depending on the situation.

In any case, the differences between the situations for introduction of sulphur-free unleaded petrol and sulphur-free diesel would indicate that they should be analysed separately.

Member States may choose the methods they feel most appropriate to implement the availability of sulphur-free fuels nationally. However, it is recommended that Member States consider the options presented here, before making a decision on the most appropriate measures to aid implementation for their national situation. Special cases are considered in section 4.



3.1. *Option A: Proportion of refuelling stations with sulphur-free grade available by region*

3.1.1. **Criterion**

Number and percentage of national unleaded petrol and diesel refuelling stations with sulphur-free fuel grades/types available (at the end of each reporting year), by Eurostat's three-level Nomenclature of Territorial Units for Statistics (NUTS) Level 3 regional breakdown.

The following units are used in this criterion:

- (a) number of refuelling stations;
- (b) percentage of refuelling stations with sulphur-free fuel available.

3.1.2. **Usefulness**

The advantage of this criterion is that it gives a clear indication of the geographical availability of sulphur-free fuels at a level that ensures reasonably even distribution across the national territory. Furthermore, the NUTS regional areas are already defined, and used in other Community statistics and the availability of other NUTS regional data (such as population, land area, etc.) will allow further useful analyses to be carried out.

3.2. *Option B: Average distance between refuelling stations with sulphur-free grade available*

3.2.1. **Criterion**

Average distances between either unleaded petrol or diesel refuelling stations where sulphur-free fuel is available. It includes the calculation of the national average, maximum and minimum distances between refuelling stations providing sulphur-free fuel (separately for unleaded petrol and diesel). It may also be useful to compare this with the national average for all refuelling stations.

3.2.2. **Usefulness**

The advantage of this criterion is that it gives an appreciation of the variation in distances owners of vehicles needing sulphur-free fuels may have to travel in order to refuel their vehicle within the national territory. Comparison with the national average for all refuelling stations puts the criterion in better perspective with national specific conditions.

3.3. *Option C: Availability of sulphur-free fuels at large refuelling stations*

3.3.1. **Criterion**

Number and total percentage of large/major refuelling stations with sulphur-free unleaded petrol or diesel available nationally. Large refuelling stations should be defined by the Member State in terms of the minimum limit in million litres/year fuel throughput, as appropriate to the national situation (e.g. it may be that around 5 % of all refuelling stations are included).

3.3.2. **Usefulness**

Large refuelling stations are located in areas of high demand, so this criterion will provide a useful measure of availability of sulphur-free fuels in such areas. These are likely to be distributed fairly evenly across the national territory, and the criterion should also be relatively easily utilised.

3.4. *Option D: Availability of sulphur-free fuels at highway/motorway refuelling stations*

3.4.1. **Criterion**

Number and total percentage of major road or highway/motorway refuelling stations with sulphur-free unleaded petrol or diesel available nationally. Major roads or highways/motorways should be defined, as appropriate, by the Member State.

3.4.2. **Usefulness**

This criterion is particularly useful with regard to transit and tourism in that it gives a measure of the availability on the major transport arteries. These stations are also likely to be distributed on a relatively even and wide geographical basis across the national territory, though mainly linked to larger population centres.

#### 4. SPECIAL CASES

In some cases, due to the type of measures taken by Member States or due to the special situation they are facing, it need not be necessary for Member States to fully use either the primary or the secondary options to adequately illustrate the level of geographical availability of sulphur-free fuels. Two such cases are envisaged, where reduced evaluation of the success of the national policy may be appropriate:

1. very high availability or conversion of the national market to sulphur-free unleaded petrol or diesel;
2. single terminal/supplier for Member State or restricted island market.

In these cases the following reduced level of analysis is appropriate.

##### 4.1. *Very high availability/market conversion*

In cases where the type of measures taken by Member States ensures a very high availability/market conversion nationwide (e.g. 60 to 80 % of refuelling stations or sales), it could possibly be sufficient to utilise only the basic information on total sales proportions (volumes) of sulphur-free fuels and national level data for unleaded petrol or diesel, as appropriate.

There are a number of ways this high availability/market conversion may have been achieved. These could possibly include:

- (a) industry agreements guaranteeing sulphur-free fuels offered at the majority of refuelling stations;
- (b) use of fiscal incentives resulting in a facilitated market switch to predominantly sulphur-free fuels;
- (c) introduction of mandatory conversion to/availability of sulphur-free fuels at refuelling stations.

##### 4.2. *Single terminal/island markets*

Member States with single supply terminals, or island market conditions might experience a swift increase to wide or even 100 % availability of sulphur-free fuels. This could reduce the usefulness of applying the options A to D in these particular areas, depending on the specific situation.

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## **Appendix 6: 2007 Excel Reporting Template**



## EU Fuel Quality Monitoring Submissions – 2007 Reporting Template

### Introduction, purpose & format

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC, as last amended by Directive 2003/17/EC, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive.

By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report was to be made by 30 June 2002, in the format specified under Commission Decision 2002/159/EC. From 2004 Member States are required to report according to the requirements of the European Standard EN 14274:2003, unless they are using national fuel quality monitoring systems of equivalent confidence. In addition from 2005 Member States are required to phase in "sulphur free" petrol and diesel fuels on an appropriately balanced geographical basis. To support this revised reporting a 'Common Format for the Submission of Summaries of National Fuel Quality for Petrol and Diesel from 2004' was proposed & agreed with Member States.

Member State submissions providing the results of monitoring for years 2001 - 2005 have been summarised in the EU Fuel Quality Monitoring Summary Reports for those years. In these reports an electronic format for submissions was recommended, together with additional information to assist in the collation and interpretation of results. The common reporting format for 2005 reporting onwards contained herein is attempts to harmonise reporting submissions across the Member States whether they are using either the European Standard or their own national systems. This format essentially summarises information already required or requested under the Directive and European Standard. The purpose of this extended Excel template based upon the format for reporting from 2007 is to:

- Assist Member States in their data reporting;
- Facilitate the collation and interpretation of Member State submissions, reducing the need to return to Member States for additional information;
- Provide additional guidance to Member States on the provision of information that would assist in the interpretation/understanding of both their national fuel quality monitoring systems and the significance of the results of sample analysis in the annual EU Fuel Quality Monitoring Summary Report.

The format of this template broadly follows that of the common format for reporting from 2005; mandatory requirements outlined in the Directive/European Standard, which are denoted by **black text/light blue fields**, text and fields in **red/orange** are additional information requested beyond these (such as specific information on the availability of sulphur free fuels, or the national monitoring system where EN 14274:2003 is not used).

**Your assistance in providing submission data using this Excel template is greatly appreciated.**

### Additional Information Fields

#### 1. Description of fuel quality monitoring system.

The additional optional information requested serves several purposes, firstly in clarifying the location/method of sample collection and analysis; second to help put into context/explain the reasons for differences in national fuel quality monitoring systems; in particular the number of samples taken and location of sampling:

- a) The number of sources fuels and distribution pathways (i.e. number of refineries, imported fuel sources and major distribution terminals) will affect the total number of samples needed to ensure a similar degree of statistical confidence in how representative monitoring results are of national fuel quality.
- b) Sampling at the end of the distribution chain (i.e. dispensing/refuelling sites) ensures that any contamination is identified before it reaches the vehicle, whilst sampling the whole distribution chain will also help identify at what point any potential contamination might have occurred.

#### 2. Sales and availability.

The additional optional information requested serves to help clarify EU picture of the rate of introduction of low (<50 ppm) and zero (<10 ppm) sulphur petrol and diesel.

#### 3. Petrol and Diesel sample analysis reporting tables

- Separate tables are requested for different RON and different sulphur grades in order to identify any particular issues with different fuel types;
- Additional clarifying information is requested to help interpret correctly the significance of any exceedances of the limit values and allow Member States the opportunity to provide information on how such a potential exceedances are followed up.

### Help on completing the Form

If you have any queries, regarding this Excel reporting template, please do not hesitate to call or e-mail Nikolas Hill of AEA Technology on: Tel: +44 (0)870 190 6490; E-mail: [nikolas.hill@aeat.co.uk](mailto:nikolas.hill@aeat.co.uk)

**Thank you again for your assistance with this work.**

**Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits\***

\*Based on information provided by the German Environmental Protection Agency, Italy, Irish EPA, UK DTI and CEN TC19

**Petrol**

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R*	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Research Octane Number (RON) (RON 91 fuel only)	--	95		EN-ISO 5164	2005	0.7	94.6	
	--	91		EN-ISO 5164	2005	0.7	90.6	
Motor Octane Number (MON) (RON 91 fuel only)	--	85		EN-ISO 5163	2005	0.9	84.5	
	--	81		EN-ISO 5163	2005	0.9	80.5	
Vapour Pressure, DVPE								
--summer period (normal)	kPa		60	EN 13016-1	2000	3.0		61.8
--summer period (arctic or severe weather conditions)	kPa		70	EN 13016-1	2000	3.2		71.9
Distillation *								
--evaporated at 100 °C	% (v/v)	46		EN-ISO 3405	2000	4.0	43.6	
-- evaporated at 150 °C	% (v/v)	75		EN-ISO 3405	2000	4.0	72.6	
Hydrocarbon analysis								
-- Olefins *without oxygenates	% (v/v)		18.0	ASTM D1319 ASTM D1319* EN 14517	95a 95a 2004	4.6 6.5 2.6		20.7 21.8 19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319 EN 14517	95a 2004	5.1 3.0		24.0 22.8
-- Aromatics (up to 2004)	% (v/v)		42.0	ASTM D1319 EN 14517	95a 2004	3.7 2.0		44.2 43.2
-- Aromatics (from 2005)	% (v/v)		35.0	ASTM D1319 EN 14517	95a 2004	3.7 1.7		37.2 36.0
-- Benzene	% (v/v)		1.0	EN 12177 EN 238 EN 14517	1998 1996 2004	0.10 0.17 0.05		1.06 1.10 1.03
Oxygen content	% (m/m)		2.7	EN 1601	1997	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3	EN 1601	1997	0.4		3.2
-- Ethanol	% (v/v)		5	EN 1601	1997	0.3		5.2
-- Iso-propyl alcohol	% (v/v)		10	EN 1601	1997	0.9		10.5
-- Tert-butyl alcohol	% (v/v)		7	EN 1601	1997	0.6		7.4
-- Iso-butyl alcohol	% (v/v)		10	EN 1601	1997	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15	EN 1601	1997	1		15.6
-- other oxygenates	% (v/v)		10	EN 1601	1997	0.8		10.5
Oxygen content	% (m/m)		2.7	EN 13132	2000	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3.0	EN 13132	2000	0.3		3.2
-- Ethanol	% (v/v)		5.0	EN 13132	2000	0.4		5.2
-- Iso-propyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Tert-butyl alcohol	% (v/v)		7.0	EN 13132	2000	0.5		7.3
-- Iso-butyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15.0	EN 13132	2000	1		15.6
-- other oxygenates	% (v/v)		10.0	EN 13132	2000	0.8		10.5
Sulphur content	mg/kg		150	EN ISO 14596 EN ISO 8754 EN 24260 EN ISO 20846 EN ISO 20847 EN ISO 20884	1998 1995 1994 2004 2004 2004	30 CEN: Not suitable for fuels 150ppm and below*** 18.6 25.6 27.7 15.9		168 161 165.1 166.3 159.4
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596 EN 24260 EN ISO 20846 EN ISO 20847 EN ISO 20884	1998 1994 2004 2004 2004	20 6.8 9.7 16.6 7.9		62 54 55.7 59.8 54.7
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596 EN 24260 EN ISO 20846 EN ISO 20884	1998 1994 2004 2004	5 3.4 2.7 3.1		13 12 11.6 11.8
Lead content	g/l		0.005	EN 237 EN 237	1996 2004	0.002 0.00062		0.0062 0.0054

\* R values and limits are fixed precision statements provided by CEN, to be used in the absence of specific values from Member States. Member States may use and report their own defined R depending on their testing conditions.

\*\*\* According to CEN/TR 15139: August 2005 - "Petroleum products and other liquids - Applicability of test methods on sulphur determination in petrol and diesel fuel", the test method EN ISO 8754 is not suitable for determining the sulphur content of petrol or diesel fuels at or below 150ppm and 350ppm, respectively. This is because the method does not comply with the tolerance limit guidance according to EN ISO 4259.



**Diesel**

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproducibility, R*	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Cetane number	--	51.0	--	EN-ISO 5165	1998	4.3	48.5	
Density at 15 °C	kg/m <sup>3</sup>		845	EN-ISO 3675	1998	1.2		845.7
				EN ISO 12185	1996	0.5		845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	2000	10.0		365.9
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50.0		379.5
				EN 24260	1994	42.4		375.0
				EN ISO 20846	2004	40.0		373.6
				EN ISO 20847	2004	17.9		360.6
				EN ISO 20884	2004	30.9		368.2
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20.0		62
				EN 24260	1994	6.8		54.0
				EN ISO 20846	2004	6.7		54.0
				EN ISO 20847	2004	12.8		57.6
				EN ISO 20884	2004	7.9		54.7
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5.0		13.0
				EN 24260	1994	3.4		12.0
				EN ISO 20846	2004	2.2		11.3
				EN ISO 20884	2004	3.1		11.8



## Contacts & Summary

### Details of those compiling the Fuel Quality Monitoring Report

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

Reporting Year:	2007
Country:	
Date Report Completed:	
Organisation Responsible for Report	
Address of Organisation:	
Person Responsible for Report:	
Telephone Number:	
Email:	

### DEFINITIONS AND EXPLANATION

*Parent fuel grade* : Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade* : Member States may, of course, define 'national' fuel grades which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, <50 ppm sulphur petrol, zero sulphur diesel, <50 ppm sulphur diesel, etc.

*Zero sulphur or sulphur-free fuels* are petrol and diesel fuels that contain less than 10 mg/kg (ppm) of sulphur.

### SUMMARY REPORTING FORMAT FOR PETROL & DIESEL

Member States are requested to provide a brief general summary of the results of the year's monitoring, including information on any:

- other parameters measured;
- exclusions;
- further details on breaches of parameter tolerance limits (i.e. number of samples, values);
- enforcement actions taken as a result of breaches of the limit values/tolerance limits; and
- additional information deemed relevant.

In particular, Member States should provide additional explanatory information on reasoning for exceptional cases where exclusions are made, such as:

- fuel grades marketed in very small quantities;
- mandatory fuel parameters that are not measured;
- geographical areas that are left outside the monitoring programme;
- exceptionally high or low values of analytical results (i.e. outliers).

### General Summary of Analysis and Additional Information:

## Fuel Quality Monitoring System

Year:

### Description of Fuel Quality Monitoring System

Member States should provide details on the operation of their national fuel quality monitoring systems.

Directive 98/70/EC requires the vapour pressure of petrol to be less than 60.0 kPa during the summer period, which spans 1 May until 30 September. However, for those Member States that experience 'arctic or severe weather conditions' the summer period covers the period 1 June to 31 August and the vapour pressure must not exceed 70 kPa. Member States are requested to define the Summer/Winter periods implemented in their territories and also applying to their fuel quality monitoring system reporting.

#### Definition of Monitoring System Summer and Winter Periods:

Summer Period	Start	
	End	
Winter Period	Start	
	End	

\* Normal = 1st May to 30th September; Arctic = 1st June to 31st August

Member States should indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C and whether it is based on the large or small country framework. Alternatively, the Member State should indicate if they are using their own nationally defined system.

Country Size (L = Large, S = Small)		Minimum number of samples each period (Petrol, per grade; Diesel)	
Fuel Quality Monitoring System model used:	Yes / No	Small Country	Large Country
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--

If Member States are using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in **Annex I** (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States are not using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries & distribution terminals):

- Organisations responsible for sampling, analysis and reporting;
- Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
- Frequency of sampling and selection of sampling points;
- Assessment that shows the monitoring system's equivalency to the CEN system.

#### Description of National Fuel Quality Monitoring System (give once and up-date if necessary):

**Total Sales of Petrol and Diesel**Year: 

Member states are requested to complete the following table, as applicable detailing the quantities of each type and grade of petrol and diesel fuel marketed in their territory.

**\*NB: Please do not report national fuel grade sales under more than one category.**

Fuel Grade	Name of national fuel grade	National sales total		No. Samples Taken
		Litres	Tonnes	
Regular unleaded petrol (minimum RON = 91) <sup>1</sup>				
Regular unleaded petrol (minimum RON = 91 & < 50 ppm Sulphur)				
Regular unleaded petrol (minimum RON = 91 & < 10 ppm Sulphur)				
Unleaded petrol (minimum RON = 95) <sup>1</sup>				
Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur) <sup>2</sup>				
Unleaded petrol (minimum RON = 95 & < 10 ppm Sulphur) <sup>3</sup>				
Unleaded petrol (minimum 95 =< RON < 98)				
Unleaded petrol (minimum 95 =< RON < 98 & < 50 ppm Sulphur)				
Unleaded petrol (minimum 95 =< RON < 98 & < 10 ppm Sulphur)				
Unleaded petrol (minimum RON >= 98)				
Unleaded petrol (minimum RON >= 98 & < 50 ppm Sulphur)				
Unleaded petrol (minimum RON >= 98 & < 10 ppm Sulphur)				
<b>Total unleaded petrol (&lt;150 ppm Sulphur)</b>				
<b>Total unleaded petrol (&lt;50 ppm Sulphur)</b>				
<b>Total unleaded petrol (&lt;10 ppm Sulphur)</b>				
<b>Total Petrol</b>				
Diesel fuel <sup>4</sup>				
Diesel fuel (< 50 ppm sulphur) <sup>5</sup>				
Diesel fuel (< 10 ppm sulphur) <sup>6</sup>				
<b>Total Diesel</b>				

1 as specified in Annex I of Directive 98/70/EC

2 as specified in Annex III of Directive 98/70/EC

3 as specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10ppm

4 as specified in Annex II of Directive 98/70/EC

5 as specified in Annex IV of Directive 98/70/EC

6 as specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10ppm

**Comments (completeness of data, particular issues, etc.)**

**Geographical Availability of Sulphur-Free Fuels**

Year: 2007

Member States are requested to complete the following tables with basic information on the geographical availability of sulphur free petrol and diesel sold in their territories.

	Litres	Tonnes	% Total Petrol/Diesel Sales
Total National sales <10 ppm sulphur petrol			
Total National sales <10 ppm sulphur diesel			
<b>Details of petrol RON grades available with &lt;10 ppm sulphur:</b>			
<b>Are &lt;10 ppm sulphur fuels (petrol and/or diesel) labelled differently from regular grades (i.e. can they be easily distinguished from regular/higher sulphur fuels by the consumer)?</b>			

Where Member States choose to apply the measures in their national territories, they are also requested to complete, as far as possible, the following tables with detailed information (Options A to D) on the geographical availability of sulphur free petrol and diesel in their territories, as outlined in the Commission Guidance note[1]. Member States should also take into account any specific provisions made for special cases in the Commission Guidance.

[1] The more detailed reporting on geographical availability is not needed until the 2005 monitoring reports, but would be useful if Member States were also able to provide it from 2004.

Where the more detailed information is not available, or additional notes/clarifications are needed or other guidance than that given by the Commission is used, the Member States are requested to provide a description on the extent to which sulphur free fuels are marketed in their territory (i.e. geographical availability). This free form text box should also be used to provide any additional information such as the special cases outlined in the Commission Guidance note.

Description of the geographical availability of sulphur free fuels or additional notes:

**Option (A): Proportion of refuelling stations with sulphur free grades available by region**

See Annex II for reporting table format.

**Option (B): Average distance between refuelling stations with sulphur free grades available**

	No. Refuelling Stations		Distance between refuelling stations (km)			
	<10 ppm	All	With <10 ppm grades available			All
	Number	Number	Min.	Max.	Mean	Mean
Petrol						
Diesel						

**Option (C): Availability of sulphur free fuels at large refuelling stations**

	Petrol	Diesel
National criteria for definition of "large refuelling stations" in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

**Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations**

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

### ANNEX I: Fuel Quality Monitoring System Regional Sampling of Petrol and Diesel <sup>(1)</sup>

Country:												
Fuel type (petrol or diesel):												
Statistical Model (A, B or C) <sup>(2)</sup>												
Reporting Year:		2007										
Period (Summer or Winter):												
Min. number of samples per grade:												
Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability factor <sup>(3)</sup>	Proportion of total samples	Min. number of Samples per grade <sup>(4)</sup>	Actual number of samples taken							
					Grade: Name/ID:	Grade 1 e.g. RON95	Grade 2 e.g. RON98	Grade 3	Grade 4	Grade 5	Grade 6	
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
Remainder	--	--	--									
<b>Total</b>												

Fill out a separate form for petrol and diesel

Fill out a separate form for summer and winter OR separate information below (e.g. Grade 1 = RON95 summer, Grade 2 = RON95 winter)

In EACH of the summer and winter periods

- (1) As defined in Annexes B and C of EN 14274:2003
- (2) Definitions according to those provided in EN 14274:2003.
- (3) Only for statistical Model A
- (4) For grades comprising <10% total sales, the minimum is calculated as: %sales x min. for parent grade (at least 1 sample)

**Additional Notes (e.g. identification of grades comprising <10% total sales)**

**ANNEX II: Options (A) - Proportion of Refuelling Stations with Sulphur Free Grade Available by Region<sup>(1)</sup>**

<b>Country:</b>	
<b>Fuel type (petrol or diesel):</b>	
<b>Year:</b>	2007
<b>Period (Summer or Winter):</b>	

*Note:*

Please fill out the orange sections with the relevant information as far as possible, inserting extra rows for additional regions as needed and with additional comments as necessary for explanation in the relevant section.

<b>Regional Parameters</b>				<b>% of refuelling stations with sulphur free fuel available<sup>(2)</sup></b>		
<b>NUTS Region Description<sup>(2)</sup></b>		<b>NUTS Code<sup>(2)</sup></b>	<b>No. of refuelling stations</b>	<b>Minimum %</b>	<b>Maximum %</b>	<b>Mean %</b>
<b>LEVEL 2 Regions</b>	<b>Region Names</b>	--	--	<b>By (NUTS) level 3 region:</b>		
<b>Region 1</b>		E.g. XX11				
<b>Region 2</b>		E.g. XX12				
<b>Region 3</b>		E.g. XX13				
<b>Region 4</b>		E.g. XX21				
<b>Region 5</b>		E.g. XX22				
<b>Region 6</b>		E.g. XX31				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>LEVEL 1 Regions</b>	<b>Region Names</b>	--	--	<b>By (NUTS) level 2 region:</b>		
<b>Region 1</b>		E.g. XX1				
<b>Region 2</b>		E.g. XX2				
<b>Region 3</b>		E.g. XX3				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>National Total</b>		<b>E.g. XX</b>				

(1) According to the Eurostat Nomenclature of territorial units for statistics – NUTS Statistical Regions of Europe (see: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.h](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.h))

(2) Additional information on NUTS, including full country code listings, may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

**Additional Comments:**

--

**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2007
Period (Summer or Winter)	Winter
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specification, if any		According to 98/70 EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum			
Research Octane Number	--									95 <sup>(2)</sup>		EN 25164	2005
Motor Octane Number	--									85 <sup>(3)</sup>		EN 25163	2005
Vapour Pressure, DVPE	kPa										(4)		
--summer period only											60.0	EN 13016-1	2000
Distillation													
-- evaporated at 100 °C	% (v/v)									46.0		EN ISO 3405	2000
-- evaporated at 150 °C	% (v/v)									75.0			
Hydrocarbon analysis													
-- Olefins	% (v/v)										18.0 <sup>(5)</sup>	ASTM D 1319 or EN 14517	1995, 2004
-- Aromatics	% (v/v)										42.0	ASTM D 1319 or EN 14517	1995, 2004
-- Benzene	% (v/v)										1.0	EN 12177, EN 238 or EN 14517	1998, 1996, 2004
Oxygen content	% (m/m)										2.7	EN 1601 or PrEN 13132	1997 1998
Oxygenates													
-- Methanol	% (v/v)										3		
-- Ethanol	% (v/v)										5		
-- Iso-propyl alcohol	% (v/v)										10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)										7	Or	
-- Iso-butyl alcohol	% (v/v)										10	EN 13132	2000
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)										15		
-- other oxygenates	% (v/v)										10		
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004
Lead content	g/l										0.005	EN 237	1996, 2004

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
			<b>Total</b>

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**

**Test Methods and Analysis**

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)					Notes on exceedences			
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
(RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
(RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3		61.8				
--summer period (arctic or severe weather cond)	kPa	EN 13016-1	2000	3.2		71.9				
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63		20.7				
*without oxygenates		ASTM D1319*	95a	6.5		21.8				
		EN 14517	2004	2.6		19.5				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	95a	5.1		24.0				
		EN 14517	2004	3		22.8				
-- Aromatics (from 2005)	% (v/v)	ASTM D1319	95a	3.7		37.2				
		EN 14517	2004	1.7		36.0				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996	0.2		1.1				
		EN 14517	2004	0.1		1.0				
Oxygen content	% (m/m)	EN 1601	1997	0.3		2.9				
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4		3.2				
-- Ethanol	% (v/v)	EN 1601	1997	0.3		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6		7.4				
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8		10.5				
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1		15.6				
-- other oxygenates	% (v/v)	EN 1601	1997	0.8		10.5				
Oxygen content	% (m/m)	EN 13132	2000	0.3		2.9				
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3		3.2				
-- Ethanol	% (v/v)	EN 13132	2000	0.4		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5		7.3				
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8		10.5				
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0		15.6				
-- other oxygenates	% (v/v)	EN 13132	2000	0.8		10.5				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	9.7		55.7				
		EN ISO 20847	2004	16.6		59.8				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				
		EN ISO 20846	2004	2.7		11.6				
		EN ISO 20884	2004	3.1		11.8				
Lead content	g/l	EN 237	1996	0.002		0.0062				
		EN 237	2004	0.00062		0.0054				



**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2007
Period (Summer or Winter)	Summer
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal); A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specification, if any		According to 98/70 EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum			
Research Octane Number	--									95 <sup>(2)</sup>		EN 25164	2005
Motor Octane Number	--									85 <sup>(3)</sup>		EN 25163	2005
Vapour Pressure, DVPE	kPa										(4)		
--summer period only											60.0	EN 13016-1	2000
Distillation													
-- evaporated at 100 °C	% (v/v)									46.0		EN ISO 3405	2000
-- evaporated at 150 °C	% (v/v)									75.0			
Hydrocarbon analysis													
-- Olefins	% (v/v)										18.0 <sup>(5)</sup>	ASTM D 1319 or EN 14517	1995, 2004
-- Aromatics	% (v/v)										42.0	ASTM D 1319 or EN 14517	1995, 2004
-- Benzene	% (v/v)										1.0	EN 12177, EN 238 or EN 14517	1998, 1996, 2004
Oxygen content	% (m/m)										2.7	EN 1601 or PrEN 13132	1997 1998
Oxygenates													
-- Methanol	% (v/v)										3		
-- Ethanol	% (v/v)										5		
-- Iso-propyl alcohol	% (v/v)										10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)										7	Or	
-- Iso-butyl alcohol	% (v/v)										10	EN 13132	2000
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)										15		
-- other oxygenates	% (v/v)										10		
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004
Lead content	g/l										0.005	EN 237	1996, 2004

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 &amp; 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**

**Test Methods and Analysis**

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON) (RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
	--	EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON) (RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
	--	EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3		61.8				
--summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3.2		71.9				
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63		20.7				
*without oxygenates		ASTM D1319*	95a	6.5		21.8				
		EN 14517	2004	2.6		19.5				
		ASTM D1319	95a	5.1		24.0				
-- Olefins (RON 91 fuel only)	% (v/v)	EN 14517	2004	3		22.8				
-- Aromatics (from 2005)		ASTM D1319	95a	3.7		37.2				
		EN 14517	2004	1.7		36.0				
		EN 12177	1998	0.1		1.1				
-- Benzene		EN 238	1996	0.2		1.1				
		EN 14517	2004	0.1		1.0				
		EN 1601	1997	0.3		2.9				
Oxygen content										
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4		3.2				
-- Ethanol	% (v/v)	EN 1601	1997	0.3		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6		7.4				
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8		10.5				
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1		15.6				
-- other oxygenates	% (v/v)	EN 1601	1997	0.8		10.5				
Oxygen content										
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3		3.2				
-- Ethanol	% (v/v)	EN 13132	2000	0.4		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5		7.3				
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8		10.5				
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0		15.6				
-- other oxygenates	% (v/v)	EN 13132	2000	0.8		10.5				
Sulphur content (low sulphur, from 2005)										
	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	9.7		55.7				
		EN ISO 20847	2004	16.6		59.8				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)										
	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				
		EN ISO 20846	2004	2.7		11.6				
		EN ISO 20884	2004	3.1		11.8				
Lead content										
	g/l	EN 237	1996	0.002		0.0062				
		EN 237	2004	0.00062		0.0054				

**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2007
Period (Summer or Winter)	Full-Year
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70 EC		Method	Date
							Minimum	Maximum	Minimum	Maximum		
Research Octane Number	--							95 <sup>(2)</sup>		EN 25164	2005	
Motor Octane Number	--							85 <sup>(3)</sup>		EN 25163	2005	
Vapour Pressure, DVPE	kPa								(4)	EN 13016-1	2000	
--summer period only									60.0			
Distillation										EN ISO 3405	2000	
-- evaporated at 100 °C	% (v/v)							46.0				
-- evaporated at 150 °C	% (v/v)							75.0				
Hydrocarbon analysis										ASTM D 1319 or EN 14517 ASTM D 1319 or EN 14517 EN 12177, EN 238 or EN 14517	1995, 2004 1995, 2004 1998, 1996, 2004	
-- Olefins	% (v/v)								18.0 <sup>(5)</sup>			
-- Aromatics	% (v/v)								42.0			
-- Benzene	% (v/v)								1.0			
Oxygen content	% (m/m)								2.7	EN 1601 or PrEN 13132	1997 1998	
Oxygenates										EN 1601 Or EN 13132	1997  2000	
-- Methanol	% (v/v)								3			
-- Ethanol	% (v/v)								5			
-- Iso-propyl alcohol	% (v/v)								10			
-- Tert-butyl alcohol	% (v/v)								7			
-- Iso-butyl alcohol	% (v/v)								10			
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)								15			
-- other oxygenates	% (v/v)								10			
Sulphur content (regular grades)	mg/kg								50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004	
Sulphur content (fuels sold as sulphur-free)	mg/kg								10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004, 2004	
Lead content	g/l								0.005	EN 237	1996, 2004	

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
			<b>Total</b>

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 &amp; 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**

Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON) (RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
		EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON) (RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
		EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3	61.8					
--summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3.2	71.9					
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63	20.7					
		ASTM D1319*	95a	6.5	21.8					
		EN 14517	2004	2.6	19.5					
		ASTM D1319	95a	5.1	24.0					
		EN 14517	2004	3	22.8					
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	95a	3.7	37.2					
		EN 14517	2004	1.7	36.0					
-- Aromatics (from 2005)										
		EN 12177	1998	0.1	1.1					
		EN 238	1996	0.2	1.1					
		EN 14517	2004	0.1	1.0					
-- Benzene	% (v/v)	EN 1601	1997	0.3	2.9					
Oxygen content	% (m/m)									
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4	3.2					
-- Ethanol	% (v/v)	EN 1601	1997	0.3	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6	7.4					
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8	10.5					
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1	15.6					
-- other oxygenates	% (v/v)	EN 1601	1997	0.8	10.5					
Oxygen content	% (m/m)	EN 13132	2000	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3	3.2					
-- Ethanol	% (v/v)	EN 13132	2000	0.4	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5	7.3					
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0	15.6					
-- other oxygenates	% (v/v)	EN 13132	2000	0.8	10.5					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	9.7	55.7					
		EN ISO 20847	2004	16.6	59.8					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					
		EN ISO 20846	2004	2.7	11.6					
		EN ISO 20884	2004	3.1	11.8					
Lead content	g/l	EN 237	1996	0.002	0.0062					
		EN 237	2004	0.00062	0.0054					

**Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005**

Country	
Reporting year	2007
Period (Summer or Winter)	Winter
Parent fuel grade	
National fuel grade	

**Reporting Results**

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		N° Samples	Minimum	Maximum	Mean	Standard deviation	National Specifications		According to 98/70/EC		Method	Date
							Minimum	Maximum	Minimum	Maximum		
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>									845	EN ISO 3575, EN ISO 12185	1998, 1996
Distillation -- 95%-Point	°C									360	EN ISO 3405	2000
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)									11	IP 391	1995
Sulphur content (regular grades)	mg/kg									50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg									10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004

**Sampling Frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

**Other notes (optional):****Test Methods and Analysis**

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3	48.5		Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51		845.3				
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0		365.9				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	6.7		54.0				
		EN ISO 20847	2004	12.8		57.6				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				

## Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	2007
Period (Summer or Winter)	Summer
Parent fuel grade	
National fuel grade	

## Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		N° Samples	Minimum	Maximum	Mean	Standard deviation	National Specifications		According to 98/70/EC		Method	Date
							Minimum	Maximum	Minimum	Maximum		
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>									845	EN ISO 3575, EN ISO 12185	1998, 1996
Distillation -- 95%-Point	°C									360	EN ISO 3405	2000
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)									11	IP 391	1995
Sulphur content (regular grades)	mg/kg									50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg									10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004

## Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
			<b>Total</b>

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

## Other notes (optional):

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3	48.5		Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2	845.7					
		EN ISO 12185	1996	0.51	845.3					
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0	365.9					
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8	13.2					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	6.7	54.0					
		EN ISO 20847	2004	12.8	57.6					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					

## Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	2007
Period (Summer or Winter)	Full-Year
Parent fuel grade	
National fuel grade	

## Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specifications		According to 98/70/EC		Method	Date
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum		
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>									845	EN ISO 3575, EN ISO 12185	1998, 1996
Distillation -- 95%-Point	°C									360	EN ISO 3405	2000
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)									11	IP 391	1995
Sulphur content (regular grades)	mg/kg									50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg									10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004

## Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

## Other notes (optional):

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## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3		48.5	Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51		845.3				
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0		365.9				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	6.7		54.0				
		EN ISO 20847	2004	12.8		57.6				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				



The Gemini Building  
Fermi Avenue  
Harwell International Business Centre  
Didcot  
Oxfordshire  
OX11 0QR

Tel: 0845 345 3302  
Fax: 0870 190 6318

E-mail: [info@aeat.co.uk](mailto:info@aeat.co.uk)

[www.aea-energy-and-environment.co.uk](http://www.aea-energy-and-environment.co.uk)