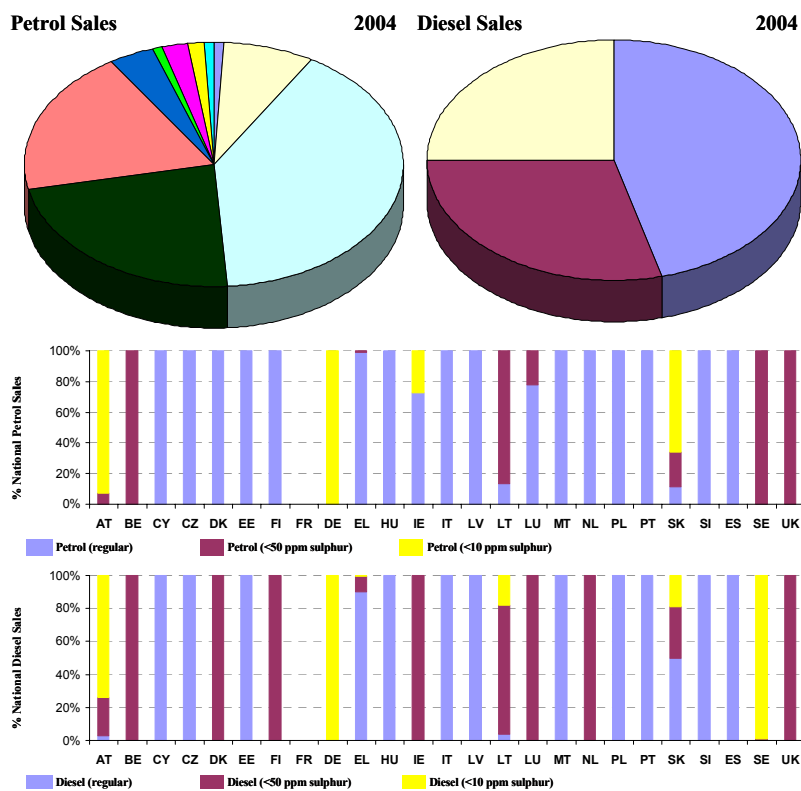


# EU Fuel Quality Monitoring – 2004 Summary Report

Final report produced for the European Commission,  
DG Environment

Nikolas Hill, AEA Technology Environment



December 2005

**AEA Technology Environment**  
AEAT/ED51182/R2 Final

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## Appendices

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## Glossary

<i>&lt;10 ppm fuels</i>	See <i>sulphur free fuels</i>
<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>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>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>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)
<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. See: <a href="http://europa.eu.int/comm/environment/sulphur/summary.pdf">http://europa.eu.int/comm/environment/sulphur/summary.pdf</a>
<i>Zero sulphur fuels</i>	See <i>sulphur free fuels</i> .



# 1 Introduction

This report produced for DG Environment represents a consolidation of the fourth 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 2004. The specifications for petrol and diesel sold in the European Community are included in Directive 98/70/EC. 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). Agreement has been reached subsequently 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, 2002 and 2003 were presented in previous reports. The 10 new Member States submitted reports in 2005 for the first time to cover the 2004 monitoring year (from May to December) and are therefore included in this summary report.

## 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:

**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.

**Sections 2 to 26** summarise the information reported by individual EU Member States, 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 and reporting requirements and with Directive 98/70/EC limit values;
- Trends in sales and availability of low or sulphur-free grades since 2001.

**Sections 27 and 28** provide an overall EU summary, discussion of the 2004 reporting and conclusions/recommendations for future reporting.

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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

## 1.2 CONTEXT

Reduction of fuel consumption and associated greenhouse gas and other emissions has become a higher priority for governments, the public, vehicle manufacturers and the fuel industry alike as concerns over air quality and global warming grow. Transport is a significant contributor to carbon dioxide (CO<sub>2</sub>), as well as other emissions and demand is rising. 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>3</sup> to reduce CO<sub>2</sub> emissions from passenger cars and improve fuel economy presented an action plan to reduce emissions over a fifteen-year period. It will help the EU meet its commitments under the Kyoto Protocol, and 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 by 2005 or 2010 at the latest.

The automobile industry has 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. Article 9, paragraph 1 (d) of Directive 98/70/EC requires the Commission to consider "*the outcome of the review of the various commitments by the Japanese (JAMA), Korean (KAMA) and European (ACEA) automobile manufacturers to reduce the fuel consumption and carbon dioxide emissions of new passenger cars in the light of the fuel quality changes introduced by this Directive and progress towards the Community target of 120 g/km CO<sub>2</sub> emissions for the average vehicle*". As part of their reviews mentioned above, ACEA<sup>4</sup>, JAMA<sup>5</sup> and KAMA<sup>6</sup> expressed general satisfaction with the quality of available fuels in the EU 15 (the scope of the commitments is limited to EU15, since they were designed in 1998/99).

The Commission is currently reviewing the CO<sub>2</sub> and cars strategy with a view to moving further towards the Community objective of 120 g CO<sub>2</sub>/km. Several pieces of research 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 technical and non-technical measures (e.g. labelling or tax incentives). Indications from the research by the Institute for European Environmental Policy (UK)<sup>7</sup> suggests that the 120 g CO<sub>2</sub>/km target might be reached cost-effectively through technological means in combination with suitable policy instruments. The strategy review is under way and will not be completed until mid-2006. Nevertheless, there is at present no

<sup>3</sup> (COM(95) 689 final, supported by the Council in 1996 and the European Parliament in 1997

<sup>4</sup> See SEC(2005)826 of 22.6.2005, Joint report of ACEA and the Commission services, Annex II

<sup>5</sup> See SEC(2005)826 of 22.6.2005, Joint report of JAMA and the Commission services, Annex II

<sup>6</sup> To be published

<sup>7</sup> "Service contract to carry out economic analysis and business impact assessment of CO<sub>2</sub> emissions reduction measures in the automotive sector", REF: B4-3040/2003/366487/MAR/C2, Final Report for EC DG Environment, by IEEP - Institute for European Environmental Policy (UK), CAIR - Centre for Automotive See [http://europa.eu.int/comm/environment/co2/pdf/cars\\_ia\\_final\\_report.pdf](http://europa.eu.int/comm/environment/co2/pdf/cars_ia_final_report.pdf)



indication emerging from that review that fuel specification changes are required to enable further fuel efficiency progress.

The automobile industry has 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.

### 1.2.2 Air Quality

The framework for the assessment and management of air quality is described in Directive 96/62/EC<sup>8</sup> and the limit values for the air pollutants nitrogen dioxide, sulphur dioxide, lead and particulate matter are set out in the first daughter Directive 1999/30/EC. The limit values for nitrogen dioxide are to be attained by 2010 and those for particulate matter by 2005. There are also indicative values for particles for the year 2010. The Clean Air for Europe (CAFE) programme, launched by the European Commission in 2001, aimed to develop 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. The Thematic Strategy on Air Pollution was adopted by the Commission on 21 September 2005.

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. There are currently five emission classes (plus EEV) for Heavy Duty Vehicles (HDVs), conventionally labelled with Roman numerals. Euro IV has entered into force on 1 October 2004 for new types of vehicles, while Euro V will enter into force on 1 October 2008. Draft proposals for a future Euro 5 standard for cars and LCVs to apply possibly from 2009 are currently in consultation. The actual proposal is expected before the end of 2005. An earlier public consultation document included a number of requirements:

- An 80% reduction in PM emissions from diesel cars.
- A 20% reduction in NO<sub>x</sub> emissions from diesel cars.
- Further reductions in emissions of NO<sub>x</sub> and HC from gasoline cars.
- Introduction of a particulate emission limit for lean burn direct injection petrol cars.
- Intention to introduce a particulate number standard.
- Extension of the durability period over which manufacturers must confirm the functioning of emission control devices.
- Removal of an exemption that enabled passenger vehicles with a mass of over 2500kg to be type approved using emission standards of light commercial vehicles.

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<sup>8</sup> Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management; OJ NO. L 296, 21/11/1996 P. 0055.

- Introducing an implementation date of 18 months after the entry into force of the regulation for new type approvals and 36 months for all types.

### 1.2.3 Fuel Quality

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 petrol in 2004 is set at 150 ppm and for diesel it is 350 ppm. However, some EU states already provided fuel in previous years at <50 ppm ahead of the mandatory requirement from 2005. Debate as to whether the 2005 limit should be reduced further prompted the EC to launch a consultation with stakeholders in 2000<sup>9</sup>. The final decision to amend Directive 98/70/EC resulted in a requirement for introduction of sulphur-free fuel (<10 ppm sulphur) made available “*on an appropriately balanced geographical basis*” from January 2005. Full mandatory conversion to sulphur-free grades is to follow from 2009 (to be confirmed for diesel). These requirements are implemented under the amending Directive 2003/17/EC<sup>10</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 more than 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 is currently conducting a review of the fuel quality Directive (98/70/EC), according to the requirements outlined in Directive 2003/17/EC, in Article 9(1),

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<sup>9</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.

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

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*”.

A number of proposed amendments are being considered in the 2005 review; amongst these the date for mandatory introduction of sulphur-free diesel is to be confirmed or modified. This is in accordance with Article 9(1)(a) of Directive 2003/17/EC, which states that “*This analysis shall consider developments in refinery processing technologies, expected fuel economy improvements of vehicles and the rate at which new fuel efficient technologies are introduced into the vehicle fleet.*”

A stakeholder meeting with Member States, the automotive and oil industries and other stakeholders was initially held in Brussels on 5<sup>th</sup> April 2005 and a follow up meeting took place on 6<sup>th</sup> October 2005. The results of the review could potentially impact on future years’ monitoring and reporting.

#### *1.2.3.1 Reporting on Fuel Quality from 2004*

Amendments to Directive 98/70/EC made in 2003 require Member States to develop Fuel Quality Monitoring Systems (FQMS) in accordance with the new European Standard (EN 14274), to have been in place from 1 January 2004. This standard also sets out reporting criteria for the new systems. A summary of the main differences compared to previous/existing systems and reporting is as follows:

1. The system is to be run twice a year, for the summer and the winter periods (as summer and winter fuels have different specifications);
2. 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);
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;
5. Specification of the minimum number of samples/sites for fuel grades with less than 10% of sales.

The new standard does not define what the appropriate geographical availability of sulphur free fuels should be, how to measure this, or even that information on this should be provided. This was the subject of a separate piece of work, discussed further in section 28.1.2.2. Nevertheless the adoption of this standard by Member States in reporting is expected to ensure greater consistency in the data available for definition/measurement of a parameter for geographical availability of sulphur free fuels. However, there is an option in the Directive, 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 may mean some Member States use alternative systems, reducing the ease of direct comparisons between different Member States and guarantee of availability of certain data.

## 2 Austria

### 2.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
2	RON 91	<50 ppm	ON EN 228 "Normal"	Yes	2
3	RON 91	<10 ppm	ON EN 228 "Normal"	Yes	2
5	RON 95	<50 ppm	ON EN 228 "Super"	Yes	5
6	RON 95	<10 ppm	ON EN 228 "Super"	Yes	5
12	RON 98	<10 ppm	ON EN 228 "Super Plus"	Yes	12
13	Diesel	<350 ppm	Diesel	Yes	14
14	Diesel	<50 ppm	Diesel	Yes	14
15	Diesel	<10 ppm	Diesel	Yes	14

#### 2.1.1 Sales

Figure 2.1: National fuel sales proportions by fuel type (%)

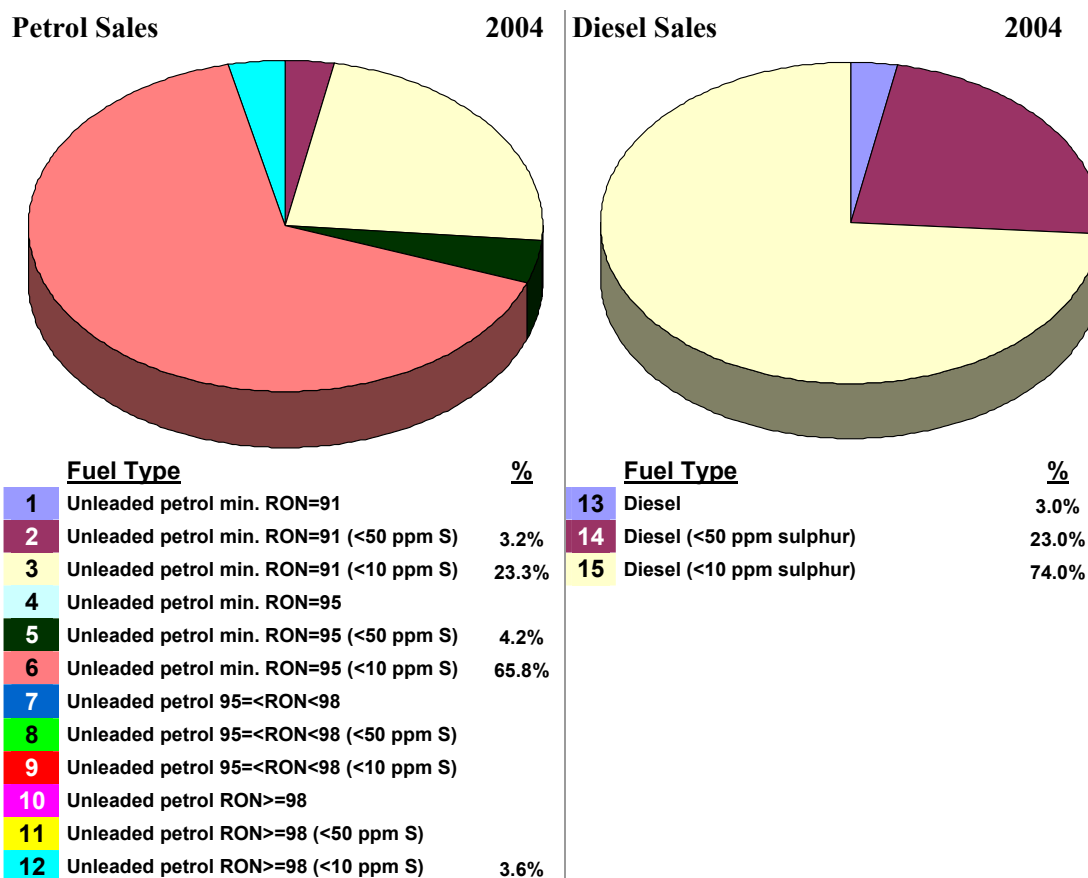


Figure 2.1 clearly shows that RON 91 petrol was still sold widely in Austria in 2004, accounting for 26% sales (30% in 2001), sales of RON 95 petrol were 70% compared to 65% in 2001, with RON 98 only accounting for 4% sales. Sales of sulphur free (<10 ppm) petrol have increased significantly from just over 4% of sales to 93% in 2004. Since 2003 significant quantities of low and sulphur-free diesel have been made available and comprised 23% and 74% of sales respectively in 2004.

## 2.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** sulphur free unleaded petrol at RON 98 quality was available all over Austria, sulphur free diesel became available in 2004. 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. Since January 1st 2004, 93% of all petrol fuels are sulphur free in Austria (extrapolated from 200 samples). About 74% of diesel fuels are sulphur free too (extrapolated from 100 samples).

**Are sulphur-free grades clearly labelled differently / marketed separately?** Sulphur free fuels are not labelled.

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001, see Table 2.1.

### 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 2.1: Annual trend in average sulphur content in petrol and diesel fuels**

<b>AT</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>2004</b>
<b>Petrol</b>	21	17	14	7		38
<b>Diesel</b>	277	236	213	14		113

## 2.2 FUEL QUALITY MONITORING 2004

### 2.2.1 Description of system

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

**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:** 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), accounting for approximately 70% of the total domestic petrol use as well as approximately 56% of diesel fuel use. The remaining demand is accounted for by imports from Germany, Italy, Slovakia and Hungary in particular. Data on the regional distribution of imported fuels in Austria is not available, however fuel controls carried out in recent years show no regional quality differences. Therefore it can be seen that imported fuels are of a similar quality.

### 2.2.2 Sampling and reporting

Austria was in most respects compliant with the sampling and reporting requirements in 2004. However, no samples were taken and analysed for RON 98 fuel and reporting of analyses for summer and winter periods was not separate. The following Table 2.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**Table 2.2: 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>			
1	RON 91								
2	RON 91 <50ppm S	2	3.2%	50	50	100	No	All of 18	
3	RON 91 <10ppm S	2	23.3%	0	0				
5	RON 95 <50 ppm S	5	4.2%	50	50	100	No	All of 18	
6	RON 95 <10 ppm S	5	65.8%	0	0				
12	RON 98 <10 ppm S	12	3.6%	0	0	4			(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>100</b>	<b>100</b>	<b>204</b>	<b>No</b>	<b>All of 18</b>	
13	Diesel	14	3.0%	0	0				
14	Diesel <50 ppm S	14	23.0%	50	50	100	No	All of 5	
15	Diesel <10 ppm S	14	74.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) Samples of Super Plus 98 were not tested in 2004 because of low sales and no exceedances in 2003.

### 2.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:** Summer vapour pressure (maximum 60) limit values were exceeded by 3 samples.

**Statistical significance:** The tolerance limit for statistical significance for the vapour pressure test method is 61.7 kPa. Only one sample was non-compliant with the Directive with respect to summer vapour pressure.

**Member State's notes:** -

##### **Super Petrol**

None.

##### **Super Plus Petrol**

None.

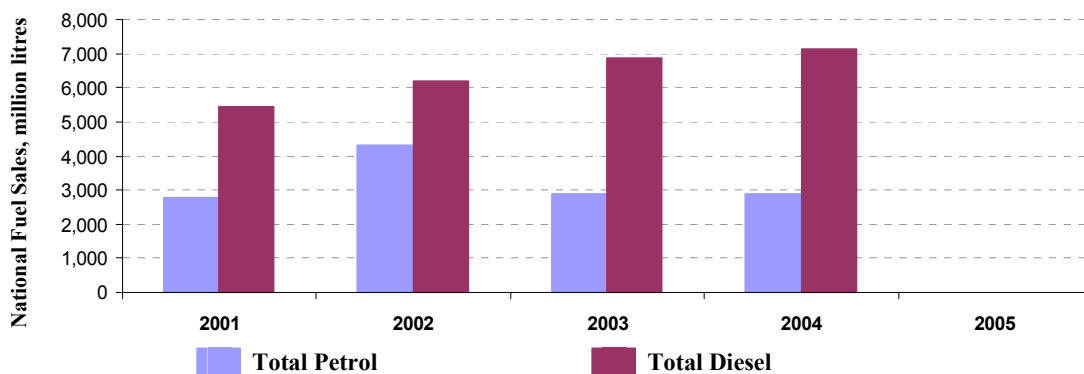
##### **Diesel**

None.

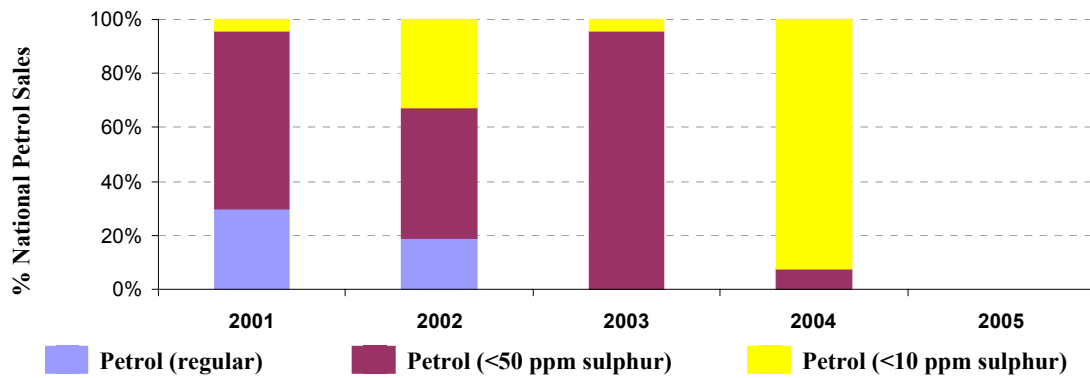
## 2.3 TEMPORAL TRENDS

The following Figure 2.2 to Figure 2.4 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 both increased, by 5% and 31% respectively since 2001. However, of the petrol sales, regular grade sales have all converted to low sulphur (<50 ppm) grade or sulphur-free (< 10 ppm) grades. Sulphur-free fuels now make up the majority of sales with 93% and 75% of total sales of petrol and diesel respectively.

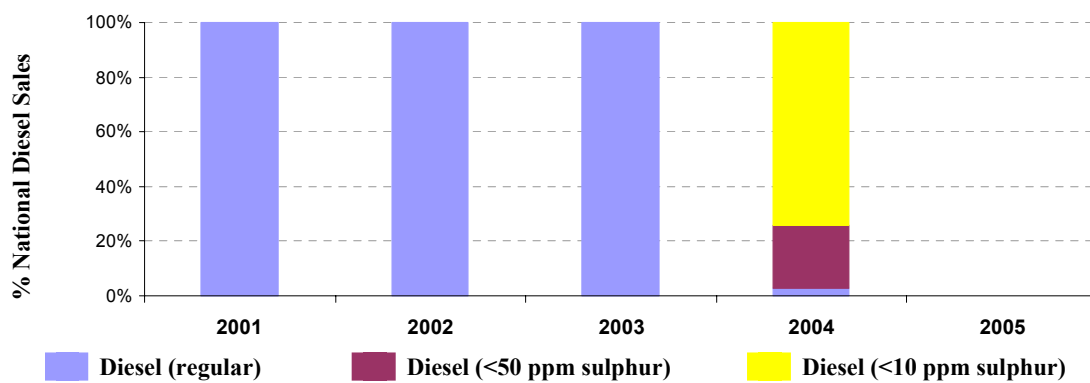
**Figure 2.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 2.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 2.4: Temporal trends in national sales of low sulphur diesel (%)**





### 3 Belgium

#### 3.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
5	RON 95	<50 ppm	Eurosuper	Yes	5
11	RON 98	<50 ppm	Super Plus	Yes	11
14	Diesel	<50 ppm	Diesel 50S	Yes	14

##### 3.1.1 Sales

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

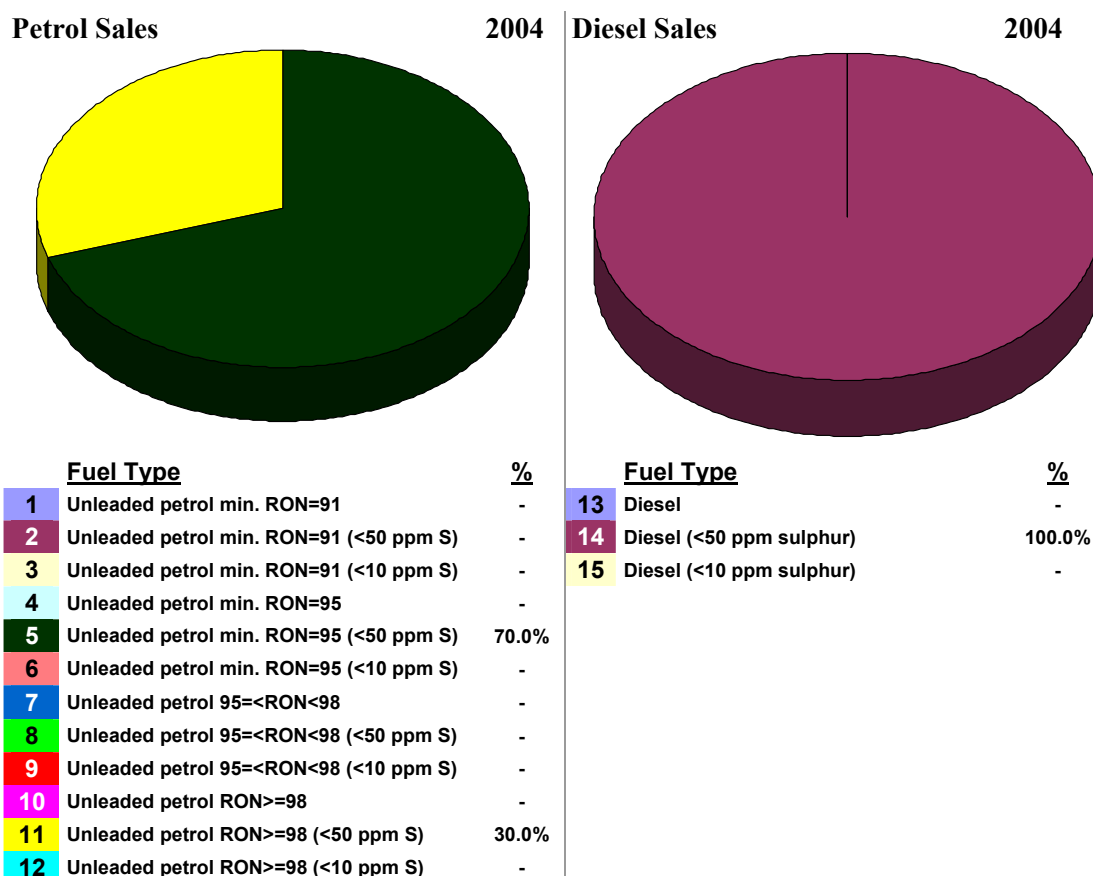


Figure 3.1 above shows that the majority (70%) of petrol sold in Belgium in 2004 was still RON 95 (up from 66% in 2001), with the remainder being sales of RON <98 fuel. Between 2002 and 2003 Belgium switched completely from regular RON <98 to low sulphur (<50 ppm) RON <98 and between 2003 and 2004 switched from regular to low sulphur RON 95 fuel. Low sulphur diesel (< 50 ppm) has comprised 100% of sales since beginning of 2002.

### 3.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** 20% of samples of RON 98 fuel had a sulphur content of <10 ppm.

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

**Average sulphur content of all petrol and diesel sold:** see Table 3.1.

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

<b>BE</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>2004</b>
<b>Petrol</b>	68	44	42	33		38
<b>Diesel</b>	269	47	40	40		113

## 3.2 FUEL QUALITY MONITORING 2004

### 3.2.1 Description of system

**Responsible organisation(s):** FAPETRO (Fonds d'Analyse des produits Pétroliers) ], 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. FAPETRO is run jointly by the authorities and the petroleum industry.

**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 80 service stations and 50 private distribution points and in total 210 samples taken per week at random throughout the year.

**Specification of test methods:** Not specified, assumed to be in accordance with the Directive.

**Collection of sales data:** National petroleum statistics available at:  
<http://ecodata.mineco.fgov.be/Fr/html/dir/Z/EN/PET/root/ZENPETR.htm#B>

**Other details:** Belgium's monitoring system was introduced in 1996 and this monitoring system allows them to detect fraud 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. If the first registered laboratory for the analyses notices that one of the parameters does not respect the standard, the Administration of Energy gives the benefits of doubt to the oil station and does not follow the case. If the second check

confirms the breach, the pump attendant is quickly informed by the Administration of Energy. They are aware that they have to replace the non-compliant fuel within 24 hours and that they will be subject to a new control in the following days. Charges varying between 125 to 250 euros are transferred to the concerned pump attendant as a result of the analysis of the non-compliant samples, as a kind of fine.

In 1996, more than 13% of samples were not compliant with standards, in 2000 this percentage dropped to 2% but in 2002 abnormal samples increased to 5.4%. This is due to the extension of checking to private stations and to a shortfall of sales of fuels with substitutes of lead, which leads to breaches on the parameter of vapour pressure (there is still some left over winter quality during summer months). [Full details of 2004 sampling actions are not yet available.]

Belgium takes around 10,000 samples each year so there are always some non-compliant samples, especially from heating oil contamination. 620 files were opened as a result of 2002 sampling and analysis; warning letters were issued for some minor infringements and court action was taken for others. Monitoring is also carried out by an independent body at a rate of 10 samples per week as a double-check on sampling and analysis.

### 3.2.2 Sampling and reporting

Belgium was for the most part compliant with the sampling and reporting requirements in 2004. The following Table 3.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
5	RON 95 <50 ppm S	5	70.0%	1204	1429	-	No	17 of 18	(2)
11	RON 98 <50 ppm S	11	30.0%	904	1273	-	No	17 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>2108</b>	<b>2702</b>	-	<b>No</b>	<b>17 of 18</b>	<b>(2)</b>
14	Diesel <50 ppm S	14	100.0%	2128	2917	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>2128</b>	<b>2917</b>	-	<b>No</b>	<b>5 of 5</b>	

Notes: S = Summer; W = Winter

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) Oxygen content has not been reported

### 3.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:* Some samples exceeded the limit values for RON, MON, summer vapour pressure (DVPE), distillation - evaporation at 150°C, olefins, aromatics and ethers with 5 or more carbon atoms per molecule. The number of samples exceeding these limits was not provided.

*Statistical significance:* The maximum/minimum values of all the exceedances were beyond the tolerance limits of statistical significance for each parameter, with the exception of olefins. Therefore a number of samples were non-compliant with the Directive.

*Member State's notes:* See section 3.2.1

##### **Petrol RON 98**

*Detail:* Some samples exceeded the limit values for MON, summer vapour pressure (DVPE), distillation-evaporation at 100°C and 150°C, aromatics, benzene and ethers with 5 or more carbon atoms per molecule. The number of samples exceeding these limits was not provided.

*Statistical significance:* The maximum/minimum values of all the exceedances were beyond the tolerance limits of statistical significance for each parameter, except olefins and aromatics. Therefore a number of samples were non-compliant with the Directive.

*Member State's notes:* See section 3.2.1

##### **Diesel**

*Detail:* Some samples exceeded the limit values for Cetane no. and Density at 15 C, however no information was supplied on the numbers of samples exceeding the limits, or the statistical significance of these exceedances.

*Statistical significance:* Some of the samples will be in non-compliance with the Directive.

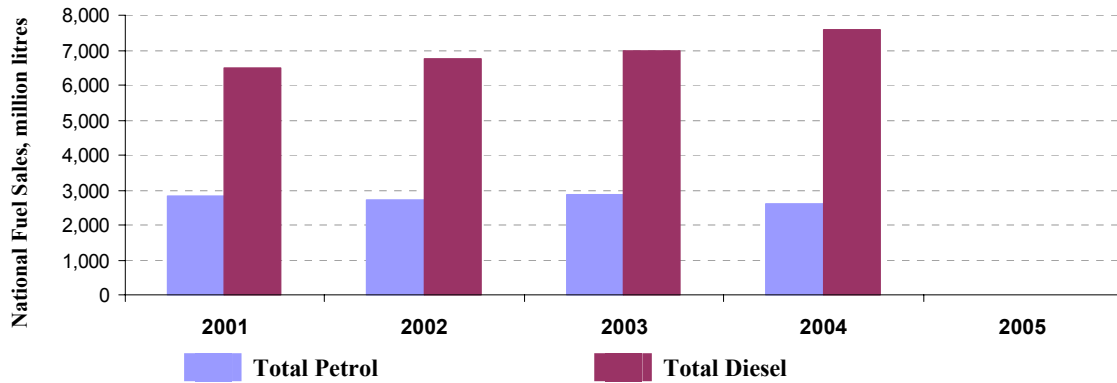
*Member State's notes:* See section 3.2.1

## 3.3 TEMPORAL TRENDS

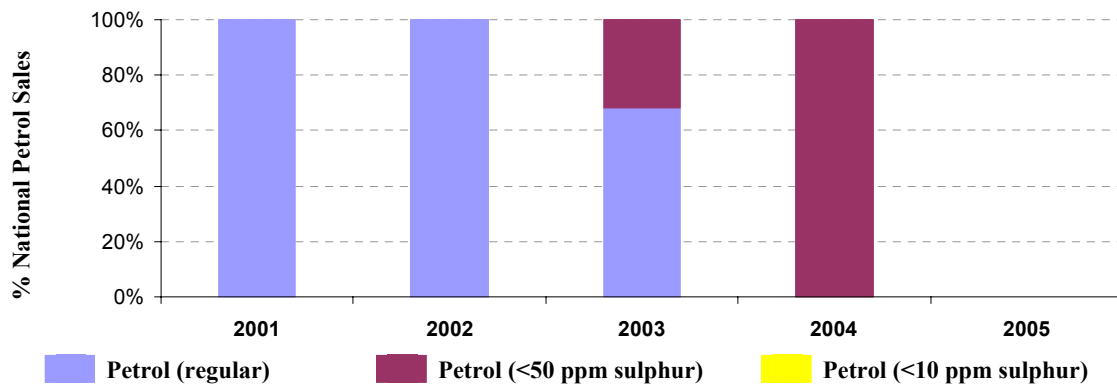
The following Figure 3.2 to Figure 3.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol have decreased by 7% since 2001, whilst those of diesel have increased by 17%. However, regular grades of petrol and diesel have been completely phased out – low sulphur diesel was introduced in 2002, low sulphur

RON 98 became available for the first time in 2003 and low sulphur RON 95 was introduced in 2004.

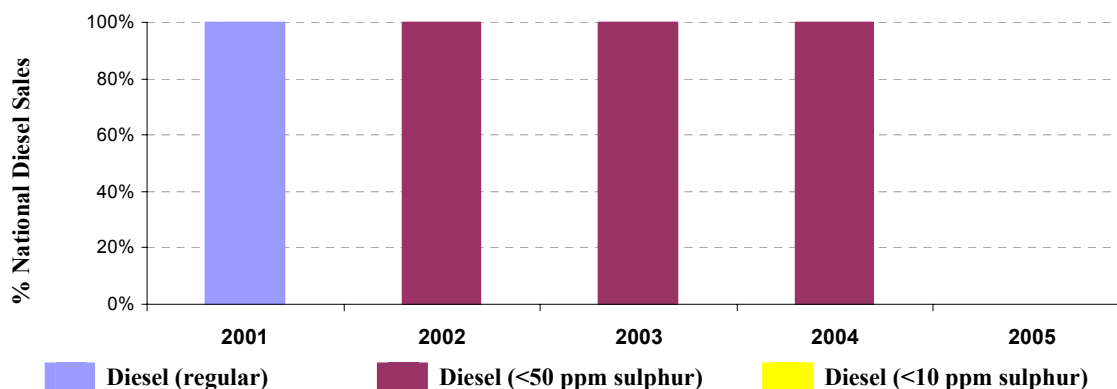
**Figure 3.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 4 Cyprus

### 4.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	Unleaded RON 95	Yes	4
10	RON 98	<150 ppm	Unleaded RON 98 and RON 100	Yes	10
13	Diesel	<350 ppm	Diesel 350 ppm Sulphur (Eurodiesel 0.035%)	Yes	13

#### 4.1.1 Sales

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

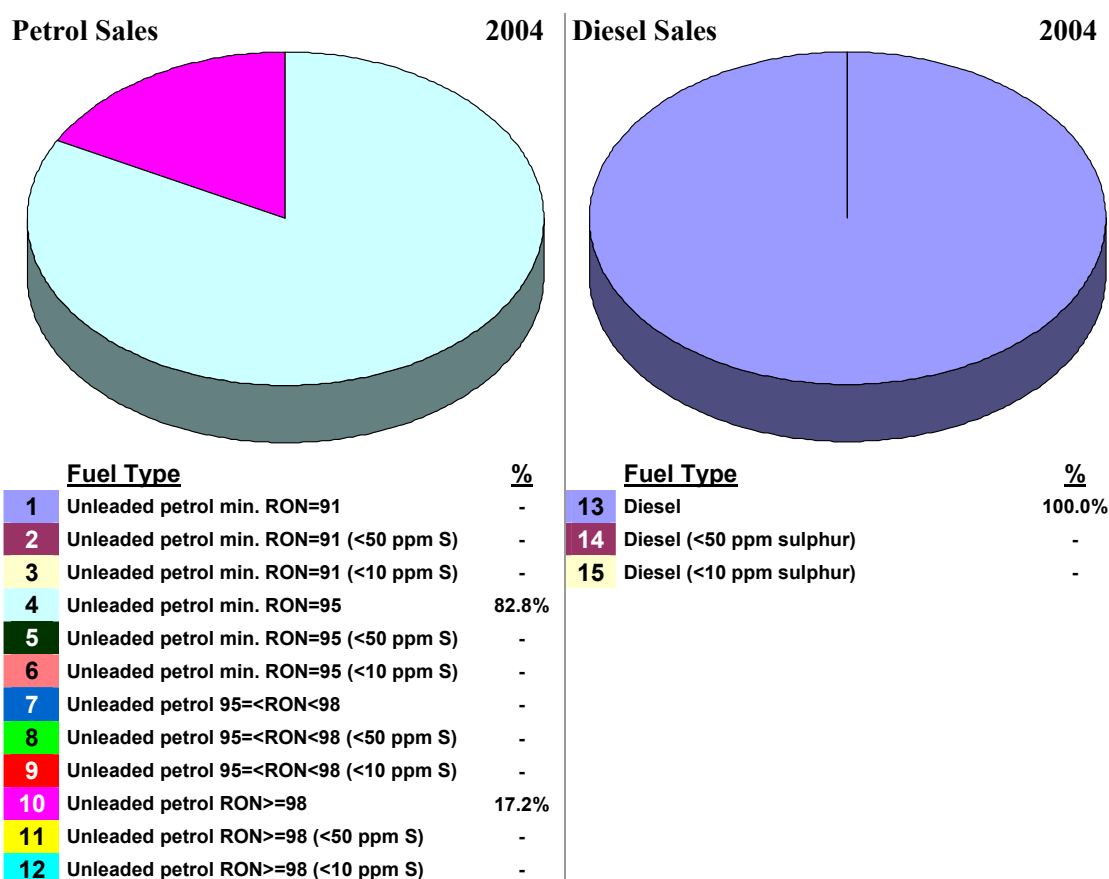


Figure 4.1 shows the majority of fuel available in 2004 in Cyprus was RON 95 (83%) and that no low sulphur grades of petrol or diesel were available.

**4.1.2 Sulphur content**

*Geographical availability of sulphur-free fuels:* none available in 2004.

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

*Average sulphur content of all petrol and diesel sold:* Table 4.1 shows the average content of fuel sold in 2004 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 4.1: Annual trend in average sulphur content in petrol and diesel fuels**

CY	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				70		38
<i>Diesel</i>				197		113

**4.2 FUEL QUALITY MONITORING 2004**

**4.2.1 Description of system**

*Responsible organisation(s):* Energy Service, 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:* starting from the date of joining the EU in May 2004, 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:* Cyprus is dependent completely 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 Oil Terminal Ltd (former refinery) are located in a single depot at the Larnaca coastal area. There are 250 petrol stations throughout the country.

**4.2.2 Sampling and reporting**

Cyprus was essentially compliant with the sampling and reporting requirements in 2004. The following Table 4.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	82.8%	22	28	-	No	12 of 18	(2)
10	RON 98	10	17.2%	12	10	-	No	12 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>34</b>	<b>38</b>	-	<b>No</b>	<b>12 of 18</b>	<b>(2)</b>
13	Diesel	13	100.0%	28	36	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>28</b>	<b>36</b>	-	<b>No</b>	<b>5 of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) 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. However, 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.

### 4.2.3 Compliance with fuel quality limit values

#### Exceedances of 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 summer vapour pressure limit value (of 60 kPa) was exceeded by some samples with a maximum of 60.6 kPa.

*Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8 kPa. All samples were therefore compliant with the Directive.

*Member State's notes:* -

##### **RON 98 Petrol**

*Detail:* Distillation at 150 °C limit values (min. 75 %v/v) was exceeded by some samples with a minimum of 67.4 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the test method is 72.6. These samples were therefore non-compliant with the Directive.

*Member State's notes:* -



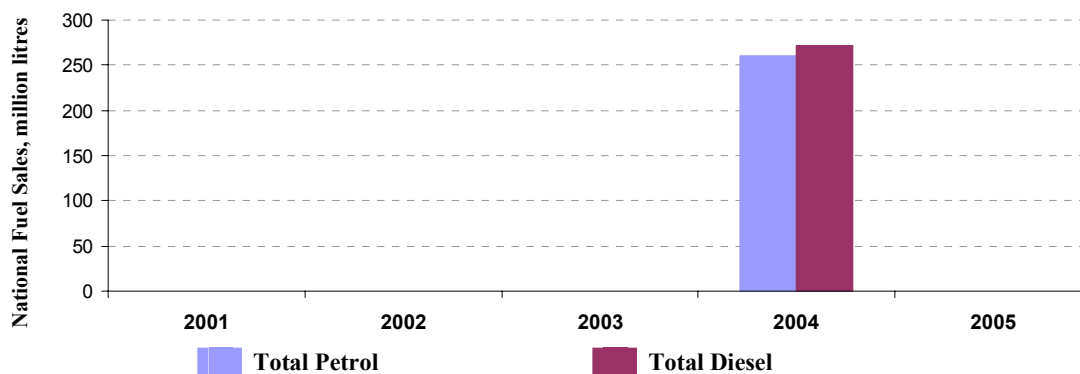
**Diesel**

*Member State's notes:* Some samples of diesel, taken from petrol stations with low sales, were out of specifications regarding sulphur content, mainly due to the diesel produced locally by the Cyprus refinery. These quantities of diesel were downgraded as heating gasoil.

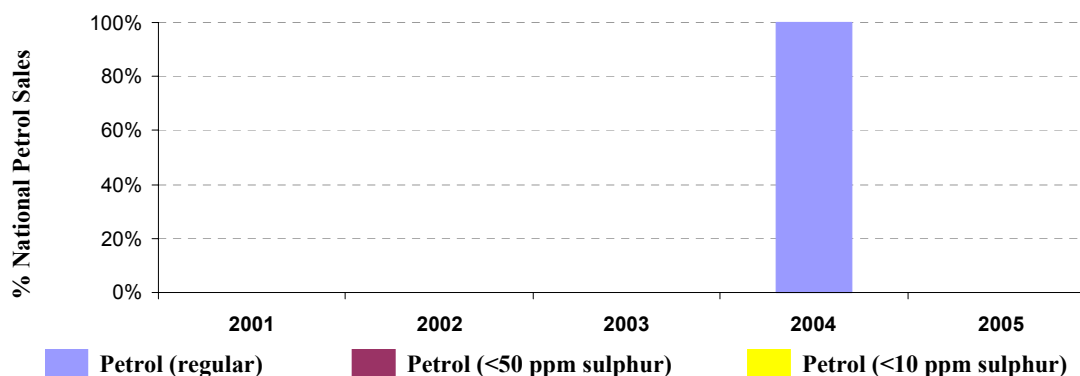
**4.3 TEMPORAL TRENDS**

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

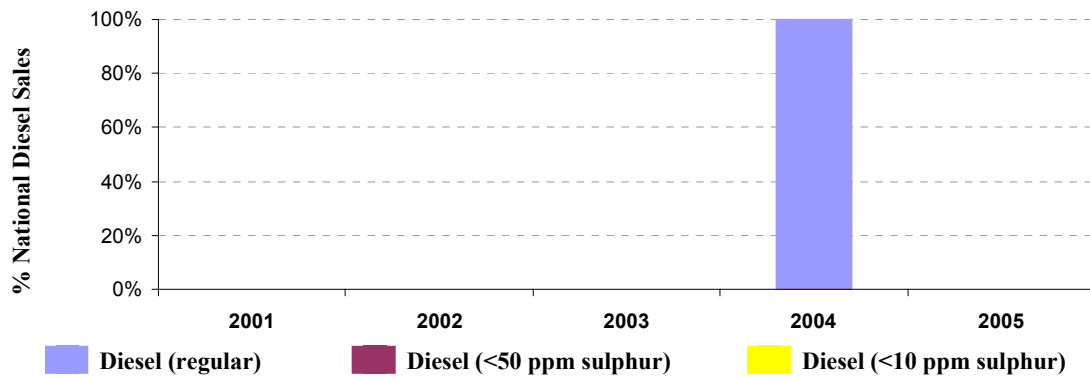
**Figure 4.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 5 Czech Republic

### 5.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	Normal BA-91/Speciál BA-91	Yes	1
4	RON 95	<150 ppm	SUPER BA-95	Yes	4
10	RON 98	<150 ppm	SUPER SPECIAL BA-98	Yes	10
13	Diesel	<350 ppm	Motorová nafta	Yes	13

#### 5.1.1 Sales

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

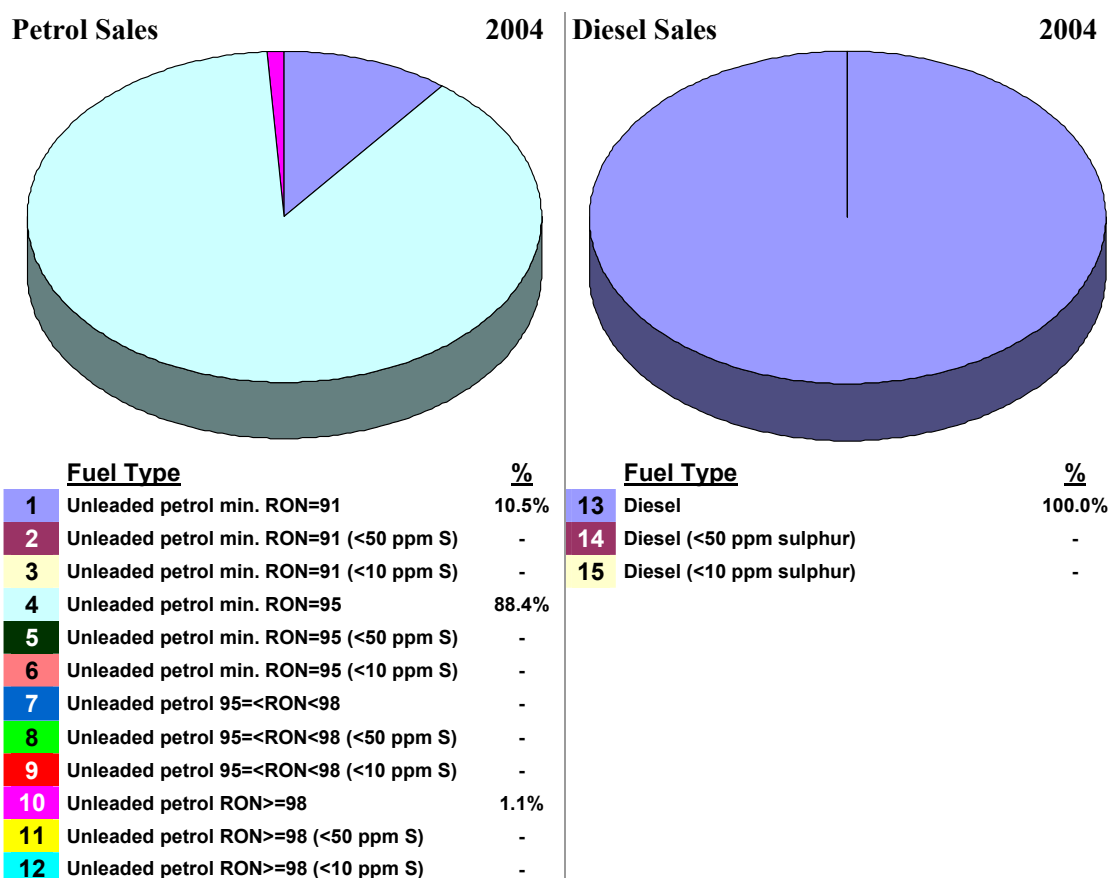


Figure 5.1 shows no low sulphur fuel grade is where available in 2004. Ron 91 only comprised of over 10% of Petrol Sales, with RON 95 accounting for 88% and RON 98 only 1%. There was only one grade of diesel available.

## 5.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Not available in 2004.

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

**Average sulphur content of all petrol and diesel sold:** Table 5.1 shows the average content of fuel sold in 2004 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 5.1: Annual trend in average sulphur content in petrol and diesel fuels**

<b>CZ</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>2004</b>
<b>Petrol</b>				132		38
<b>Diesel</b>				238		113

## 5.2 FUEL QUALITY MONITORING 2004

### 5.2.1 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:** January - December 2004, 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 on the method of collection.

**Other details:** Sampling was carried out by CTI (at 883 filling stations) and subsequent samples are analysed by accredited laboratory that is concurrently accredited inspection body.

## 5.2.2 Sampling and reporting

The Czech Republic was fully compliant with the sampling and reporting requirements in 2004. The following Table 5.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
1	RON 91	1	10.5%	117	152	100	No	All of 18	
4	RON 95	4	88.4%	214	278	100	No	All of 18	
10	RON 98	10	1.1%	4	15	2	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>335</b>	<b>445</b>	<b>202</b>	<b>No</b>	<b>All of 18</b>	
13	Diesel	13	100.0%	330	370	100	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>330</b>	<b>370</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

## 5.2.3 Compliance with fuel quality limit values

### Exceedances of 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, distillation at 100°C, olefins, aromatics, benzene and oxygen content limit values (of 60.0 kPa, min. 46 %v/v, 21.0 %v/v, 42.0 %v/v, 1.0 %v/v, 2.7 %m/m) were exceeded by 16, 3, 1, 3, 4 and 4 samples respectively. Sulphur content was also exceeded by a number of samples, the highest being 264 ppm (limit is 150 ppm).

*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).

**RON 95 Petrol**

*Detail:* The RON, MON, summer vapour pressure, distillation at 100°C, benzene, oxygen content, and methanol limit values (of min. 95, min. 85, 60.0 kPa, min. 46 %v/v, 1.0 %v/v, 2.7 %m/m and 3.0 %v/v) were exceeded by 6, 6, 9, 6, 6, 9 and 11 samples respectively. Sulphur content was also exceeded by a number of samples, the highest being 219 ppm (limit is 150 ppm).

*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:* As for RON 91 Petrol.

**RON 98 Petrol**

*Detail:* The summer vapour pressure limit value (of 60.0 kPa) was exceeded by 1 sample, with a value of 66.5.

*Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8. Therefore the sample was non-compliant with the Directive.

*Member State's notes:* As for RON 91 Petrol.

**Diesel**

*Detail:* The cetane number, density at 15°C, distillation 95 % point and sulphur content limit values (of min. 51, 845 kg/m<sup>3</sup>, 360°C and 350 ppm) were exceeded by two, 4, 16 and 18 samples.

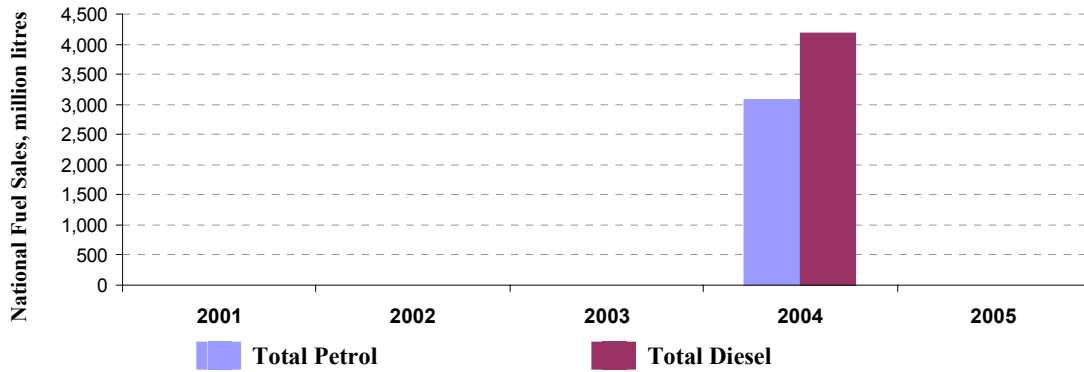
*Statistical significance:* The tolerance limits for statistical significance for these parameter test methods were not adhered to and therefore the samples were non-compliant with the Directive.

*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 several cases increased content of sulphur detected in diesel was caused by addition of light heating oils into diesels. General Directorate of the Customs together with the Czech Police are investigating this matter thoroughly.

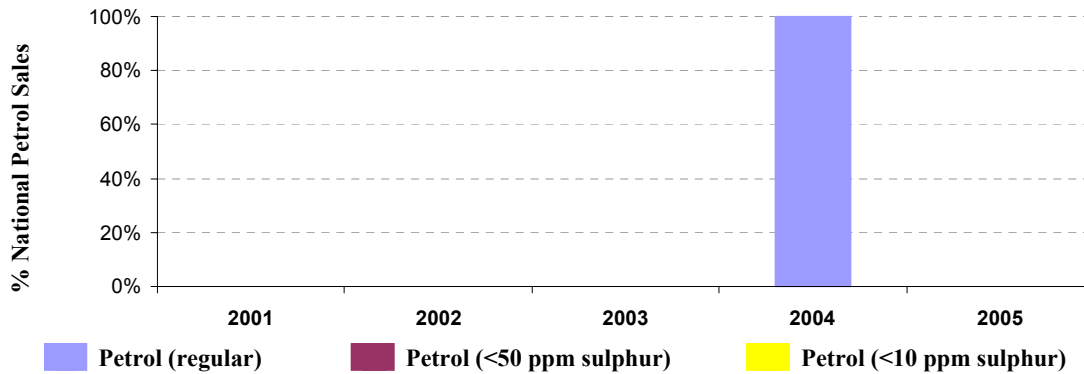
### 5.3 TEMPORAL TRENDS

The following Figure 5.2 to Figure 5.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

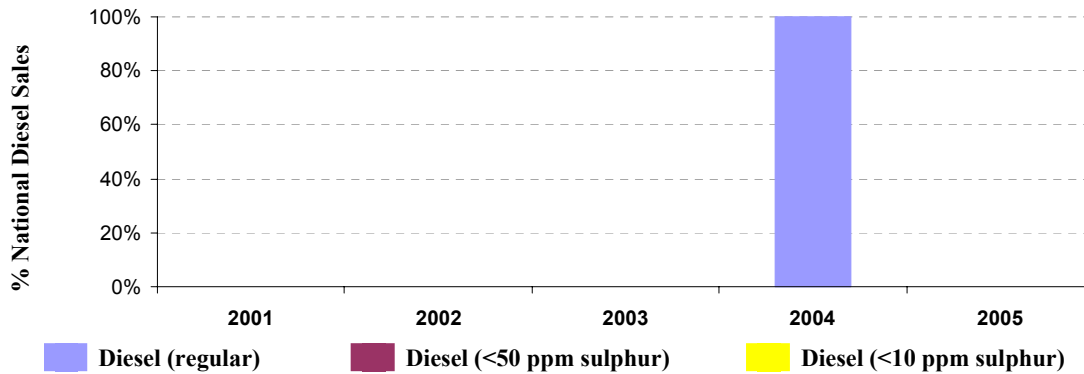
**Figure 5.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 6 Denmark

### 6.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	RON 92	Yes	1
4	RON 95	<150 ppm	RON 95	Yes	4
10	RON 98	<150 ppm	RON 98	Yes	10
14	Diesel	<50 ppm	Diesel	Yes	14

#### 6.1.1 Sales

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

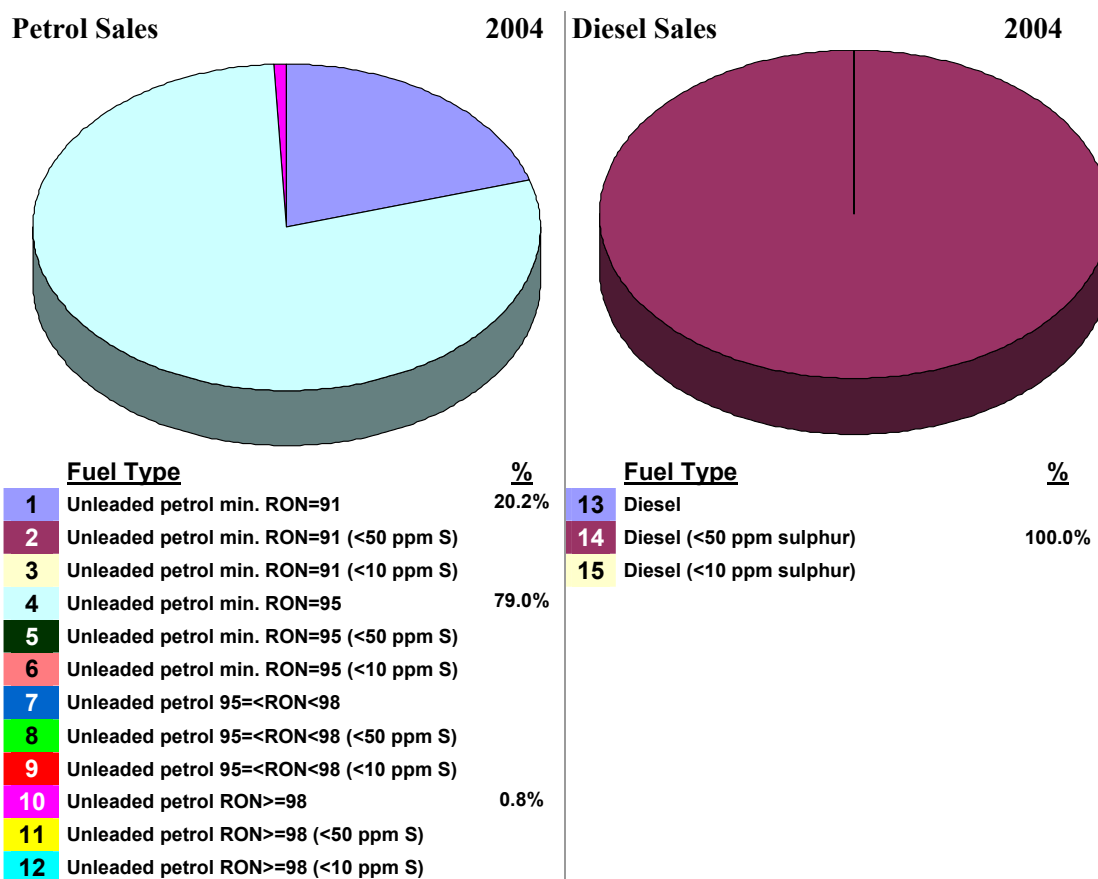


Figure 6.1 above shows that 20% of fuel sales in 2004 were at the lowest RON 91 petrol fuel grade – up slightly from 19% in 2001 - 2003. The majority of sales (79%) were again RON 95 grades, up from 76% in 2001, and the remainder of sales were RON>98. Whilst there



were no specific low sulphur (<50 ppm) petrol grades available in Denmark in 2004, all diesel fuel sold was of low sulphur content.

### 6.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None available in 2004.

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

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001 but is up slightly in 2004 compared to 2003, see Table 6.1. Despite a specific <50 ppm sulphur grade of petrol not being available, the average sulphur content of fuel sold shows that the majority of it meets this criteria.

**Additional information:** Although not required by national legislation, analysis of samples of RON > 98 petrol in 2004 have found that this met the low sulphur (<50 ppm) quality standard. Most of the samples of RON 91 and RON 95 petrol also met this quality standard. A fiscal incentive has been in place to promote auto diesel with sulphur content below 50 ppm since June 1999.

*[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**

<b>DK</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>2004</b>
<b>Petrol</b>	47	40	19	23		38
<b>Diesel</b>	51	48	28	35		113

## 6.2 FUEL QUALITY MONITORING 2004

### 6.2.1 Description of system

**Responsible organisation(s):** Danish Environmental Protection Agency, sampling and analysis by SGS Sweden.

**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)

**Location(s) of sampling:** Refuelling retail sites, half from the east of Storebaelt and the other half west of Storebaelt. Samples were taken from a representative spread of suppliers.

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

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

**Collection of sales data:** Official Danish statistics.

**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 re-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.

### 6.2.2 Sampling and reporting

Denmark was compliant with the sampling and reporting requirements in 2004. The following Table 6.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
1	RON 91	1	20.2%	3	3	-	No	All of 18	
4	RON 95	4	79.0%	14	16	-	No	All of 18	
10	RON 98	10	0.8%	1	3	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>18</b>	<b>22</b>	-	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	9	11	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>9</b>	<b>11</b>	-	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 6.2.3 Compliance with fuel quality limit values

#### Exceedances of 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**

None.

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

None.

#### **Petrol-RON 98**

None.

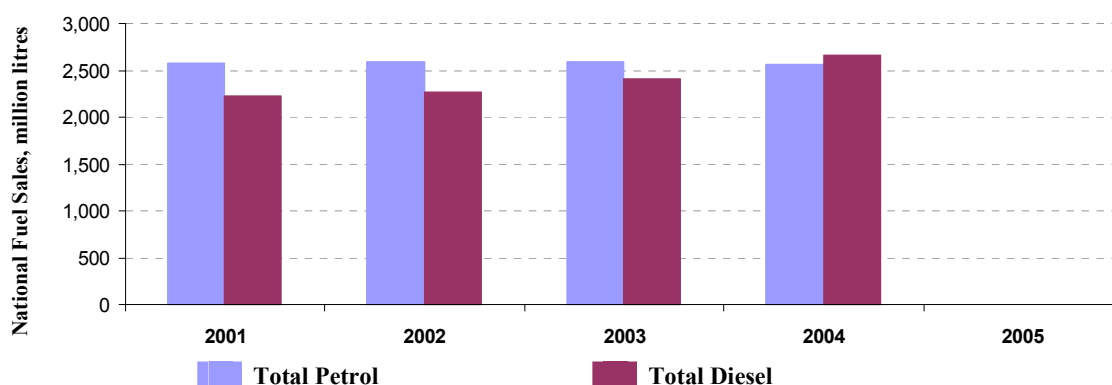
#### **Diesel**

None.

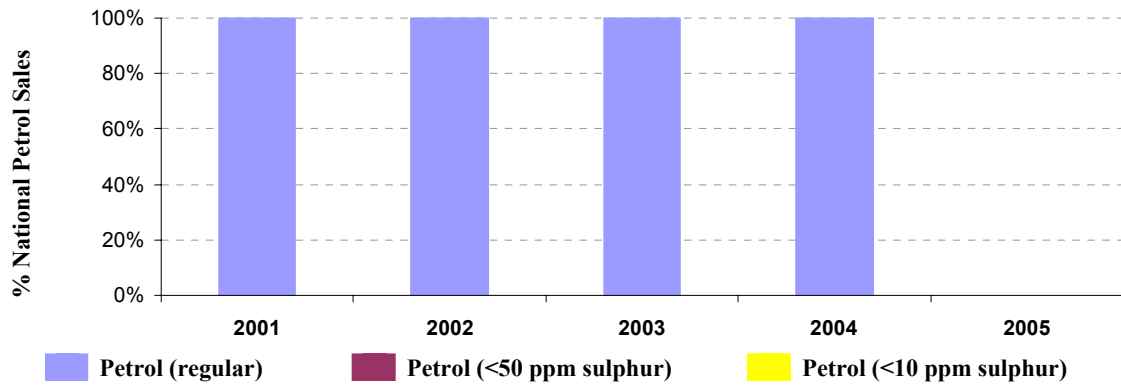
### 6.3 TEMPORAL TRENDS

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. There was little change in the sales of petrol (-1%), but a 20% increase in the sales of diesel since 2001. The sales of RON 91 and RON 95 petrol only increased by 8% and 3% respectively since 2001, but there was a 85% decrease in the sales of RON 98 fuel, though this fuel represents a small percentage of overall fuel sales. There was no change in the availability of low sulphur fuel grades.

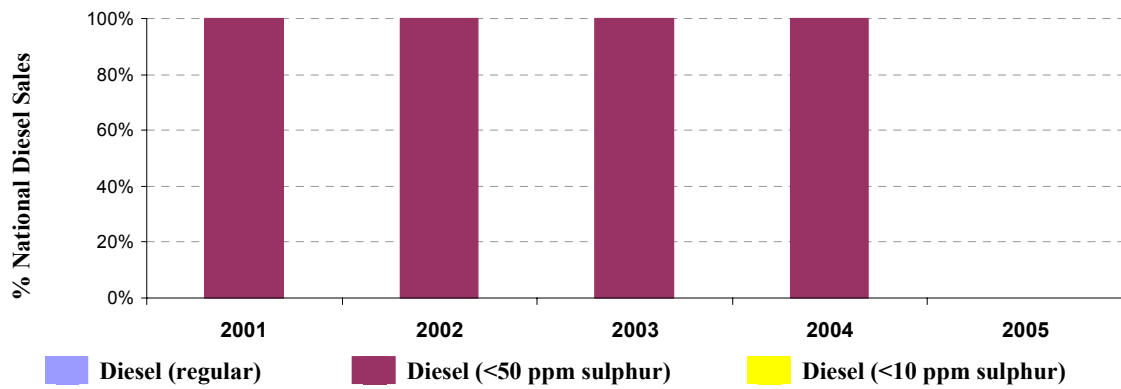
**Figure 6.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 7 Estonia

### 7.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	pliivaba bensiin 92	Yes	1
4	RON 95	<150 ppm	Pliivaba bensiin 95	Yes	4
10	RON 98	<150 ppm	Pliivaba bensiin 98	Yes	10
13	Diesel	<350 ppm	Diisel	Yes	13

#### 7.1.1 Sales

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

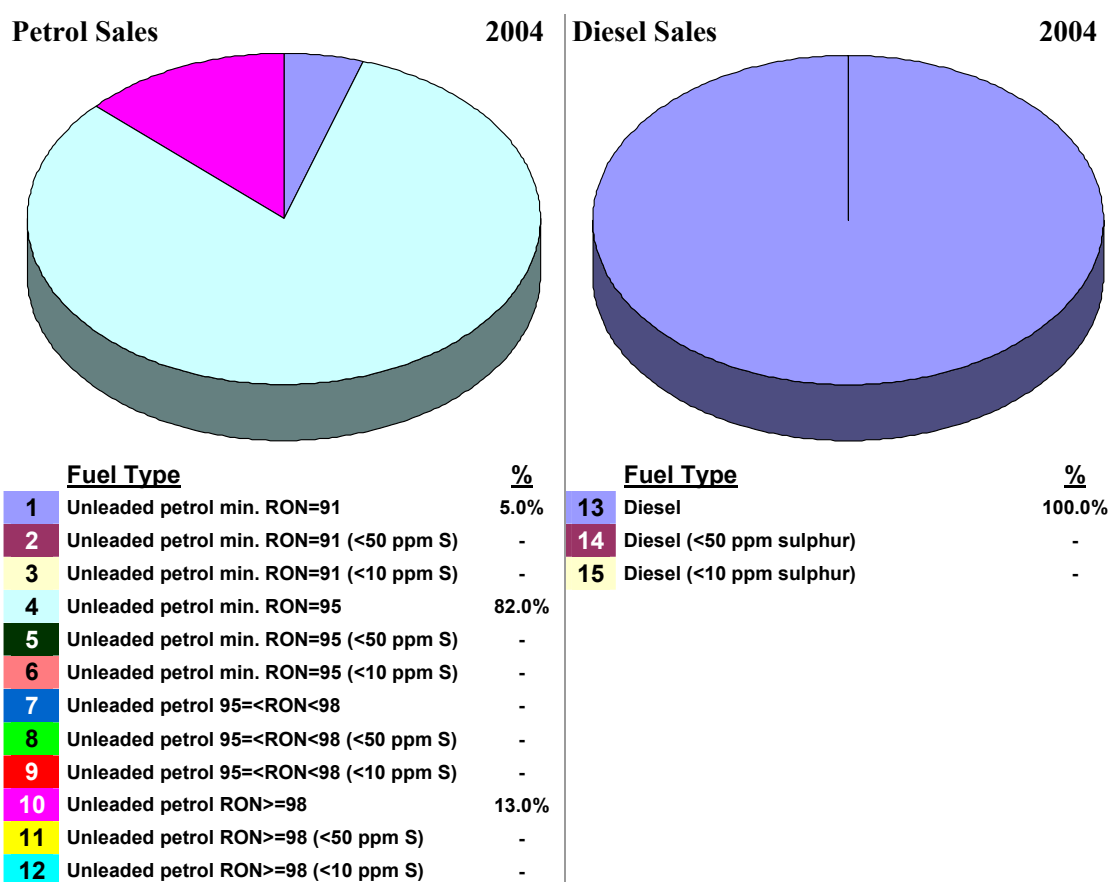


Figure 7.1 shows that no low sulphur fuel grades were available in 2004 and that the predominant petrol grade was RON 95 (80%), with 13% of petrol sales of RON 98 and only 5% RON 91.

### 7.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** not available in 2004.

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

**Average sulphur content of all petrol and diesel sold:** Table 7.1 shows the average content of fuel sold in 2004 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**

EE	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				57		38
<i>Diesel</i>				188		113

## 7.2 FUEL QUALITY MONITORING 2004

### 7.2.1 Description of system

**Responsible organisation(s):** Estonian Environmental Research Centre (EERC) is managing the FQMS and reporting the results. Tax and Customs Board (TCB) has taken for all samples and throughout the year, for this reporting period. The lab of EERC and another accredited lab carried out the analyses of samples.

**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:** Starting from the date of joining the EU in May 2004, 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 sales data of the fuels were provided by TCB.

**Other details:** The relative high amount of samples reflects the interest of TCB to identify possible cases of fraud, which is committed in consideration of the contrasting tax rates on diesel and light heating oil.

### 7.2.2 Sampling and reporting

Estonia was not compliant with the sampling and reporting requirements in 2004, as they only took samples for the Ron 95 grade of petrol and have failed to measure several mandatory parameters for petrol. The reason given is a delay in the Twinning Project designed to upgrade to the national testing laboratories to conduct the analyses of samples. It is hoped that the 2005 analyses will be complete. They have also not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 7.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
1	RON 91	1	5.0%	0	0	-			
4	RON 95	4	82.0%	65	58	-	No	7 of 18 (2)	
10	RON 98	10	13.0%	0	0	-			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>65</b>	<b>58</b>	<b>-</b>	<b>No</b>	<b>7 of 18 (2)</b>	
13	Diesel	13	100.0%	357	295	-	Yes	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>357</b>	<b>295</b>	<b>-</b>	<b>Yes</b>	<b>5 of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) The only petrol parameters measured were RON, DVPE, Distillation, Benzene, Sulphur and Lead.

### 7.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:* RON limit value (of min. 95) was exceeded by 3 samples.

*Statistical significance:* The tolerance limit for statistical significance for this test method was not adhered to and therefore the samples were non-compliant with the Directive.

*Member State's notes:* -

**Diesel**

*Detail:*

Sulphur content limit value (of 350 ppm) was exceeded by 35 samples, ranging from 355-963 ppm. The cetane number limit value (min. 51) was also exceeded by some samples.

*Statistical significance:*

The tolerance limit for statistical significance for the sulphur test method was not adhered to and therefore the samples were non-compliant with the Directive. The cetane number samples were within tolerance limits and therefore compliant.

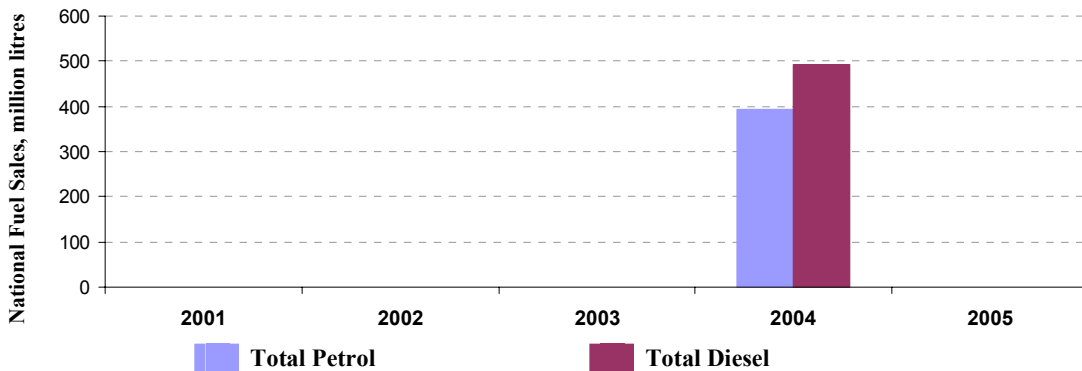
*Member State's notes:*

About 100 samples had some extraordinarily high levels of sulphur (400 - 1800 ppm) exceeding the limits; these cases are not comprised in the reporting table since they stem from non-representative samples. In all these non-complying cases liability procedures were immediately started.

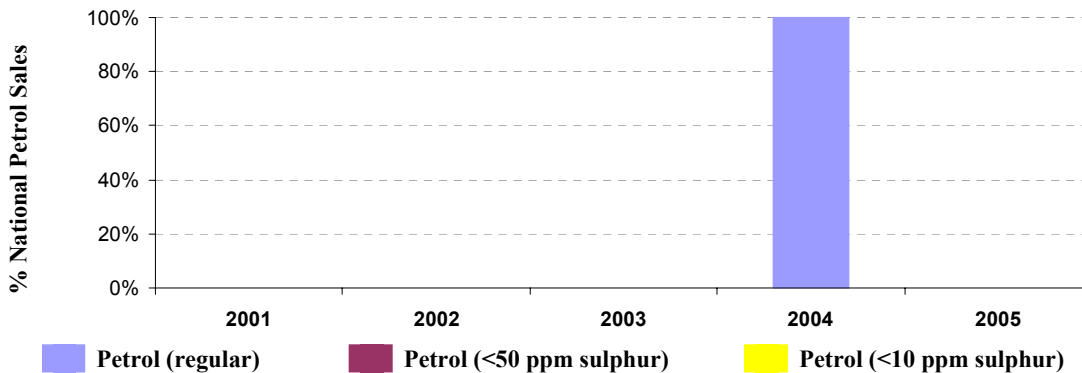
**7.3 TEMPORAL TRENDS**

The following Figure 7.2 to Figure 7.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

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

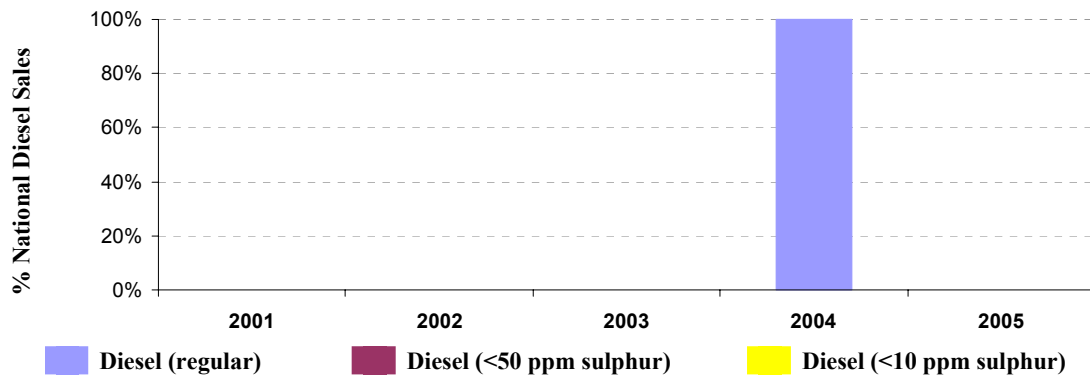


**Figure 7.3: Temporal trends in national sales of low sulphur petrol (%)**





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



## 8 Finland

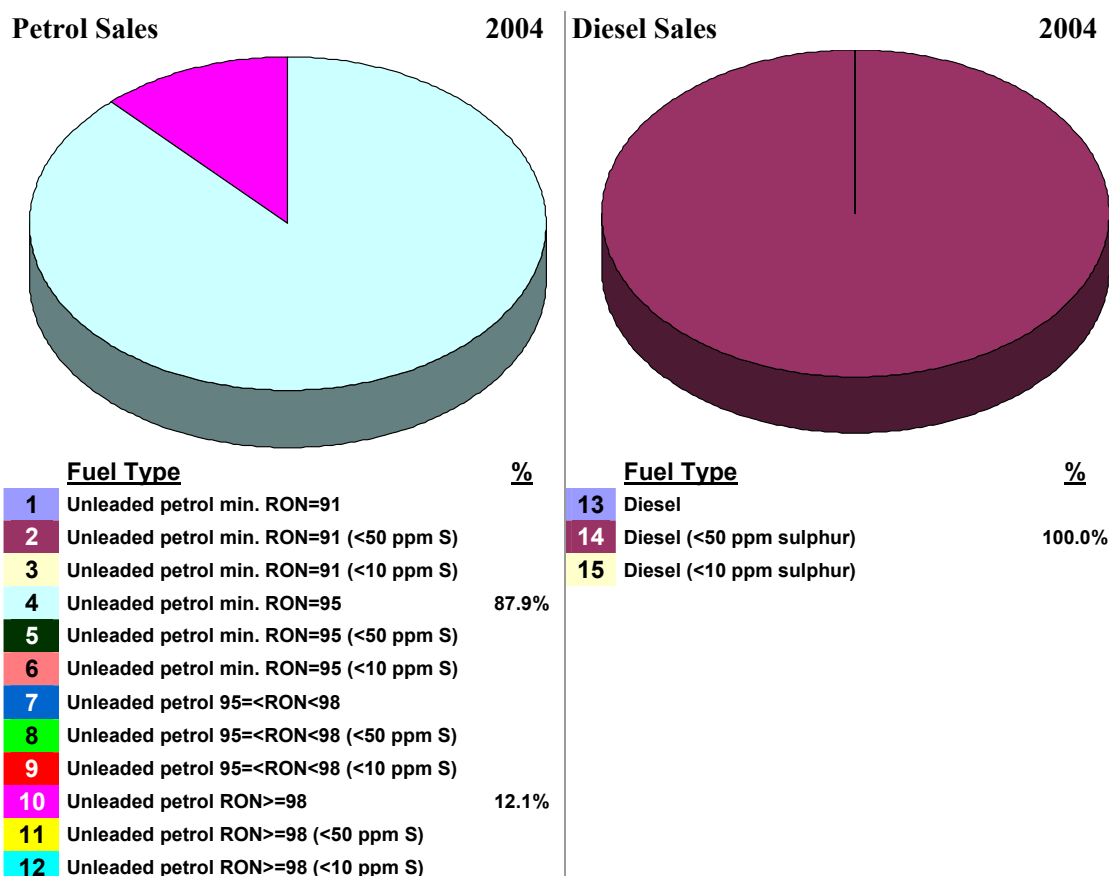
### 8.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	95 Okt.	Yes	4
10	RON 98	<150 ppm	98 Okt.	Yes	10
14	Diesel	<50 ppm	Diesel	Yes	14

#### 8.1.1 Sales

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



Of petrol sales, 88% were of RON 95 classification (up from 85% in 2001), with the remainder being of RON>98. All of the diesel fuel sold was low sulphur diesel (<50 ppm), although this was not required by National Standards. Petrol with low sulphur content (<50 ppm) was also available on the market. However, low sulphur qualities were not separated from the regular (parent) fuel grades in the Fuel Quality Monitoring System. Furthermore, the

sulphur content was not specifically presented at the point of sale, or in the annual sales statistics.

### 8.1.2 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. From the 1st September 2004 fiscal incentives were introduced for sulphur free petrol and diesel fuel (Law on the Excise Duty on Liquid Fuels 394/2004 amending the provisions of 1472/1994). The sulphur content of samples taken after this date was below 10 ppm in all studied qualities and in all macro regions.

**Are sulphur-free grades clearly labelled differently / marketed separately?** In the year 2004, sulphur-free (less than 10 ppm) grades were not marketed separately by displaying the sulphur content at the point of sale. As from the 1st January 2005 sulphur free qualities on the market have to be marked at the point of sale.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 8.1.

**Additional information:** Sulphur-free petrol and diesel fuel were found in the samples analysed. The lowest sulphur content found in RON 95 grade petrol was 5.2 mg/kg (average 11.2 mg/kg), while for RON 98 grade petrol it was 3.4 mg/kg (average 8.3 mg/kg) and for diesel fuel 1.6 mg/kg (average 6.7 mg/kg). The Finnish tax legislation in force during 2004 sets criteria for low sulphur diesel oil and the excise duty on this quality is lower than regular diesel. Consequently practically all diesel marketed in 2004 was low sulphur (or sulphur free).

*[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**

FI	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	84	53	23	11		38
<i>Diesel</i>	34	24	14	7		113

## 8.2 FUEL QUALITY MONITORING 2004

### 8.2.1 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

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

**Summer Period:** 1st June to 31st August (Arctic)

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

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

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

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

**Other details:** Monitoring and reporting for the independent region of Åland was separate from the mainland. These results are not included in this report. It is anticipated, however, that already in 2005 the test results from Åland and mainland will be merged.

### 8.2.2 Sampling and reporting

Finland was compliant with the sampling and reporting requirements in 2004. The following Table 8.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	87.9%	55	58	100	Yes	All of 18	
10	RON 98	10	12.1%	55	58	100	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>110</b>	<b>116</b>	<b>200</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	53	50	100	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>53</b>	<b>50</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 8.2.3 Compliance with fuel quality limit values

#### Exceedances of 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 and tolerance limits for summer vapour pressure (70 and 71.9 respectively), with a value of 80.7. Samples exceeded the minimum limit value for MON (85), with minimum value of 84.8. One sample also

exceeded the distillation at 100°C limit (46.0 % v/v min.) with a value of 45.4 % v/v.

*Statistical significance:* The statistical significance tolerance limit (95% confidence) indicates that the summer vapour pressure sample was noncompliant with the Directive. The other samples were within tolerance limits.

*Member State's notes:* The observed exceedance of the limit value and the tolerance limits was taken on 1<sup>st</sup> June from a retail site where winter quality fuel had not yet been replaced by the summer quality. Replicate samples were taken and analysed after two weeks and that the vapour pressure of all control samples was below the limit value.

### ***Petrol-RON 98***

*Detail:* Two samples exceeded the maximum limit value and tolerance limits for summer vapour pressure (70 and 71.9 respectively), with values of 81.7 and 79.8. One sample exceeded the maximum limit value for ethers (15.0 %v/v) with 15.3 %(v/v). One sample also exceeded the distillation at 100°C limit (46.0 % v/v min.) with a value of 44.5 % v/v.

*Statistical significance:* The statistical significance tolerance limit (95% confidence) for summer vapour pressure was exceeded; therefore the sample was in breach of the Directive. Other samples were within the tolerance limits.

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

### ***Diesel***

#### ***Diesel***

*Detail:* The lowest cetane number 50.8 was below the limit value 51.0 but within the allowed tolerance limit 48.4.

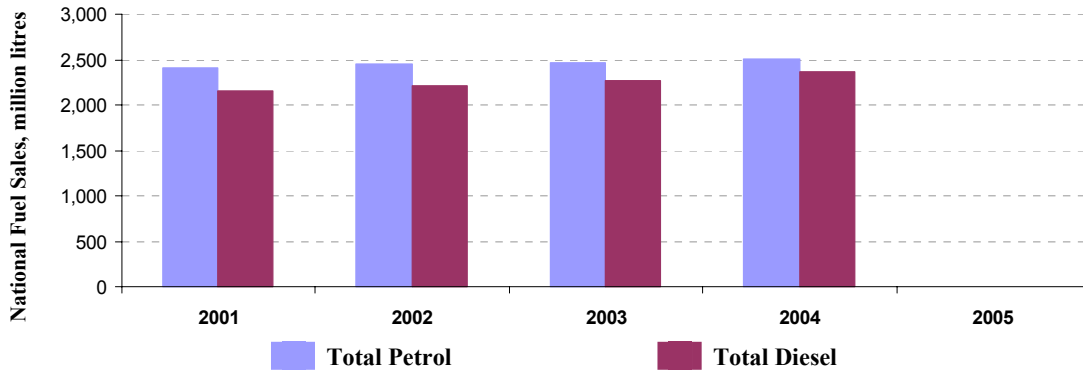
*Statistical significance:* The statistical significance tolerance limit (95% confidence) for cetane was not exceeded; therefore the sample was not in breach of the Directive.

*Member State's notes:* -

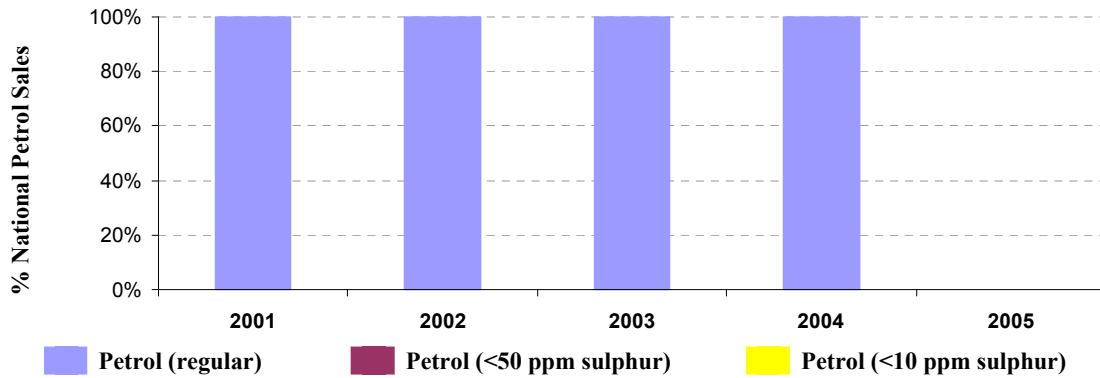
## **8.3 TEMPORAL TRENDS**

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. Small increases occurred in the sales of petrol and diesel between 2001 and 2004 (4% for petrol and for 9% for diesel). There was no separate data collection on the availability of low sulphur petrol, and subsequently no separate data reporting. Sales of regular sulphur diesel fuel have decreased to 0 since 2001, with 100% of diesel fuel now being of low sulphur (<50 ppm) quality.

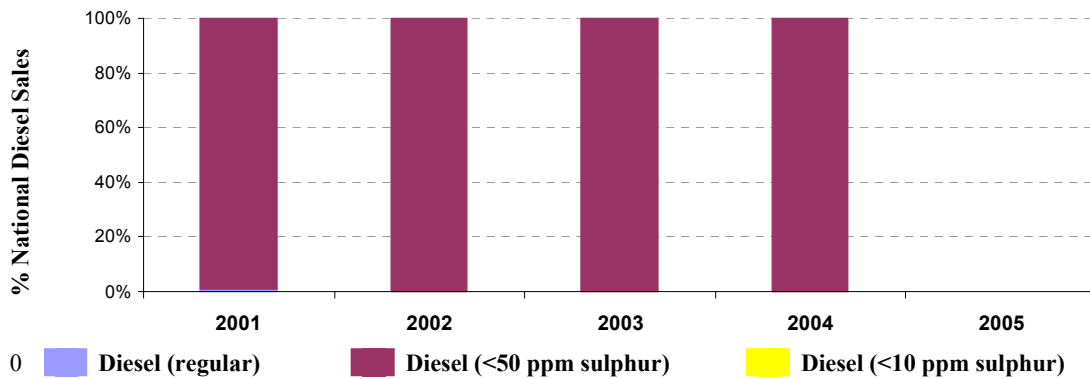
**Figure 8.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## **9 France**

**France provided no reporting submissions for 2003 or 2004 fuel quality monitoring.**

## 10 Germany

### 10.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
3	RON 91	<10 ppm	Benzin Normal	Yes	3
6	RON 95	<10 ppm	Superbenzene	Yes	6
9	95<RON<98	<10 ppm	Eurosuper	Yes	6
12	RON 98	<10 ppm	Super Plus	Yes	12
15	Diesel	<10 ppm	Dieselmotoren, schwefelfrei	Yes	15

#### 10.1.1 Sales

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

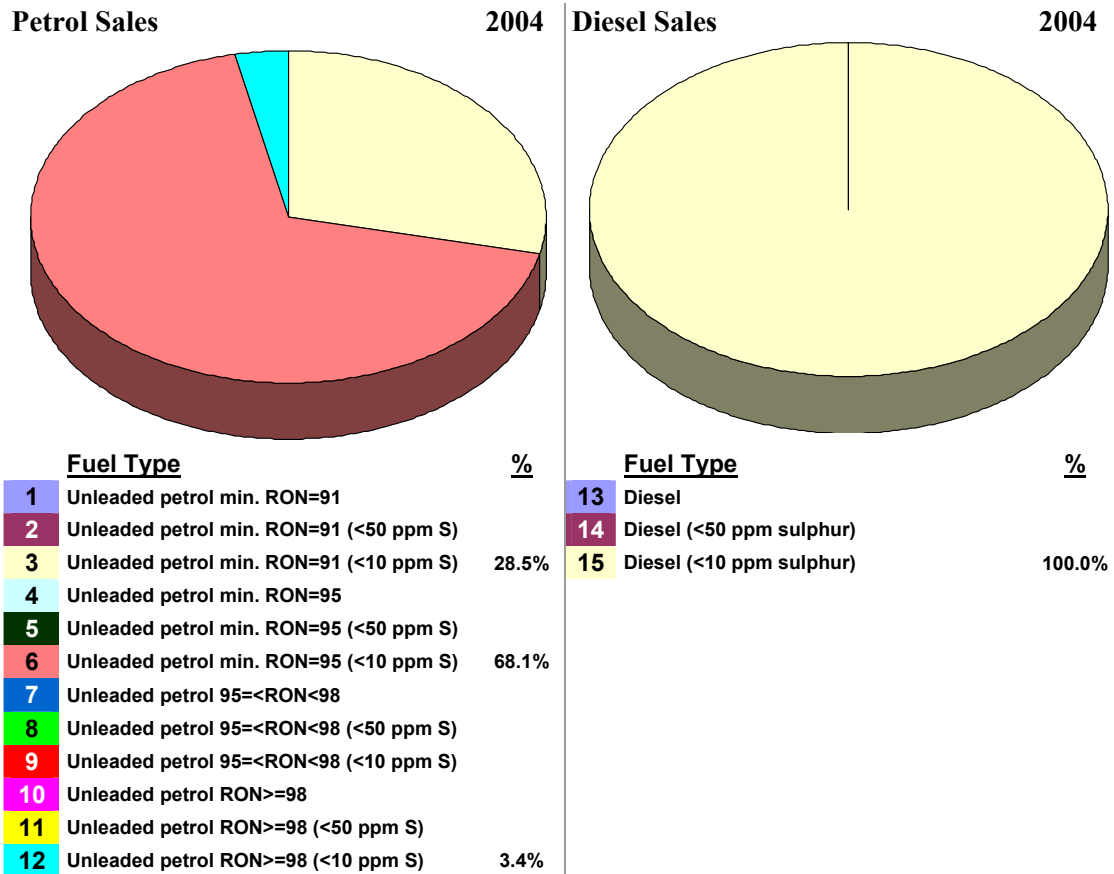


Figure 10.1 shows that as for 2003, in 2004 the German market has switched entirely to sulphur free fuels since 2002. Whilst most of the fuel sold was RON 95 quality (68%



compared to 55% in 2001), 29% of fuel sold was still RON 91. All diesel sold was sulphur-free (<10 ppm) grade.

### 10.1.2 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.

**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 10.1.

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

<b>DE</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>2004</b>
<b>Petrol</b>	54	23	7	7		38
<b>Diesel</b>	249	31	8	7		113

## 10.2 FUEL QUALITY MONITORING 2004

### 10.2.1 Description of system

**Responsible organisation(s):** Federal Environmental Protection Agency receiving the data from and the Federal States and Offices underneath.

**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:** Gathered and published by the Federal Office for Economy and Export Control (BAFA) on the basis of the Mineral Oil Data Law.

**Other details:** With regard to specification exceedances, 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.

### 10.2.2 Sampling and reporting

Germany was compliant with the sampling and reporting requirements in 2004, however they have not provided information on whether their national monitoring system is equivalent in statistical confidence with the requirements of EN 14274. The following Table 10.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
3	RON 91 <10ppm S	3	28.5%	68	77	-	No	All of 18	
6	RON 95 <10 ppm S	6	68.1%	98	88	-	No	All of 18	
9	95<RON<98 <10 ppm S	6				-			
12	RON 98 <10 ppm S	12	3.4%	41	45	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>207</b>	<b>210</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	98	114	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>98</b>	<b>114</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2)

(3)

### 10.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:*

Two samples determined in Thüringen were below the minimum value for MON of 82.5, with values of 82.3 and 82.4. In North Rhein Westphalia one exceedance of the limit value for summer vote pressure of 60.0kPa was determined at 65.7kPa.

*Statistical significance:*

The tolerance limit for statistical significance for vapour pressure test method is 61.7 kPa, therefore the sample was non-compliance with the Directive. The MON samples were within the tolerance limits.

*Member State's notes:*

No complaint was raised.

#### **Petrol RON 95**

- Detail:* There were 3 samples found to be below the minimum RON value of 95.0: in Schleswig Holstein at 94.0, Berlin at 94.6, Rheinland Palatinate at 92.2. There were 5 samples found to be below the minimum MON value of 85.0 in: Baden-Württemberg at 84.9, Brandenburg at 84.8, Hamburg at 84.8, Rheinland Palatinate at 84.9, Thüringen at 84.9.
- The value for Distillation up to 100°C in Bavaria at 45.5% was under the limit value of 46.0%.
- The aromatic content value (42%v/v) in NRW was exceeded, at 43.5% below the limit value of 45.0%. No complaint was raised.
- Statistical significance:* The tolerance limits for MON (84.5) and Distillation (46%v/v) and aromatics content (43.5%v/v) were not exceeded. Therefore these samples were compliant with the Directive. Samples exceeded the RON tolerance limit (94.6) and were therefore noncompliant with the Directive.
- Member State's notes:* The petrol station owners were made aware of the low value by the monitoring authority and tested again in the next sampling exercise.

**Petrol RON 98**

- Detail:* One sample exceeded the limit values for distillation at 100°C (min 46.0%v/v) with value of 45.8%v/v.
- Statistical significance:* The tolerance limit for distillation (min. 41.9%v/v) was not exceeded and therefore the sample was compliant with the Directive.
- Member State's notes:* -

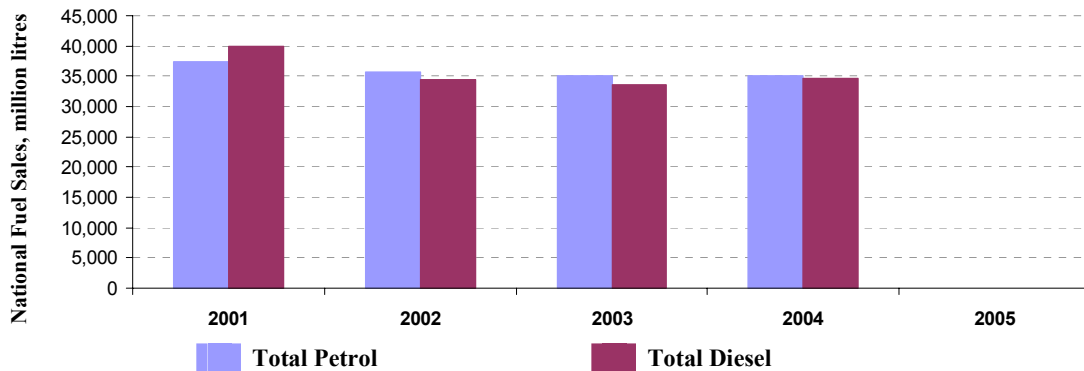
**Diesel**

None.

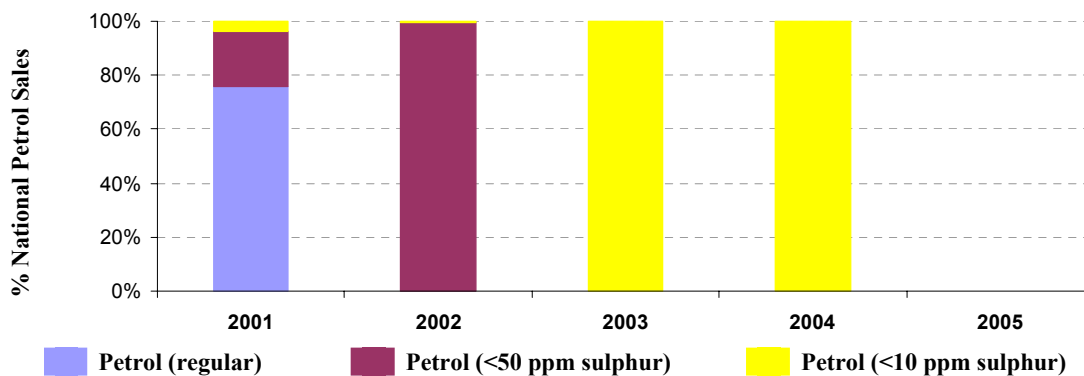
### 10.3 TEMPORAL TRENDS

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. Between 2001 and 2004, sales of petrol decreased by 6%, while sales of diesel decreased by 13%. Since end of 2002, all petrol and diesel grades have switched to sulphur free fuel.

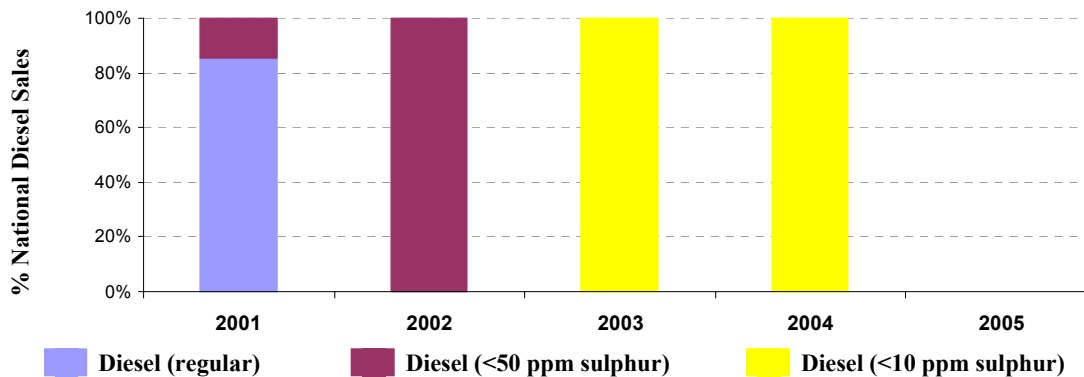
**Figure 10.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 11 Greece

### 11.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	RON 95	Yes	4
7	95<RON<98	<150 ppm	Lead Replaced Petrol (LRP)	Yes	7
10	RON 98	<150 ppm	RON 98	Yes	10
11	RON 98	<50 ppm	RON 98	Yes	10
13	Diesel	<350 ppm	Diesel	Yes	13
14	Diesel	<50 ppm	Diesel	Yes	13
15	Diesel	<10 ppm	Diesel	Yes	13

#### 11.1.1 Sales

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

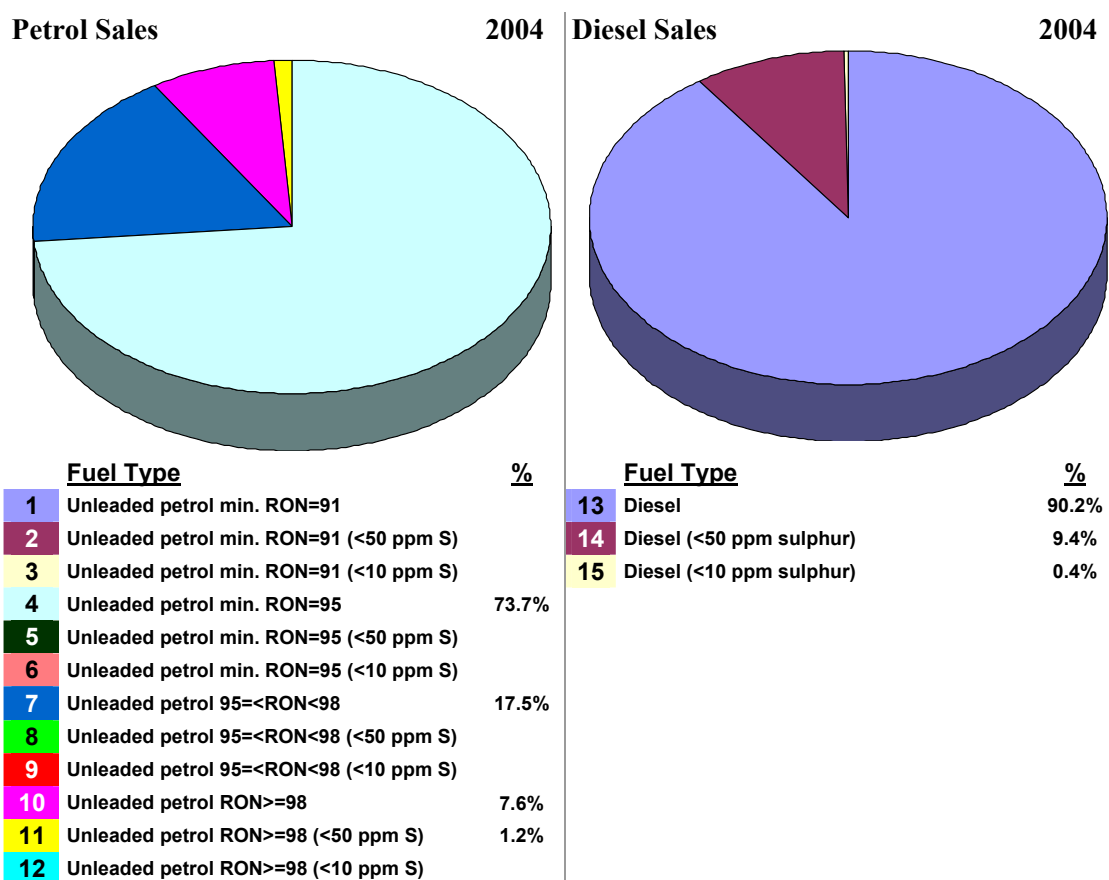


Figure 11.1 above shows that the number of grades of petrol available in Greece in 2004 has increased to four since 2002, with the majority of petrol sold, 74% (93% in 2001), being RON 95 level. Low sulphur fuel sales were available for petrol and diesel, though total sales were low. Sales of Lead Replacement Petrol (LRP – reported under Unleaded petrol 95=<RON<98) were provided again for 2004 (for the first time for 2003).

**11.1.2 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. In 2004 only small quantities of sulphur free diesel were available in Greece.

From 1st January 2005, only <50 ppm sulphur fuel has been sold at service stations. In addition, the new <10ppm sulphur diesel has been progressively introduced for selling at the service stations, mainly at the national roads. Petrol grade of RON ≥98 with sulphur 10ppm or less is being produced at the refineries, from the 1st June 2005.

Currently, for petrol and diesel fuels, the geographical distribution is not fully balanced (in some areas the 10ppm is not available). This happens, because the oil companies are mainly choosing the service stations, where sulphur free fuel is sold depending on the local market. From years 2005 to 2009, a stepwise progression (based on logistics constraints and actual demand) rather than a linear rise of sulphur free fuels (logistically impossible) is expected.

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of petrol has decreased since 2001, however it has increased slightly for diesel, see Table 11.1.

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

EL	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	108	72	92	69		38
<i>Diesel</i>	281	500	290	283		113

## 11.2 FUEL QUALITY MONITORING 2004

### 11.2.1 Description of system

**Responsible organisation(s):** General State Chemical Laboratory (GCSL)

**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 and petrol stations.

**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 fully applied in 2004 due to technical reasons. 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 and other departments of the Ministry of Economy and Finance, the Ministry of Development and the Ministry of Environment, which are also responsible for sampling. There is a difficulty of coordinating the three above authorities for sampling exactly as the relevant standard mentions. This is the main technical reason why the monitoring system has not been fully applied.

In the laboratories of GCSL, parameters of fuels (e.g. markers SY124 and quinizarine, sulphur content, density and distillation) important for investigating adulteration and smuggling events are also measured. It has to be noted that, each year, more than 4000 samples that are taken by the petrol stations are tested for adulteration and smuggling reasons by the GCSL laboratories. However, the parameters tested, of the samples taken by the petrol stations, are not in full accordance with those that the relevant standard requires. So, for the statistical analysis carried out for the present report, the percentage of the petrol station samples is between 3-5% of total. However, as mentioned above, for smuggling reasons, the applied monitoring system is different to that of the standard EN 14274, and as such it has not been counted in the present statistical analysis.

### 11.2.2 Sampling and reporting

Greece was in most respects compliant with the sampling and reporting requirements in 2004. The sampling was carried out at refineries, terminals/depots and refuelling stations, however the number of samples at refuelling stations were not sufficient to meet the criteria of EN 14274 (see details in previous section). The following Table 11.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	73.7%	44	72	100	Yes	11 of 18	(2)
7	95<RON<98	7	17.5%	43	60	100	Yes	11 of 18	(2)
10	RON 98	10	7.6%	14	35	10	Yes	11 of 18	(2)
11	RON 98 <50 ppm S	10	1.2%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>101</b>	<b>167</b>	<b>210</b>	<b>Yes</b>	<b>11 of 18</b>	<b>(2)</b>
13	Diesel	13	90.2%	63	75	100	No	5 of 5	
14	Diesel <50 ppm S	13	9.4%	0	0				
15	Diesel <10 ppm S	13	0.4%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>63</b>	<b>75</b>	<b>100</b>	<b>No</b>	<b>5 of 5</b>	

Notes: S = Summer; W = Winter

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been measured

### 11.2.3 Compliance with fuel quality limit values

#### Exceedances of 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**

None.

#### **LRP**

None.

#### **Petrol RON 98**

None.

#### **Diesel**

None.

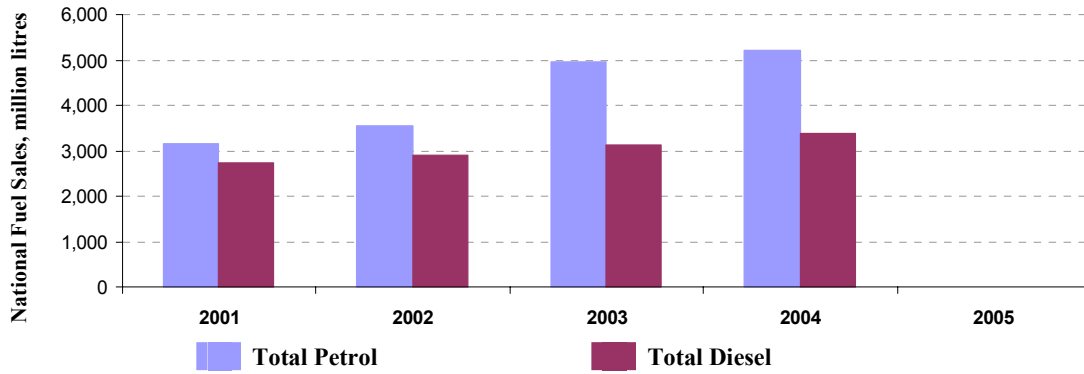
## 11.3 TEMPORAL TRENDS

The following Figure 11.2 to Figure 11.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol increased by 66% between 2001 and 2004 (up 40% between 2002 and 2003), with sales of diesel increasing by 24%. 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. These comprised almost 18% of total sales in 2004 (22% in 2003) and would explain the large increase in total sales since 2001 and 2002 (when LRP data was not provided/available). Low sulphur fuel was put on sale for the first time in 2003, with sales of low sulphur petrol and

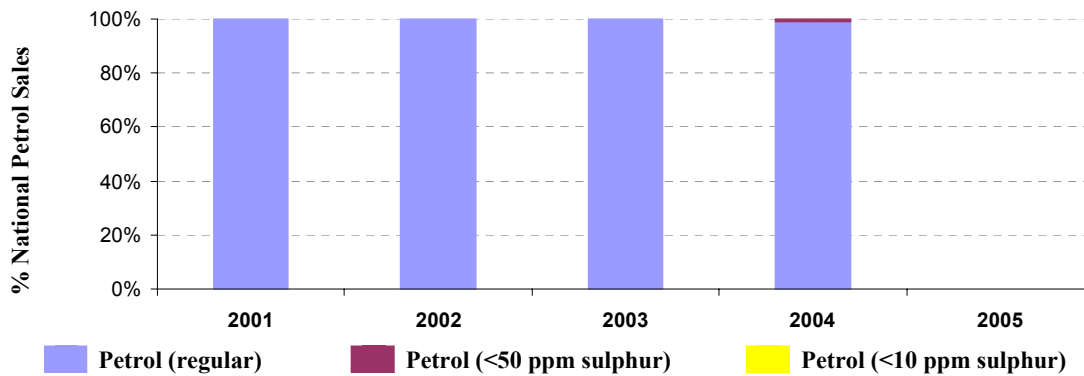


diesel contributing 1.2% and 9.4% respectively in 2004. Small quantities of sulphur free diesel were also sold in 2004 for the first time (0.4%).

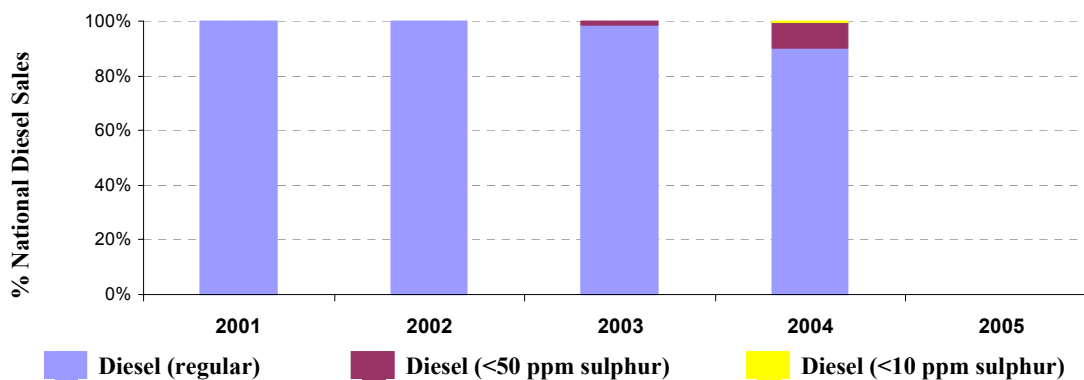
**Figure 11.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 12 Hungary

### 12.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	En-91	Yes	1
4	RON 95	<150 ppm	Esz-95	Yes	4
10	RON 98	<150 ppm	Esz-98	Yes	10
13	Diesel	<350 ppm	Diesel fuel	Yes	13

#### 12.1.1 Sales

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

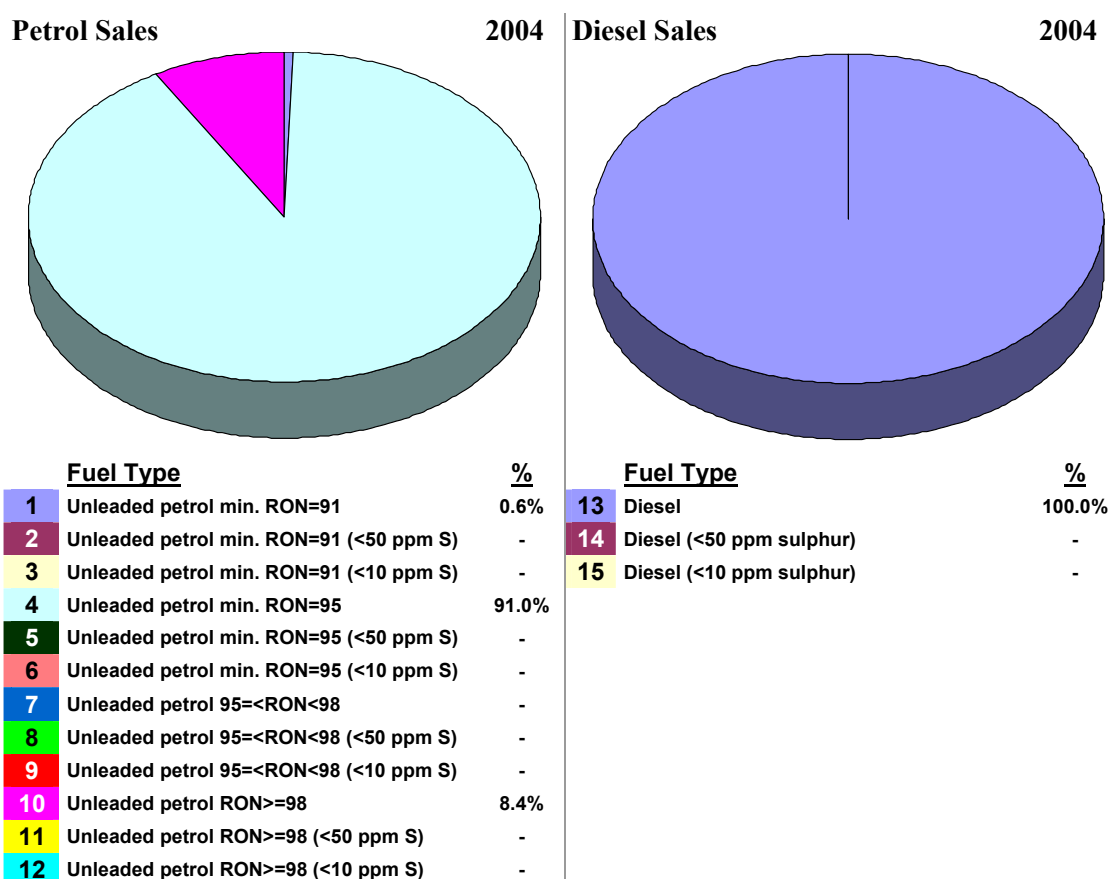


Figure 12.1 shows that there were no low sulphur fuel grades available in 2004. The majority of fuel sold comprised RON 95 (91%), with most of the remainder being RON 98 (8.4%). Only very small quantities (< 1%) of RON 91 were sold.

### 12.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In 2004 oil companies did not claim to market sulphur-free fuels, however, some top quality fuels belonged to this category. It is considered very likely that Hungary will be able to complete the appropriately balanced geographical availability of sulphur-free fuels in 2005.

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

**Average sulphur content of all petrol and diesel sold:** Table 12.1 shows the average content of fuel sold in 2004 in relation to the EU25 average.

**Additional information:** According to test results the sulphur content of the premium unleaded petrol (Esz-95) and diesel fuels was less than 50 mg/kg, and that of super unleaded petrol (Esz-98), with only one exception, was less than 10 mg/kg. This means that the quality of marketed petrol and diesel fuels in the period from November - December 2004 fulfilled the requirements stated in relevant product standards coming out in 1st January 2005, and the quality of super unleaded petrol (Esz-98) marketed in the same period fulfilled the requirements coming out 1st January 2009.

*[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**

<b>HU</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>2004</b>
<i><b>Petrol</b></i>				13		38
<i><b>Diesel</b></i>				31		113

## 12.2 FUEL QUALITY MONITORING 2004

### 12.2.1 Description of system

**Responsible organisation(s):** Ministry of Economy and Transport and 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:** Starting from the date of joining the EU in May 2004, 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 monthly and yearly data originated from Energy Efficiency, Environment and Energy Information Agency Non-Profit Company and Hungarian Petroleum Association (MÁSZ).

### 12.2.2 Sampling and reporting

Hungary was not compliant with the sampling and reporting requirements in 2004, as it did not take sufficient samples (according to EN 14274) and only carried out sampling in the Winter period (November and December 2004). The following Table 12.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
1	RON 91	1	0.6%	0	0	1			
4	RON 95	4	91.0%	0	17	100	No	12 of 18	(2)
10	RON 98	10	8.4%	0	4	9	No	12 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>0</b>	<b>21</b>	<b>110</b>	<b>No</b>	<b>12 of 18</b>	<b>(2)</b>
13	Diesel	13	100.0%	0	18	100	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>0</b>	<b>18</b>	<b>100</b>	<b>No</b>	<b>5 of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) 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. However, 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.

### 12.2.3 Compliance with fuel quality limit values

#### Exceedances of 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**

None.

#### **RON 98 Petrol**

None.

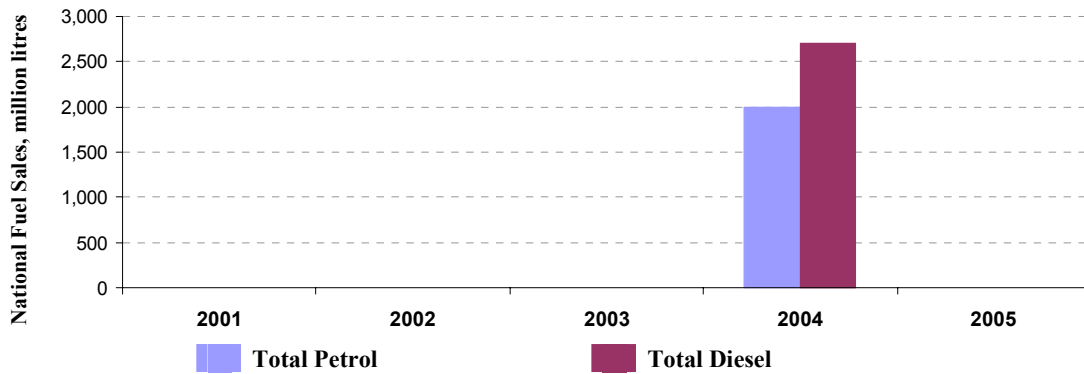
#### **Diesel**

None.

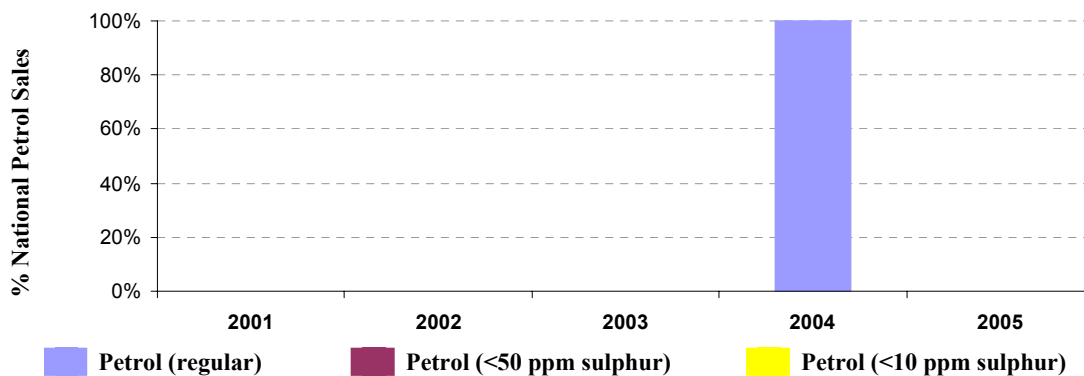
### 12.3 TEMPORAL TRENDS

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

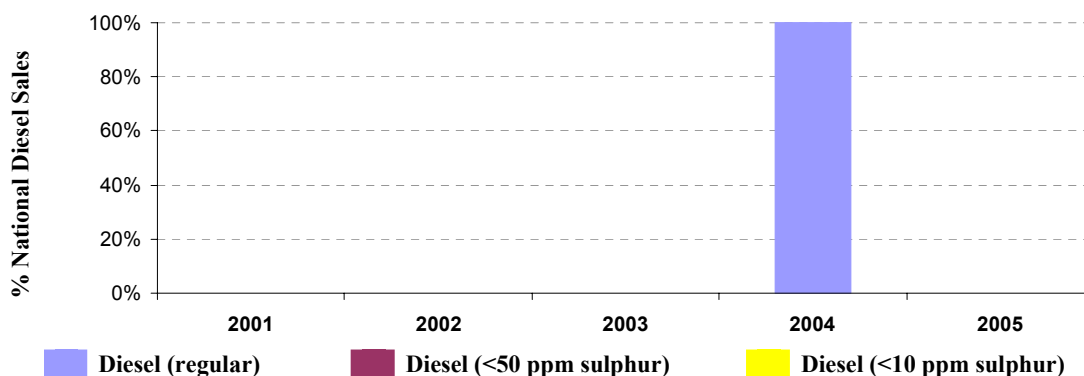
**Figure 12.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 13 Ireland

### 13.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	95 Unleaded	Yes	4
6	RON 95	<10 ppm	95 Unleaded	Yes	4
9	95<RON<98	<10 ppm	97 Unleaded	Yes	9
14	Diesel	<50 ppm	Diesel fuel	Yes	14

#### 13.1.1 Sales

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

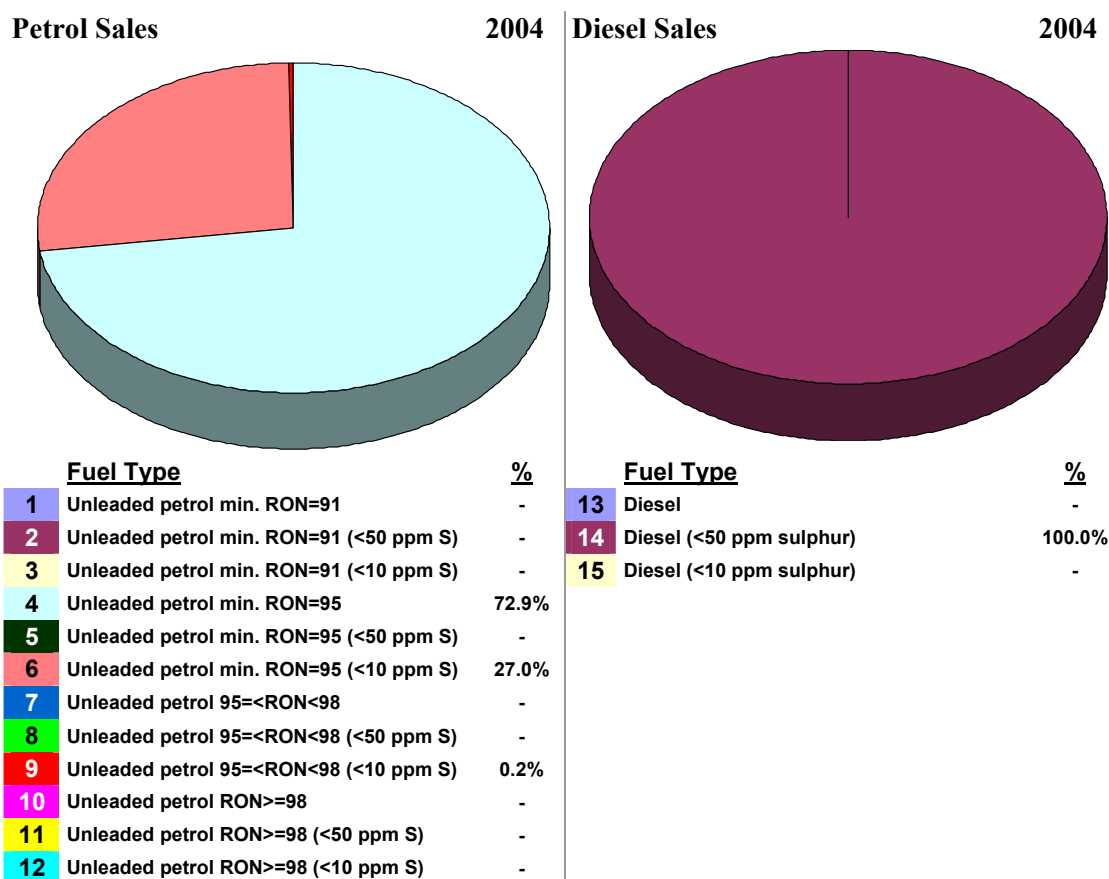


Figure 13.1 shows that 2004 diesel was only available as low sulphur grade, with petrol being available mostly at RON 95 grade (73%), but with 27% being sulphur free. RON 97 fuel was available only as a sulphur-free grade.

**13.1.2 Sulphur content**

**Geographical availability of sulphur-free fuels:** Petrol produced by the refinery at Whitegate was sulphur free standard (at <2 ppm sulphur). In total this accounted for some 27% of national sales of petrol in 2004 – down from 40% in 2003 due to planned maintenance on the refinery at Whitegate. Geographically, distribution covered Munster, parts of the midlands, western seaboard and south-eastern region. The product is not marketed in the Dublin region or in the north west of the country.

**Are sulphur-free grades clearly labelled differently / marketed separately?** RON 97 grade was only available as a sulphur-free grade. Sulphur-free RON 95 is not marked or marketed separately from regular grade.

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

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

IE	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	83	57	52	43		38
<i>Diesel</i>	231	49	42	32		113

**13.2 FUEL QUALITY MONITORING 2004**

**13.2.1 Description of system**

**Responsible organisation(s):** Department of the Environment 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)

**Location(s) of sampling:** Ireland has one national refinery located at Whitegate, County Cork. All products are batched and fully tested by the refinery operator prior to release. Samples taken at the refinery and oil terminals are analysed by the state laboratory. Retail sites, road tankers, commercial vehicles etc. are sampled by the Office of the Revenue Commissioners. Individual oil companies test their products at their home refinery and on receipt at terminals, a certificate of quality is available for inspection before each cargo/batch. Further quality spot checks are carried out 2-4 times per year at selected retail sites to give quality traceability from refinery to end user.

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

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

**Collection of sales data:** Sourced from the Department of Public Enterprise

**Other details:** The availability of sulphur free petrol is a quirk of the refining process used, and the sulphur free petrol is not marketed separately from regular grades. In 2004 for the first time, the oil companies association (Irish Petroleum Industry Association) arranged for its own sampling and testing of motor gas oil at 23 forecourts and in the Whitegate refinery in October and December 2004, the results of which were incorporated in the Irish report.

### 13.2.2 Sampling and reporting

Ireland was not completely compliant with the sampling and reporting requirements in 2004, as it did not perform the required number of samples and did not provide separate summer and winter analysis reports. The following Table 13.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	72.9%	18	79	100	No	All of 18	
6	RON 95 <10 ppm S	4	27.0%	0	0				
9	95<RON<98 <10 ppm S	9	0.2%	0	0	1			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>18</b>	<b>79</b>	<b>101</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	13	60	100	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>13</b>	<b>60</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 13.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:* 9 samples exceeded some of the parameter limit values for RON (min 95) with the lowest being 94.3. Three samples exceeded the minimum limit for distillation at 100°C, with the minimum being 42.8. One sample exceeded the parameter limit value for benzene (max 1.0 % v/v) with 1.1%v/v.



*Statistical significance:* The relevant tolerance limits are 94.6 (RON), 43.6 and 1.2%v/v (benzene). The sample was within the tolerance limit for benzene and therefore complied with the Directive. The RON samples and some of the distillation samples exceeded the tolerance limits and were therefore non-compliant.

*Member State's notes:* Fuel suppliers are required to provide a Refinery Quality Certificate to demonstrate compliance prior to distribution, all exceedances were of a minor nature and none related to forecourt samples.

**Diesel**

*Detail:* 1 sample exceeded the limit value (360°C) with a value of 367°C.

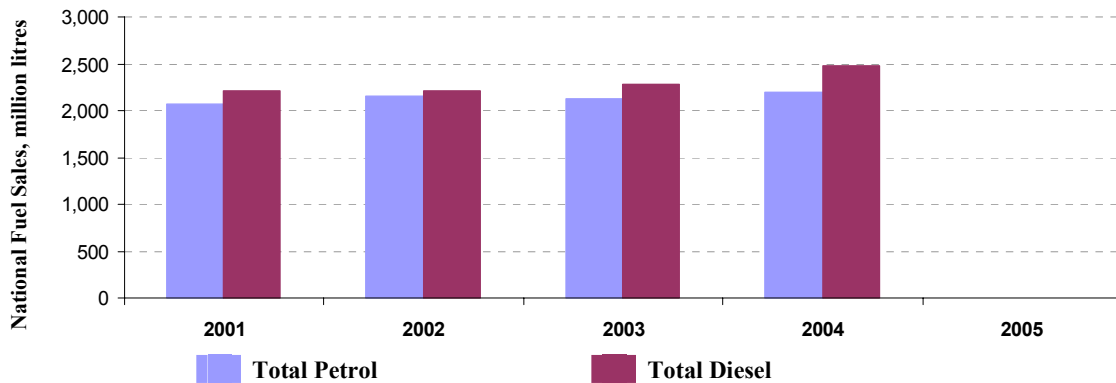
*Statistical significance:* The relevant tolerance limit is 36.09 (test reproducibility was 12.019). The sample was within the tolerance limit for benzene and therefore complied with the Directive.

*Member State's notes:*

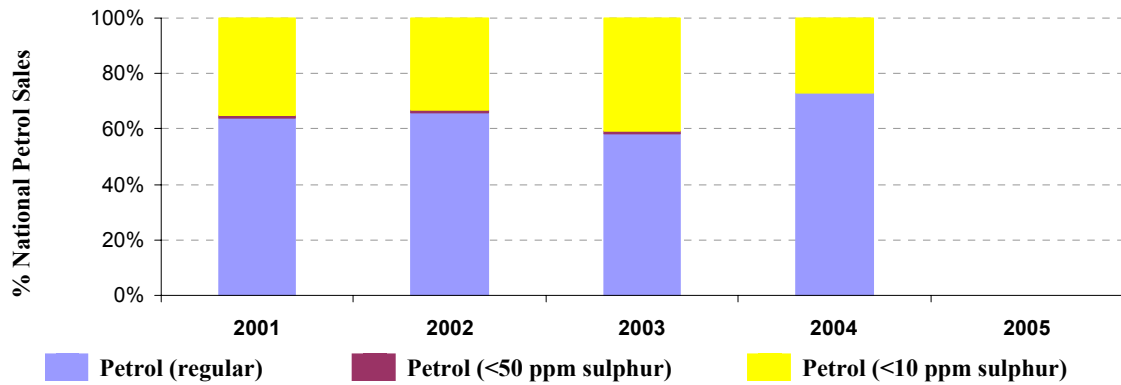
**13.3 TEMPORAL TRENDS**

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. From 2001 to 2004, petrol sales increased by 7% and diesel sales increased by 12%. There was a 17% decrease in the sales of sulphur free petrol (due to planned maintenance at the Whitegate refinery that produces it). Diesel sales switched completely from regular grade to low sulphur (<50 ppm) diesel in 2002.

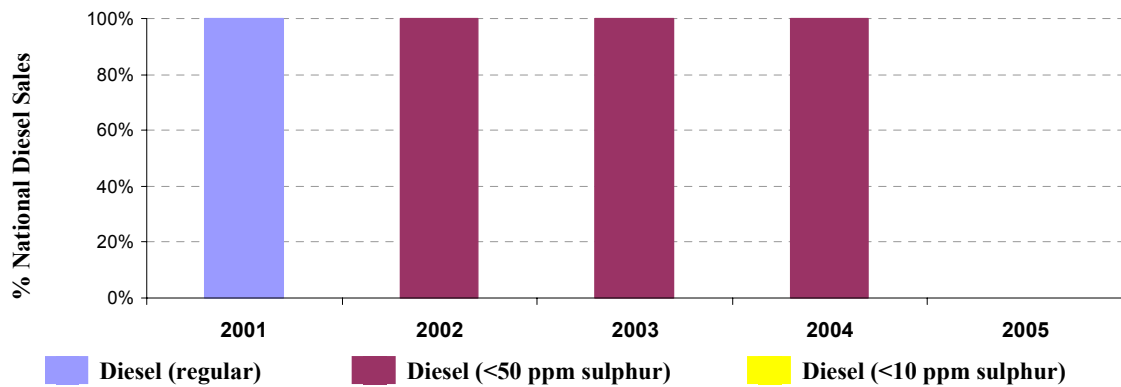
**Figure 13.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 14 Italy

### 14.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade ID	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	Petrol	Yes	4
13	Diesel	<350 ppm	Diesel fuel	Yes	13

#### 14.1.1 Sales

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

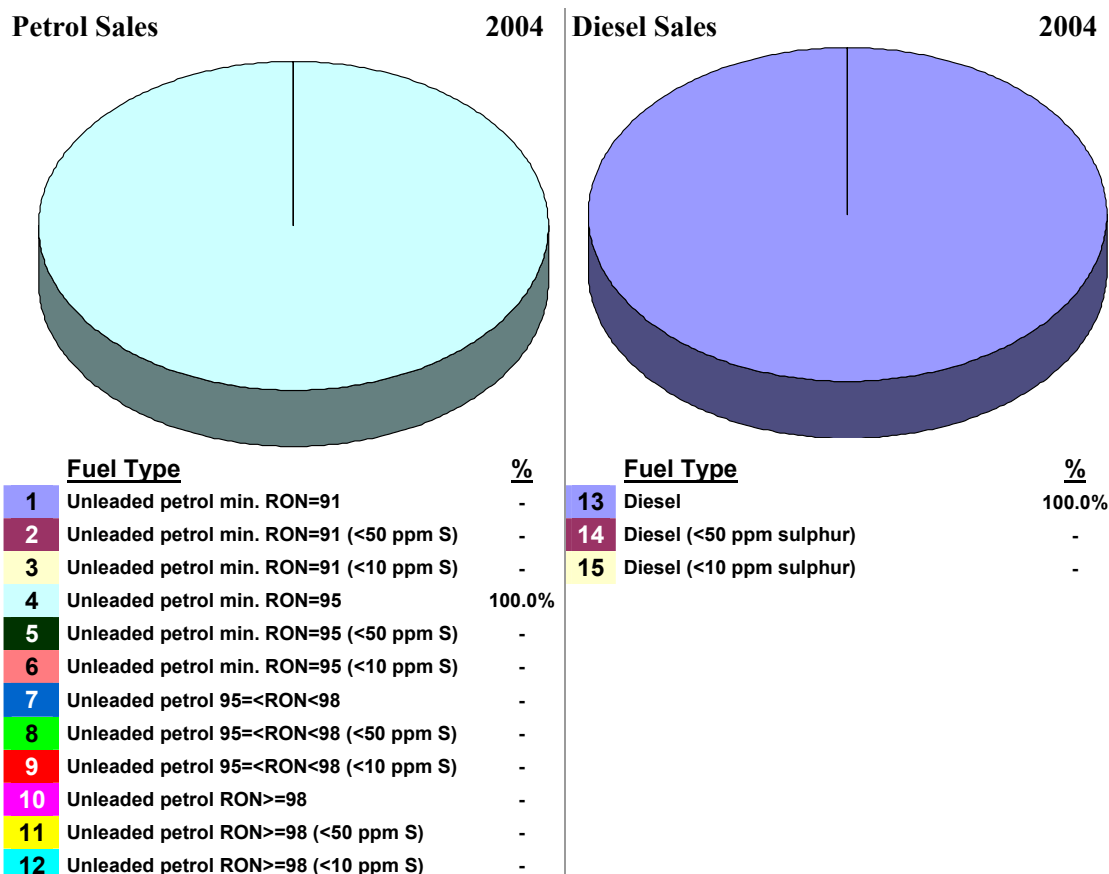


Figure 14.1 shows that all petrol sales accounted for were of RON 95 grade and all diesel fuel sold was of the regular grade.

### 14.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** According to Directive 2003/17/EC, Italy has defined sulphur free fuel grades and their mandatory introduction on an appropriately balanced geographical basis from 2005, even if a few oil companies have already sold fuels with 10 mg/kg sulphur max in 2004.

The information obtained on the basis of data advertised by these oil companies, shows that in at least 99% of all level 3 regions (NUTS) and in main motorways sulphur free fuels were available in Italy in 2004.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Some specific sulphur-free grades were sold by a few oil companies in 2004. Sulphur-free fuels were marked at refuelling stations and were marketed separately.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 14.1. Although no national low sulphur (<50 ppm) or sulphur-free petrol grades were reported to be on sale, some of the fuel met this criteria.

[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**

IT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	61	51	53	53		38
<i>Diesel</i>	273	246	238	216		113

## 14.2 FUEL QUALITY MONITORING 2004

### 14.2.1 Description of system

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

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

**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:** On a monthly basis of 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:** According to Article 8 of Directive 98/70/EC, Italy elaborated a draft decree for setting up the fuel quality monitoring system. The decree establishes a monitoring system in accordance with the requirements of the European standard EN 14274:2003. The system shall be implemented by 1st January 2005.

The 2004 report from Italy had been drawn up in compliance with EN 14274 Statistical Model A on the basis of monitoring by sampling the sales outlets distributed throughout the Italian territory, carried out by independent supervisory bodies on behalf of the main oil companies. The proportion of samples throughout the national territory is: 36% in North-West, 11% in North-East, 24% in Centre, 15% in South, 14% in Islands. The macro-regions are in accordance with the statistical model A of the EN 14274:2003. 16 national refineries serve the Italian market.

### 14.2.2 Sampling and reporting

Italy was essentially compliant with the sampling and reporting requirements in 2004, taking into account supplementary information on oxygenates measurement. The following Table 14.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
4	RON 95	4	100.0%	168	88	200	Yes	All of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>168</b>	<b>88</b>	<b>200</b>	<b>Yes</b>	<b>All of 18</b>	<b>(2)</b>
13	Diesel	13	100.0%	175	94	200	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>175</b>	<b>94</b>	<b>200</b>	<b>Yes</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, 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.

### 14.2.3 Compliance with fuel quality limit values

#### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

*Detail:* 3 samples exceeded the limit values for RON (min. 95) with 92.1, 94.0 and 94.3. 3 petrol samples also exceeded the limit values for vapour pressure (DVPE, max. 60 kPa) with 62.7, 62.7 and 63.5kPa.

*Statistical significance:* These samples were outside of the zone of tolerance for the test method (94.6 for RON and 61.8 for DVPE) and were therefore noncompliant with the Directive.

*Member State's notes:* In order to ensure the compliance with the Directive 2003/17/EC, Italy established a monitoring system carried out by a competent national authority in the production and importing sites.  
 Furthermore, Italy determined the penalties applicable to producers, importers and distributors of fuels that do not comply with the limits reported in the Directive 2003/17/EC.

**Diesel**

*Detail:* 6 samples exceeded the limits for distillation 95% point (360°C) with values from 366.9-369.6, and 1 with sulphur content (350 ppm) with a value of 356 ppm.

*Statistical significance:* The distillation samples were outside of the zone of tolerance for the test methods and were therefore noncompliant with the Directive. The sulphur sample was within tolerance limits and was therefore compliant.

*Member State's notes:* As above for petrol.

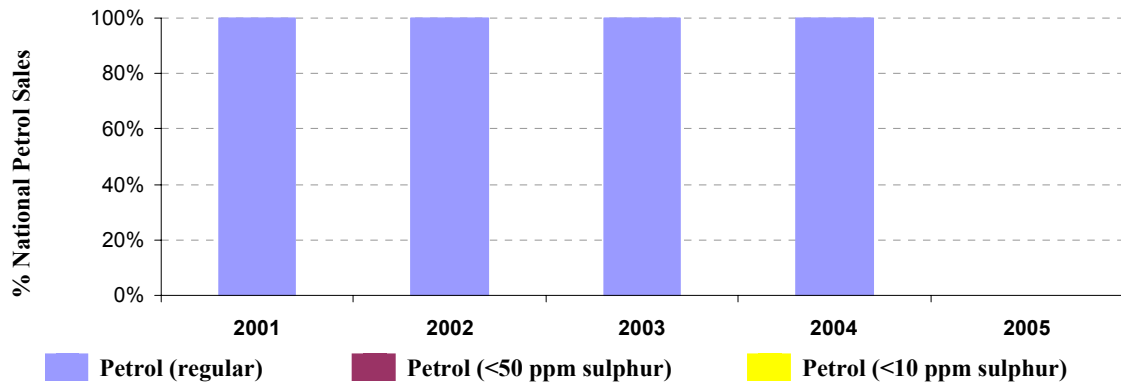
**14.3 TEMPORAL TRENDS**

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. Sales of petrol increased by 7% between 2001 and 2004, while sales of diesel increased by 17%. No specific grades of low or sulphur-free fuels were reported to be on sale.

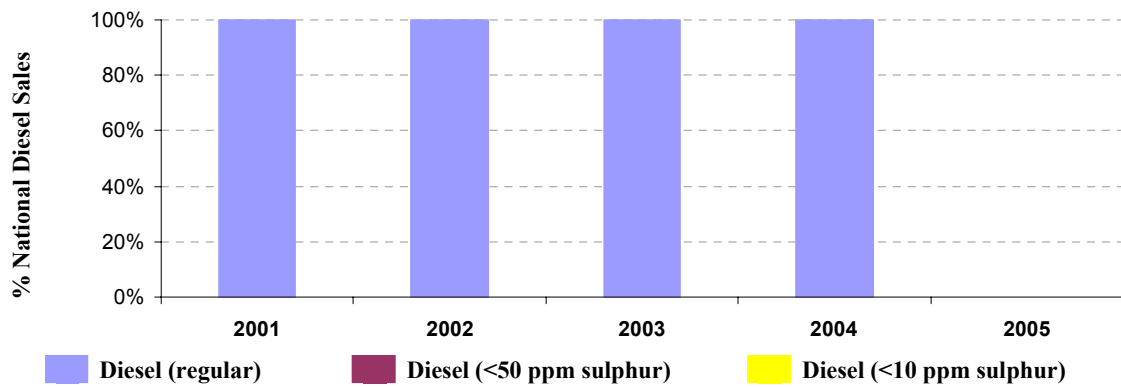
**Figure 14.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 15 Latvia

### 15.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
7	95<RON<98	<150 ppm	Petrol RON 95	Yes	7
10	RON 98	<150 ppm	Petrol RON 98	Yes	7
13	Diesel	<350 ppm	Diesel	Yes	13

#### 15.1.1 Sales

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

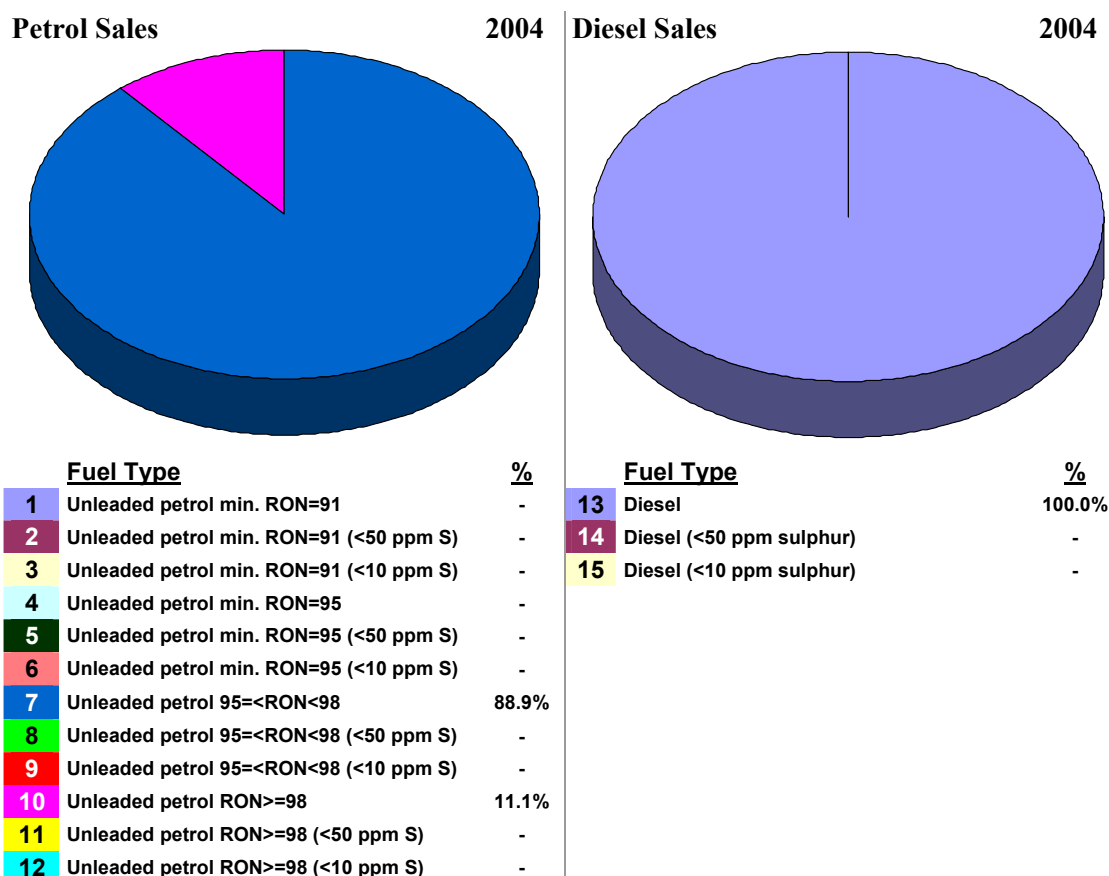


Figure 15.1 shows that in 2004 there were no low sulphur fuel grades available. RON 95-98 petrol comprised the vast majority of sales (90%), with the remainder being RON 98 category. There was only one grade of diesel available.



**15.1.2 Sulphur content**

**Geographical availability of sulphur-free fuels:** None were available in 2004, however regulations have been put in place to ensure the availability from the beginning of 2005.

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

**Average sulphur content of all petrol and diesel sold:** Table 15.1 shows the average content of fuel sold in 2004 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 15.1: Annual trend in average sulphur content in petrol and diesel fuels**

LV Fuel/Year	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
Petrol				66		38
Diesel				329		113

**15.2 FUEL QUALITY MONITORING 2004**

**15.2.1 Description of system**

**Responsible organisation(s):** Ministry of Economics

**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)

**Location(s) of sampling:** Refuelling stations and terminals/depots

**Time/frequency of sampling:** Starting from the date of joining the EU in May 2004, samples were taken most months across summer and winter periods.

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

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

**Other details:**

**15.2.2 Sampling and reporting**

Latvia was in most respects compliant with the sampling and reporting requirements in 2004, although no analyses of RON 98 petrol grade samples were performed. They have also not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 15.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
7	95<RON<98	7	88.9%	86	41	-	No	All of 18	
10	RON 98	7	11.1%	0	0	-			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>86</b>	<b>41</b>	-	<b>No</b>	<b>All of 18</b>	
13	Diesel	13	100.0%	145	94	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>145</b>	<b>94</b>	-	<b>No</b>	<b>All of 5</b>	

Notes: S = Summer; W = Winter

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 15.2.3 Compliance with fuel quality limit values

#### Exceedances of 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 and distillation at 100°C limit values (of 60 kPa and min. 46 %v/v) were exceeded by some samples with extremes of 90.3 and 45.5 respectively for the parameters.

*Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure was exceeded. Some samples were therefore non-compliant with the Directive. The distillation samples were within tolerance limits.

*Member State's notes:* -

#### **Diesel**

*Detail:* Cetane number, density at 15°C and sulphur content limit values (of min. 51, max. 845 kg/m<sup>3</sup> and 350 ppm) were exceeded by some samples with extremes of 49, 845.9 kg/m<sup>3</sup> and 650 ppm respectively for the parameters.

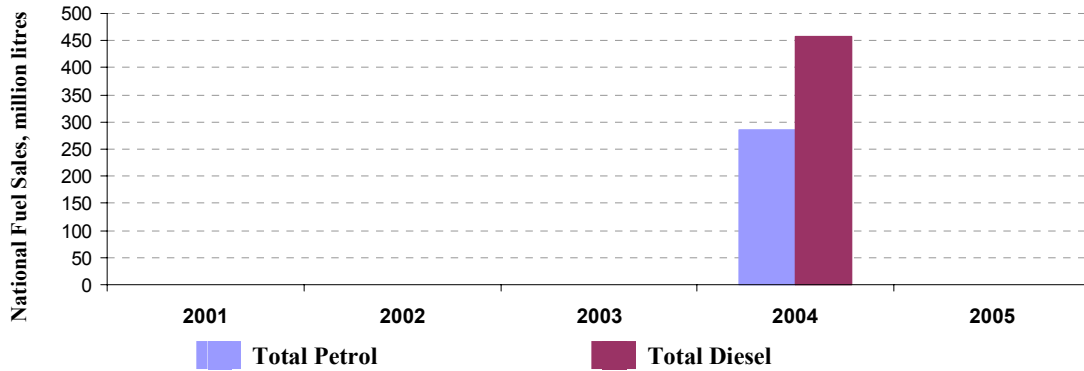
*Statistical significance:* The tolerance limit for statistical significance for the density and sulphur content were exceeded. Some samples were therefore non-compliant with the Directive. The cetane number samples were within tolerance limits.

*Member State's notes:* -

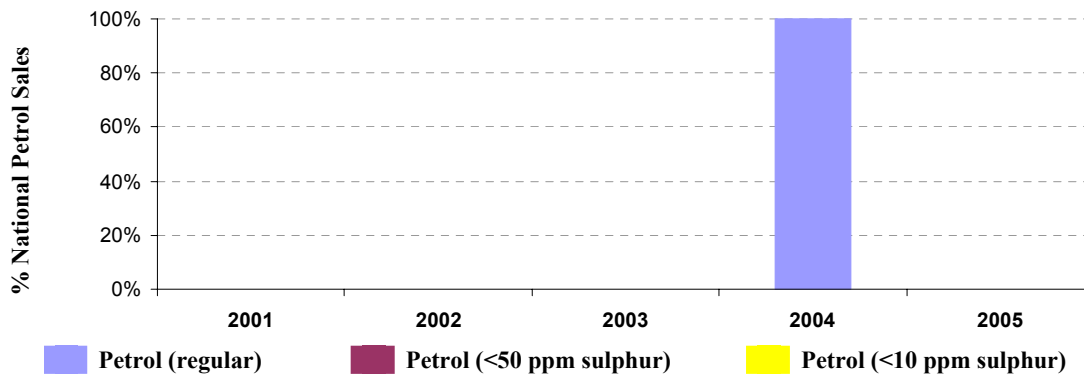
### 15.3 TEMPORAL TRENDS

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

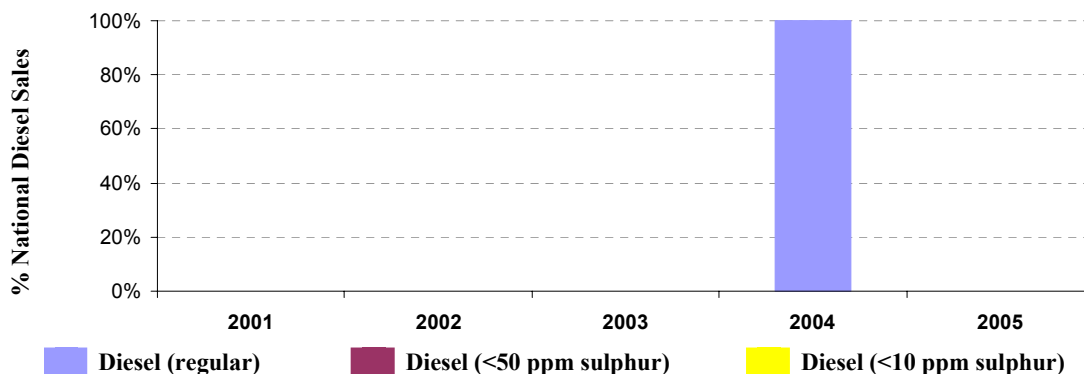
**Figure 15.2: Temporal trends in national sales of petrol and diesel (million litres)**



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



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



## 16 Lithuania

### 16.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	A-92 (RON 92)	Yes	1
2	RON 91	<50 ppm	A-92 (RON 92)	Yes	1
5	RON 95	<50 ppm	A-95 (RON 95)	Yes	5
11	RON 98	<50 ppm	A-98 (RON 98)	Yes	11
12	RON 98	<10 ppm	A-98 (RON 98)	Yes	11
13	Diesel	<350 ppm	Diesel	Yes	13
14	Diesel	<50 ppm	Diesel	Yes	13
15	Diesel	<10 ppm	Diesel	Yes	13

#### 16.1.1 Sales

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

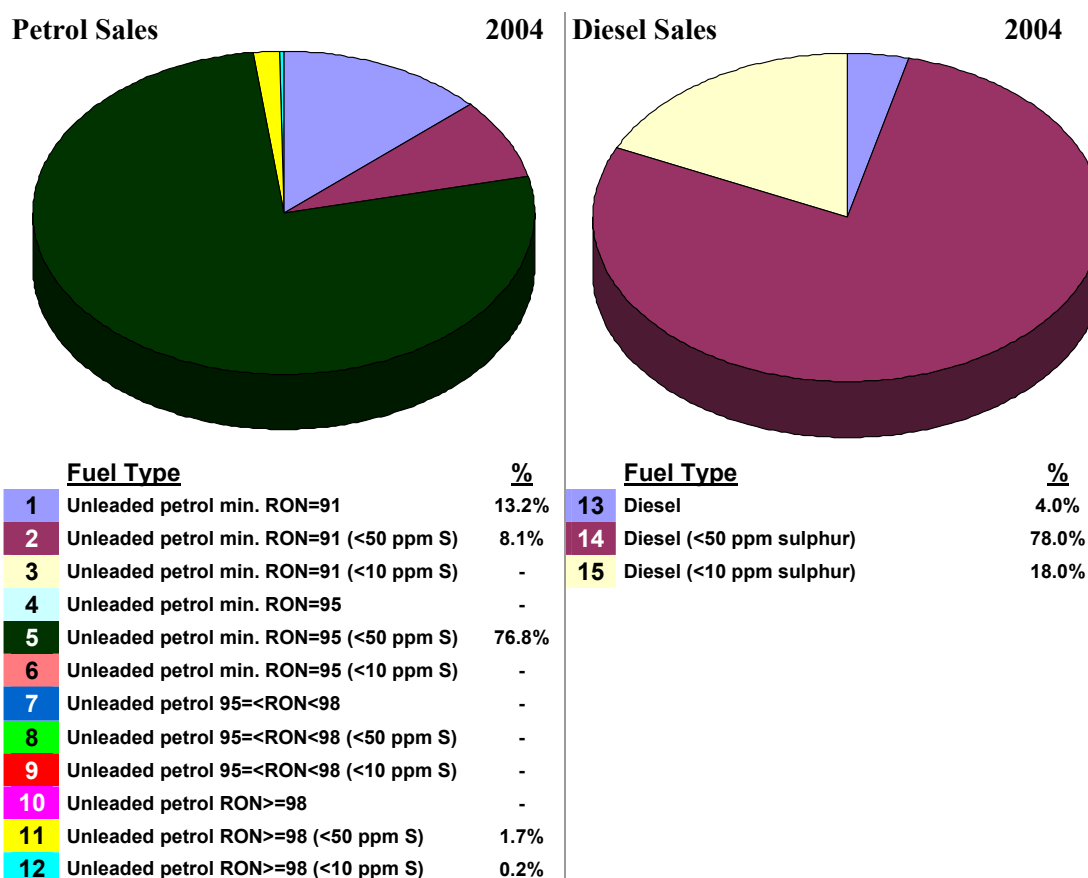


Figure 16.1 shows that the majority of fuel sold in 2004 was of low sulphur grade, with 77% of petrol sales being of RON 95 <50 ppm sulphur grade and 78% diesel sales being <50 ppm sulphur also. Only small amounts of sulphur-free petrol were sold (0.2%), but 18% of diesel sales were of sulphur-free quality.

### 16.1.2 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.

**Average sulphur content of all petrol and diesel sold:** Table 16.1 shows the average content of fuel sold in 2004 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 16.1: Annual trend in average sulphur content in petrol and diesel fuels**

LT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				39		38
<i>Diesel</i>				104		113

## 16.2 FUEL QUALITY MONITORING 2004

### 16.2.1 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 (Normal)

**Location(s) of sampling:** Refuelling stations and terminals/depots

**Time/frequency of sampling:** Starting from the date of joining the EU in May 2004, samples were taken most months across the winter and summer periods.

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

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

## 16.2.2 Sampling and reporting

Lithuania was compliant with the sampling requirements, however insufficient analyses were carried out, with many of the mandatory parameters not measured. It was therefore not compliant with reporting requirements in 2004. Lithuania has stated that the required test equipment was not available in the testing laboratory in 2004, however arrangements were made to ensure required analysis is performed in 2005. The following Table 16.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
1	RON 91	1	13.2%	53	34	100	Yes	7 of 18	(2)
2	RON 91 <50ppm S	1	8.1%	0	0				
5	RON 95 <50 ppm S	5	76.8%	81	95	100	Yes	7 of 18	(2)
11	RON 98 <50 ppm S	11	1.7%	5	7	3	Yes	7 of 18	(2)
12	RON 98 <10 ppm S	11	0.2%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>139</b>	<b>136</b>	<b>203</b>	<b>Yes</b>	<b>7 of 18</b>	<b>(2)</b>
13	Diesel	13	4.0%	129	262	100	Yes	3 of 5	(3)
14	Diesel <50 ppm S	13	78.0%	0	0				
15	Diesel <10 ppm S	13	18.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>129</b>	<b>262</b>	<b>100</b>	<b>Yes</b>	<b>3 of 5</b>	<b>(3)</b>

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

- (1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)
- (2) The only petrol parameters measured were RON, Distillation, Aromatics, Benzene and Sulphur. Lithuania have stated the equipment needed for the additional tests were not available in 2004, however arrangements have been made so that 2005 reporting will be complete.
- (3) Cetane number and PAH have not been measured for diesel, however the necessary equipment is available for 2005 monitoring analysis.

## 16.2.3 Compliance with fuel quality limit values

### Exceedances of 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**

None.

#### **RON 95 Petrol**

None.

**RON 98 Petrol**

None.

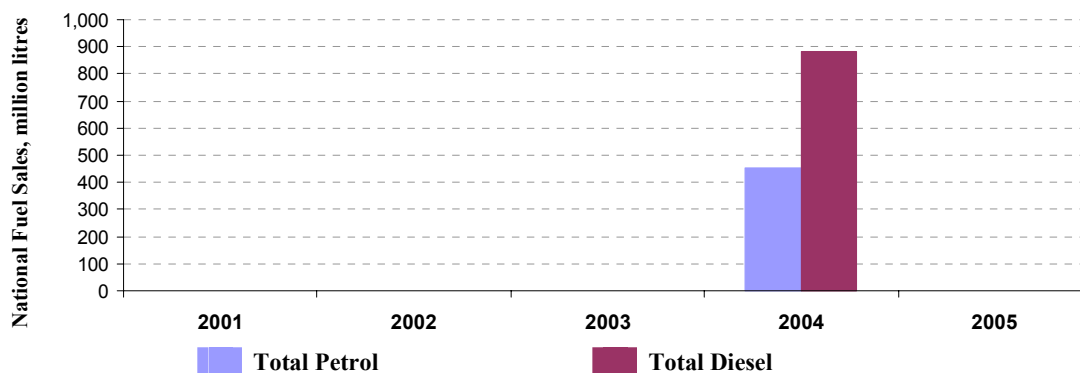
**Diesel**

None.

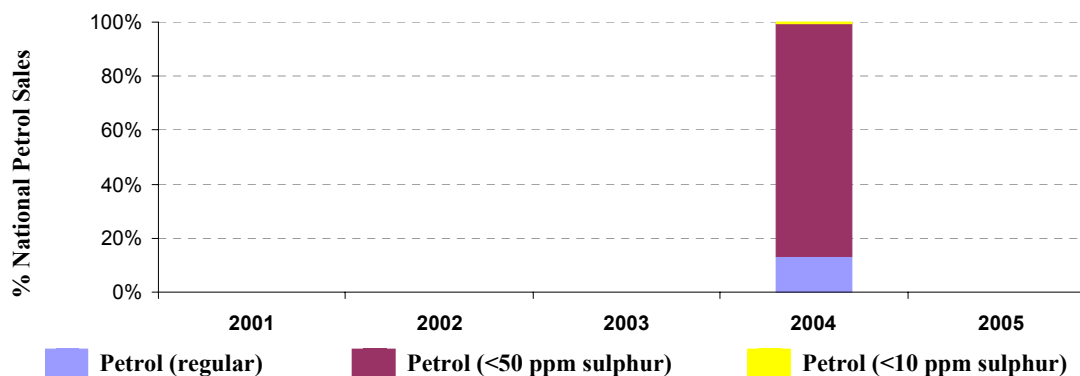
**16.3 TEMPORAL TRENDS**

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

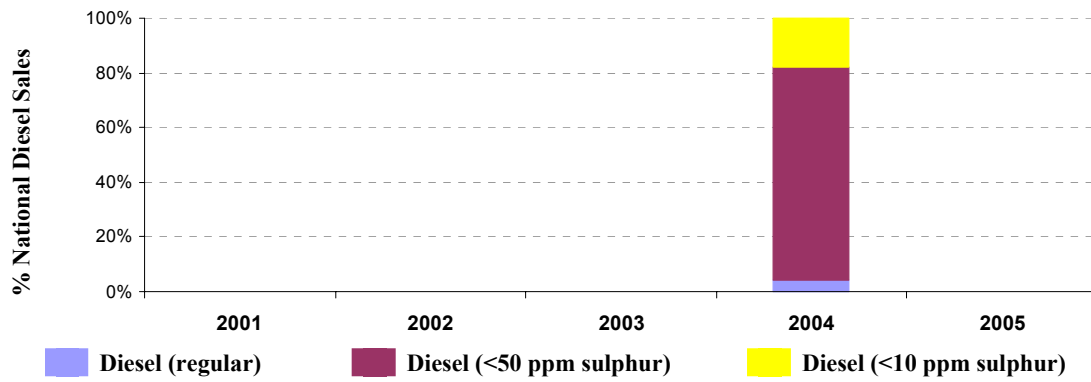
**Figure 16.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 16.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 16.4: Temporal trends in national sales of low sulphur diesel (%)**





## 17 Luxembourg

### 17.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	Essence normale RON 91	Yes	1
4	RON 95	<150 ppm	Essence Eurosuper RON 95	Yes	4
11	RON 98	<50 ppm	Essence super plus RON 98 (< 50 ppm)	Yes	11
14	Diesel	<50 ppm	Carburant Diesel (< 50 ppm)	Yes	14

#### 17.1.1 Sales

Figure 17.1: National fuel sales proportions by fuel type (%)

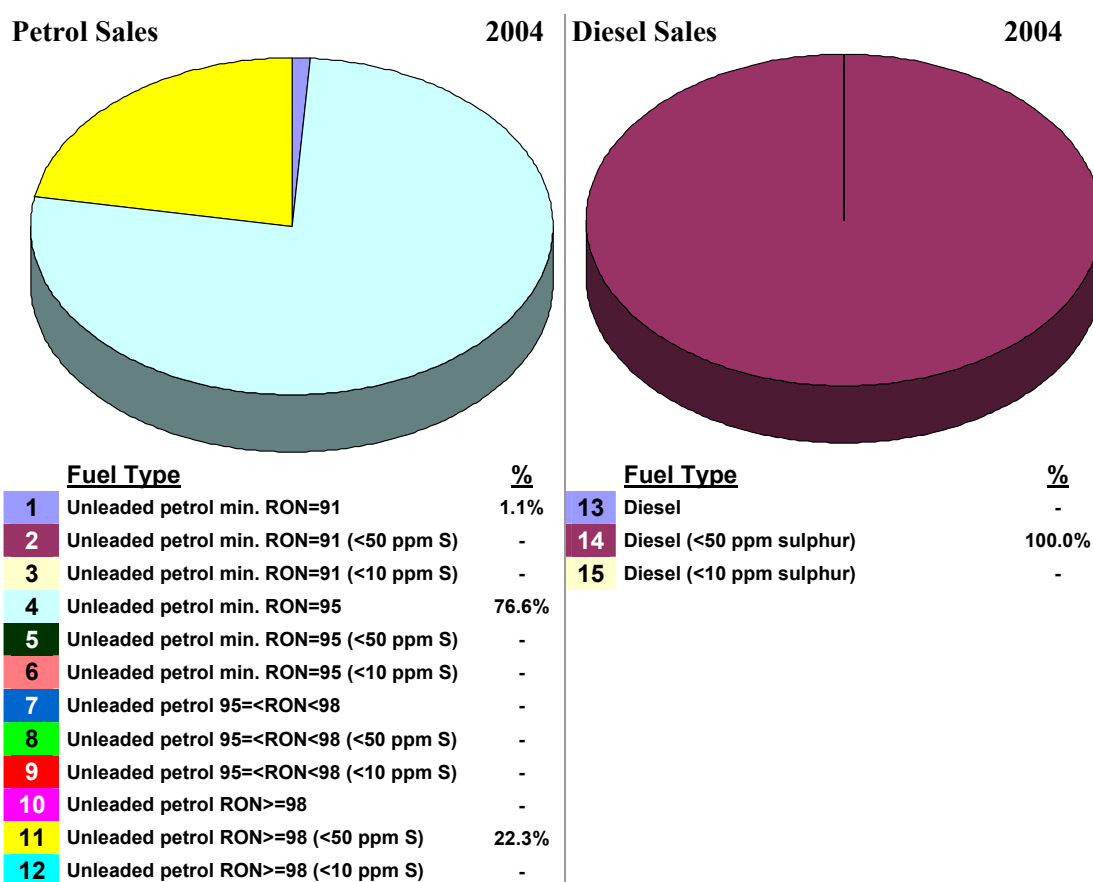


Figure 17.1 shows that the majority (75%) of Luxembourg’s petrol sales in 2004 were of RON 95 grade (compared to 67% in 2001), with the remainder comprising of RON 91 (1%, compared to 4% in 2001) and RON>98 <50 ppm sulphur (22%, compared to 24% in 2003,

27% in 2002 and 2% in 2001 with 27% regular sulphur grade). Luxembourg completely switched to low sulphur diesel grades from 2002.

### 17.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None on sale in 2004.

**Are sulphur-free grades clearly labelled differently / marketed 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 17.1, however this may be as a result of the low number of samples taken (see 17.2.1).

*[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 17.1: Annual trend in average sulphur content in petrol and diesel fuels**

Fuel/Year	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	18	38	44	31		38
<i>Diesel</i>	252	33	42	45		113

## 17.2 FUEL QUALITY MONITORING 2004

### 17.2.1 Description of system

**Responsible organisation(s):** Luxembourg Environment Agency

**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:** All fuels were imported and fuel importers were required to provide analysis of the fuels by an authorised laboratory.

**Time/frequency of sampling:** Data is sent to the Luxembourg Environment Agency every six months.

**Specification of test methods:** As required by the Directive.

**Collection of sales data:** From the fuel importers and from the Office Commercial de Ravitaillement (Ministère de l'Economie).

**Other details:** Data for RON 91 data was presented in 2004 for the first time.

### 17.2.2 Sampling and reporting

Luxembourg was essentially compliant with the sampling and reporting requirements in 2004, however sampling numbers were again low. The following Table 17.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on

European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
1	RON 91	1	1.1%	0	1	-	No	16 of 18	(2)
4	RON 95	4	76.6%	6	2	-	No	All of 18	
11	RON 98 <50 ppm S	11	22.3%	5	2	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>11</b>	<b>5</b>	-	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	6	2	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>6</b>	<b>2</b>	-	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) No analysis data were reported for MON, summer vapour pressure

### 17.2.3 Compliance with fuel quality limit values

#### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

None.

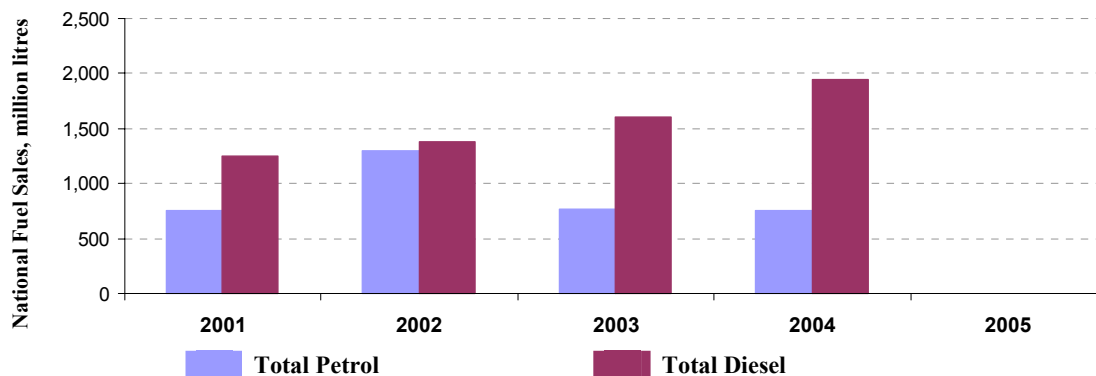
#### **Diesel**

None.

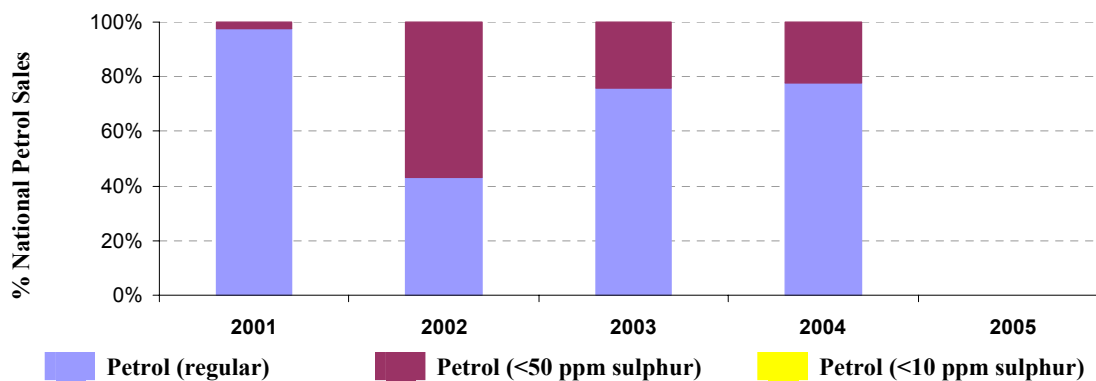
## 17.3 TEMPORAL TRENDS

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. Between 2001 and 2004, total petrol sales decreased 1% and diesel sales rose by 56%. There was significant transfer of sales regular sulphur petrol (down 22%) to low-sulphur petrol (<50 ppm) and complete transfer to low-sulphur diesel in the same time period.

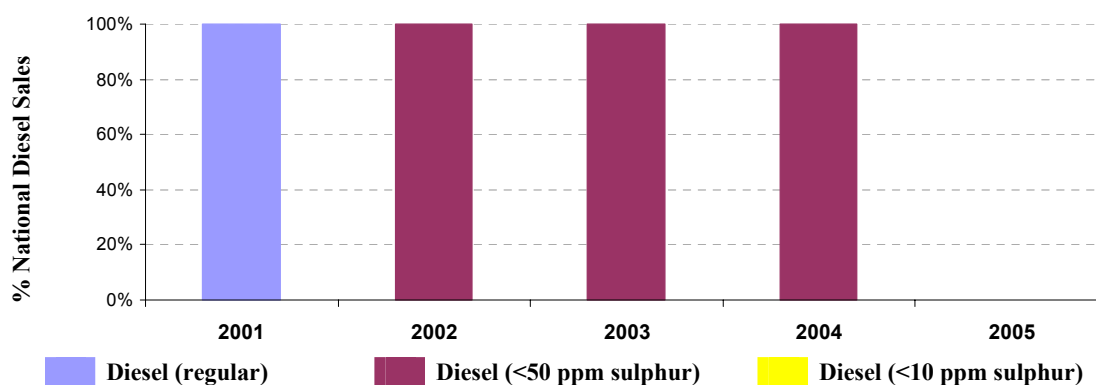
**Figure 17.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 17.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 17.4: Temporal trends in national sales of low sulphur diesel (%)**



## 18 Malta

### 18.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	Unleaded Petrol	Yes	4
7	95<RON<98	<150 ppm	Lead Replacement Petrol (LRP)	Yes	7
13	Diesel	<350 ppm	Diesel	Yes	13

#### 18.1.1 Sales

Figure 18.1: National fuel sales proportions by fuel type (%)

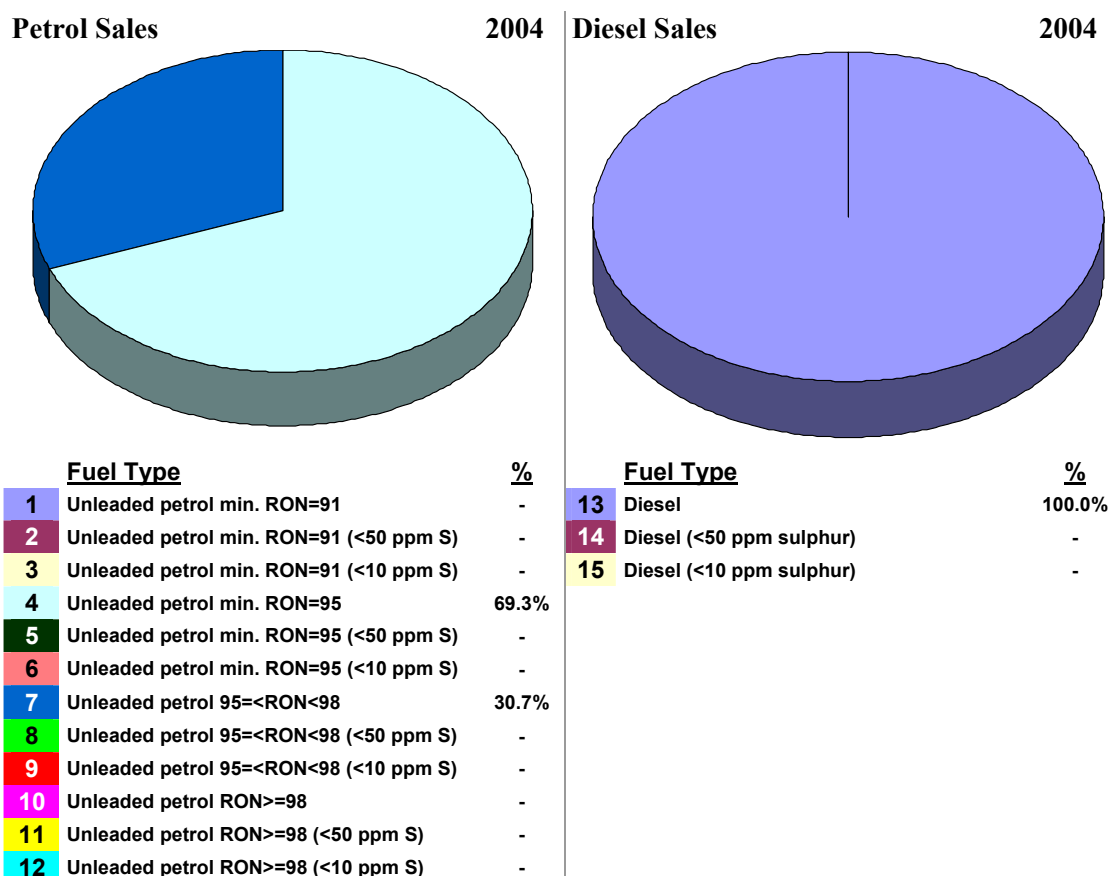


Figure 18.1 shows that no low sulphur fuel grades were available in Malta in 2004. The majority of petrol sales were of RON 95 grade (69%) with the remainder being RON 95-98.

#### 18.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None available in 2004.

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

**Average sulphur content of all petrol and diesel sold:** Table 18.1 shows the average content of fuel sold in 2004 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**

MT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				78		38
<i>Diesel</i>				322		113

## 18.2 FUEL QUALITY MONITORING 2004

### 18.2.1 Description of system

**Responsible organisation(s):** Malta Environment and Planning Authority

**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:** Starting from the date of joining the EU in May 2004, 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:** Enemalta Corporation is currently the sole importer of petrol and diesel fuels for use in Malta and deliveries are made periodically from/to its terminal. A quality certificate issued by a recognised fuel analysis organization accompanies each fuel delivery. For every fuel shipment, a sample is also taken and analysed by a separate independent analytical laboratory. Malta currently has 85 refuelling stations that have been geographically divided into four districts. A randomly selected refuelling station from one district is sampled monthly for each fuel type (thus each district is sampled 3 times per year) and the necessary analytical testing carried out by an independent analytical laboratory. The system ensures full coverage of the fuels used in Maltese territory.

## 18.2.2 Sampling and reporting

Malta was in most respects compliant with the sampling and reporting requirements in 2004, however Cetane index was measured and reported for diesel rather than Cetane number, as specified in the Directive. The following Table 18.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	69.3%	4	9	-	Yes	14 of 18	(2)
7	95<RON<98	7	30.7%	0	4	-	Yes	14 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>4</b>	<b>13</b>	<b>-</b>	<b>Yes</b>	<b>14 of 18</b>	<b>(2)</b>
13	Diesel	13	100.0%	5	9	-	Yes	4 of 5	(3)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>5</b>	<b>9</b>	<b>-</b>	<b>Yes</b>	<b>4 of 5</b>	<b>(3)</b>

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

- (1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)
- (2) Oxygen content and 3 of the oxygenates have not been reported. In principle, all substances on the list are measured at once using the oxygenates test methods. However, 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.
- (3) Cetane index has been measured instead of Cetane number

## 18.2.3 Compliance with fuel quality limit values

### Exceedances of 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**

None.

#### **RON 95-98 Petrol**

None.

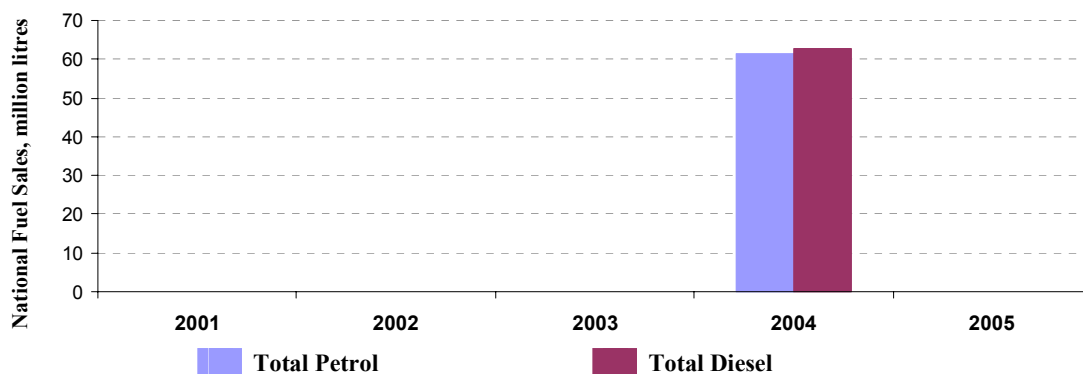
#### **Diesel**

None.

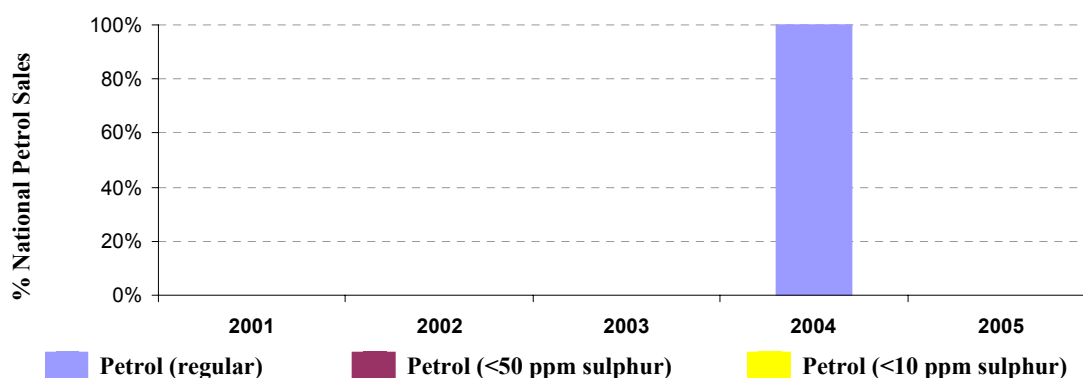
### 18.3 TEMPORAL TRENDS

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

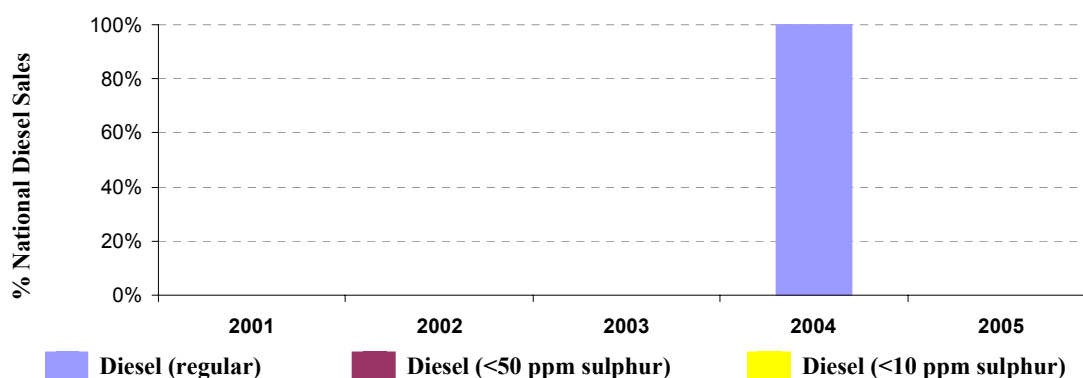
**Figure 18.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 18.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 18.4: Temporal trends in national sales of low sulphur diesel (%)**





## 19 Netherlands

### 19.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	Benzine	Yes	4
14	Diesel	<50 ppm	Dieselbrandstof	Yes	14

#### 19.1.1 Sales

Figure 19.1: National fuel sales proportions by fuel type (%)

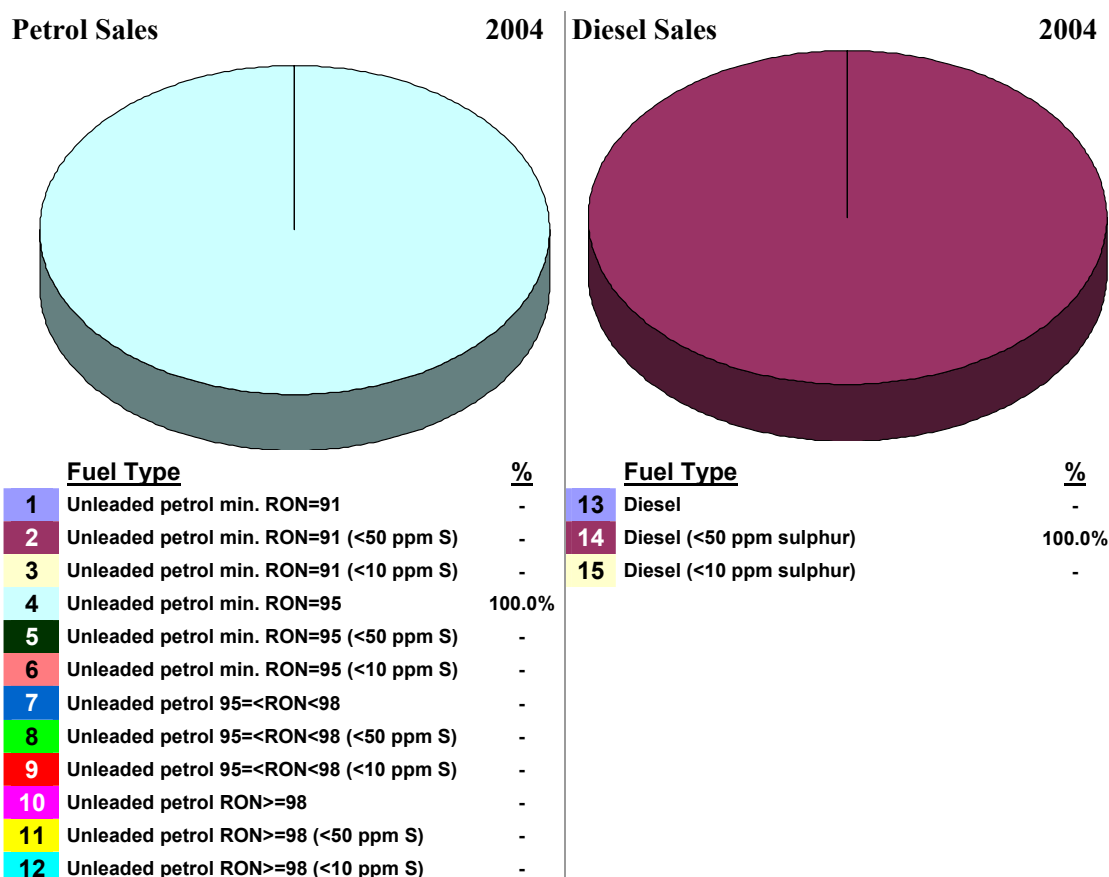


Figure 19.1 shows that all of petrol sold in The Netherlands in 2004 (up from 96% in 2003) was of regular RON 95 grade. The RON>98 was no longer sold. Although no low sulphur (<50 ppm) petrol was marketed in 2004, 100% of diesel sales were of low sulphur grades, as for 2003 (81% in 2002).

### 19.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Not available in 2004.

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 19.1. Although not required by national legislation the petrol analysis shows that all of this fuel met the low sulphur (<50 ppm) criterion.

*[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**

NL	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<b>Fuel/Year</b>						
<i>Petrol</i>	51	60	26	29		38
<i>Diesel</i>	42	34	31	34		113

## 19.2 FUEL QUALITY MONITORING 2004

### 19.2.1 Description of system

**Responsible organisation(s):** Inspectorate for Environmental Health (VROM-Inspectorate)

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model 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:** Sampling was carried out monthly from June to August and October to November 2003.

**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 B (small country), however this specifies 100 samples to be taken in the summer and winter periods.

## 19.2.2 Sampling and reporting

The Netherlands was not compliant with all the sampling and reporting requirements in 2004. There appears to be a misunderstanding here: the standard outlines the need to perform the FQMS twice a year (once for each of the winter and summer periods) with minimum number of samples to be taken in both of these periods. However, the Netherlands only carried out enough samples to meet requirements for one of these periods, with a combined full-year analysis reported. The following Table 19.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	100.0%	50	50	200	No	12 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>200</b>	<b>No</b>	<b>12 of 18</b>	<b>(2)</b>
14	Diesel <50 ppm S	14	100.0%	50	50	200	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>200</b>	<b>No</b>	<b>5 of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) 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. However, 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.

## 19.2.3 Compliance with fuel quality limit values

### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

*Detail:* 2 samples exceeded the RON limit (95), 14 exceeded the MON limit (min 85) and 1 exceeded the summer vapour pressure limit (max 60.0 kPa) with 94.6, 84.5 and 60.3 kPa being the extremes.

*Statistical significance:* The samples were all within the zone of tolerance for each of the parameters and therefore were compliant with the Directive.

*Member State's notes:* -

**Diesel**

*Detail:* 9 samples exceeded the minimum limit for cetane number (51.0), with the minimum being 48.7. 6 samples also exceeded the maximum limit for distillation 95% point (360°C), with highest being 365.8.

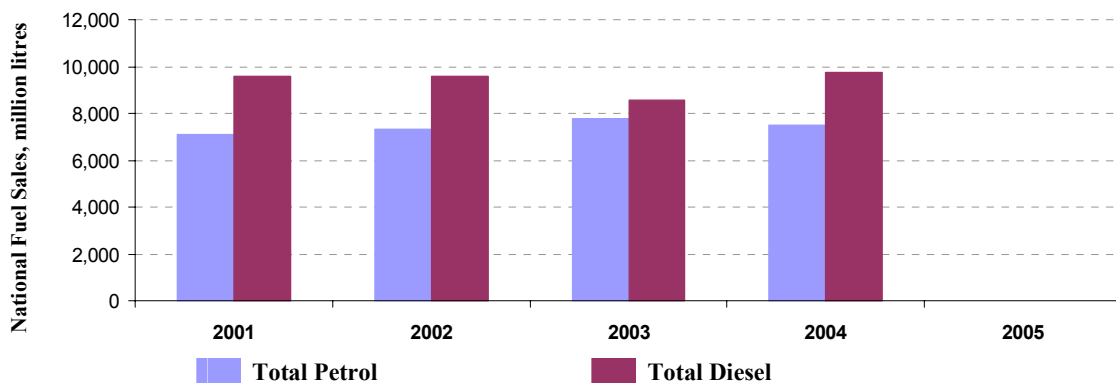
*Statistical significance:* No samples were outside of the zone of tolerance for these parameters' test methods (min. 48.5 for Cetane, and 365.9 calculated from CEN average test reproducibility data). They were therefore compliant with the Directive.

*Member State's notes:* -

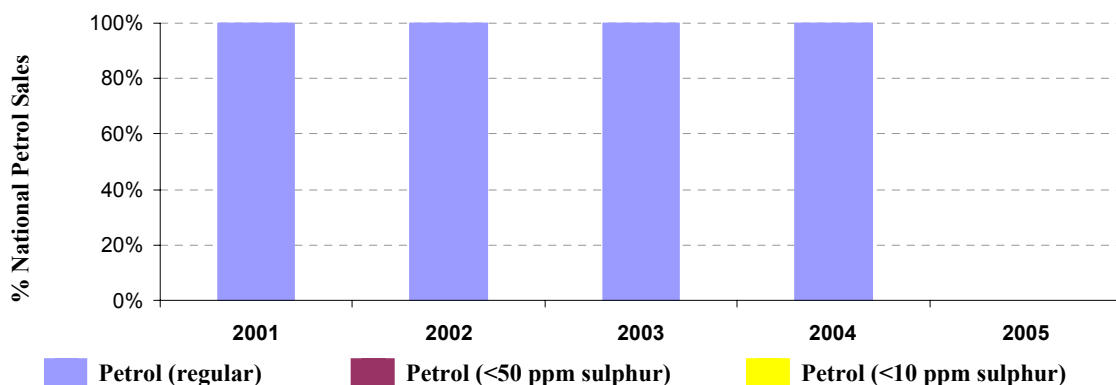
**19.3 TEMPORAL TRENDS**

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. From 2001 to 2004 petrol sales increased by 6% (down 3% on 2003) and diesel sales increased by 2% (up 14% on 2003). The only low sulphur (<50 ppm) fuel on sale was low-sulphur diesel, which comprised 100% of diesel sales from 2004.

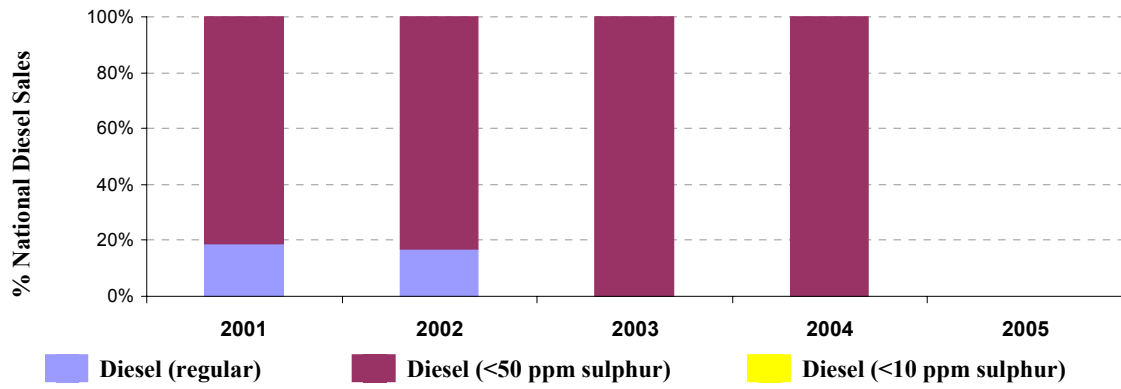
**Figure 19.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 19.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 19.4: Temporal trends in national sales of low sulphur diesel (%)**



## 20 Poland

### 20.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	95 octane gasoline	Yes	4
10	RON 98	<150 ppm	98 octane gasoline	Yes	10
13	Diesel	<350 ppm	Diesel	Yes	13

#### 20.1.1 Sales

Figure 20.1: National fuel sales proportions by fuel type (%)

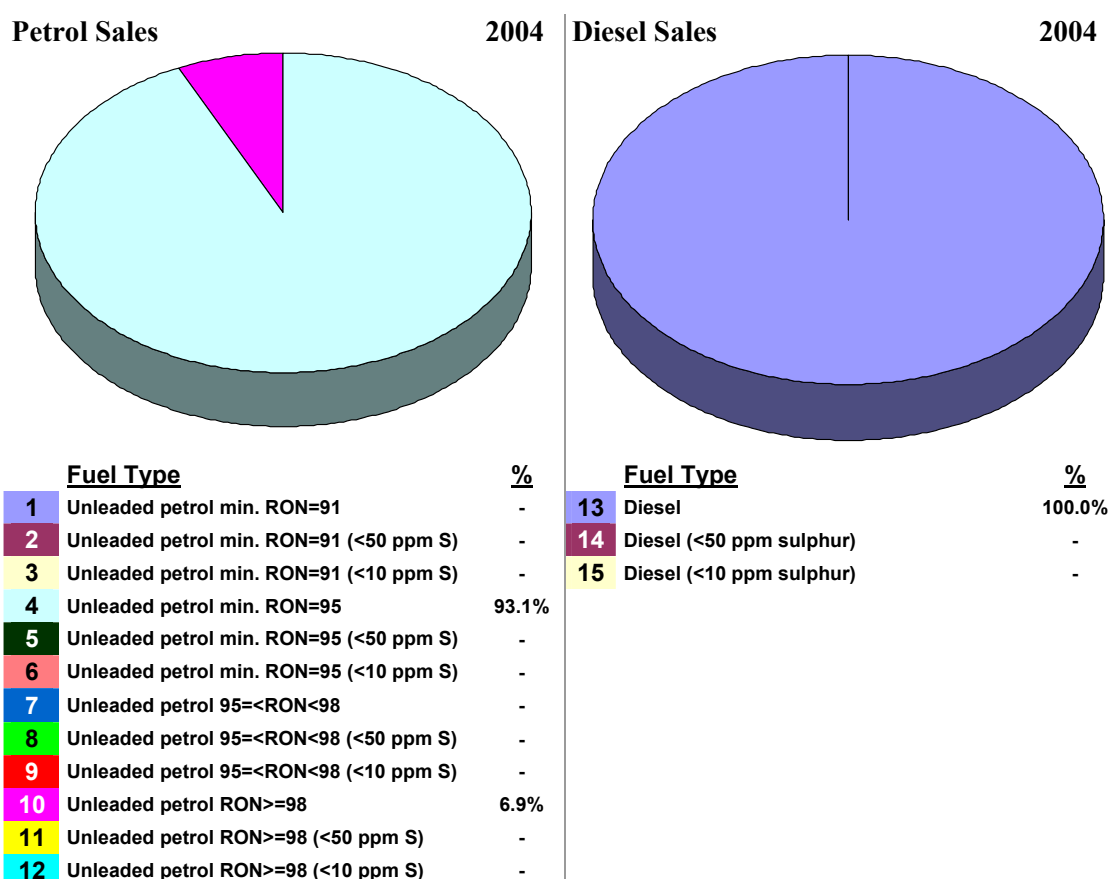


Figure 20.1 shows that no low sulphur fuel grades were available in 2004. The majority of petrol sold was of RON 95 grade (93%), with the remainder being RON 98.

## 20.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In 2004 there was no permanent network in Poland for the sale of so-called sulphur-free fuels as there was no obligation to meet the <10 ppm criterion. Therefore the majority of fuels marketed with low sulphur content were not sold from separate distributors.

Some data is available on fuels with sulphur content <10 ppm in 2004 (from the main producers distributors in Poland - obtained from questionnaires). From the data obtained in 2004, the following amounts of fuels with sulphur content below 10 mg/kg were put into circulation in Poland:

- Petrol fuels: 955.2 thousand tonnes
- Diesel fuel: 343.3 thousand tonnes.

For the most part these fuels were not sold from separate distributors, so there is a possibility that they were mixed with fuel with higher sulphur content. Only certain firms sold so-called sulphur-free fuels from separate distributors at about 740 stations distributed throughout the country.

Sulphur-free diesel fuel was also not sold from separate distributors. Only urban diesel, produced by one of the fuel companies, was sold to end users, mainly municipal transport services and other transport undertakings as diesel with content below 10 mg/kg. The organisations buying this diesel are based mainly in central and southern Poland. A total of 9.8 thousand tonnes of this diesel was sold in 2004.

**Are sulphur-free grades clearly labelled differently / marketed separately?** In some cases.

**Average sulphur content of all petrol and diesel sold:** Table 20.1 shows the average content of fuel sold in 2004 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 20.1: Annual trend in average sulphur content in petrol and diesel fuels**

PL	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				60		38
<i>Diesel</i>				124		113

## 20.2 FUEL QUALITY MONITORING 2004

### 20.2.1 Description of system

**Responsible organisation(s):** Administration of system is the responsibility of the President of the Office for Competition and Consumer Protection with the assistance of the Trade Inspectorate, which undertakes controls of fuel quality. Analysis of fuel quality is carried out

by laboratories possessing accreditation of the Polish Centre for Accreditation for testing fuel by the methods stipulated in the regulations.

**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:** Starting from the date of joining the EU in May 2004, 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.

### 20.2.2 Sampling and reporting

Poland was fully compliant with the sampling and reporting requirements in 2004. The following Table 20.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**Table 20.2: 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>			
4	RON 95	4	93.1%	206	69	-	No	All of 18	
10	RON 98	10	6.9%	50	18	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>256</b>	<b>87</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
13	Diesel	13	100.0%	108	49	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>108</b>	<b>49</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)



### 20.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:* RON, MON, summer vapour pressure, oxygen content, ethers and sulphur content limit values (of 95, 85, 60 kPa, 2.7 %m/m, 15 %v/v and 150 ppm) were exceeded by 4, 3, 1, 7, 7 and 3 samples respectively. Values, by parameter, reached extremes of 91.6, 81.3, 74.6 kPa, 11.15 %m/m, 56.7 %v/v and 564 ppm.

*Statistical significance:* The tolerance limits for statistical significance for the parameters' test methods were exceeded and therefore the samples were non-compliant with the Directive.

*Member State's notes:* In each of the cases, the information of the limit exceedance was delivered to the prosecutor's office – in accordance with the Act on the Fuel Quality Monitoring and Scrutinizing System (which transposes the Directive 98/70/EC).

After the proceeding conducted by the prosecutor's office the case is the subject to a legal proceeding that can end with the court imposing a fine. The suitability of fine levels is currently under review.

##### **RON 98 Petrol**

*Detail:* MON, summer vapour pressure and benzene content limit values (of 85, 60 kPa and 1 %v/v) were exceeded by 1, 2 and 1 samples respectively. Values, by parameter, reached extremes of 87.2, 64.4 and 2.4%v/v.

*Statistical significance:* The tolerance limits for statistical significance for the parameters' test methods were exceeded and therefore the samples were non-compliant with the Directive.

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

##### **Diesel**

*Detail:* Distillation 95% Point and sulphur content limit values (of 360°C and 350 ppm) were exceeded by 4, 7 samples. Values, by parameter, reached extremes of 400°C and 2268 ppm.

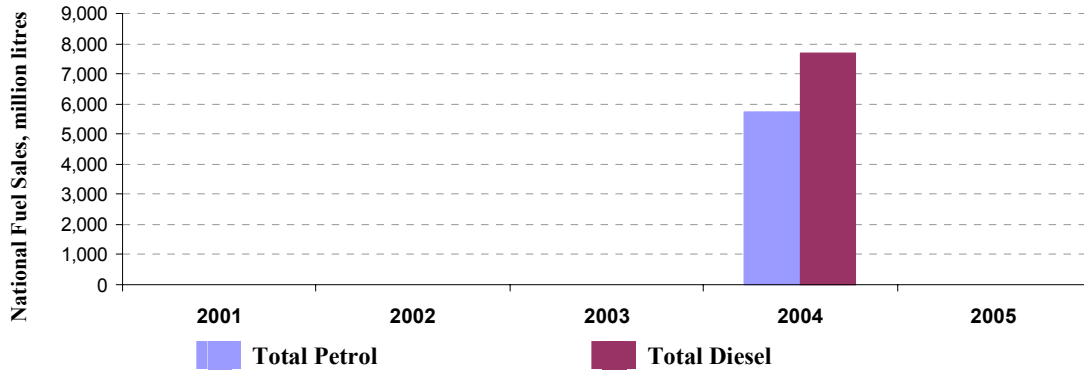
*Statistical significance:* The tolerance limits for statistical significance for the parameters' test methods were exceeded and therefore the samples were non-compliant with the Directive.

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

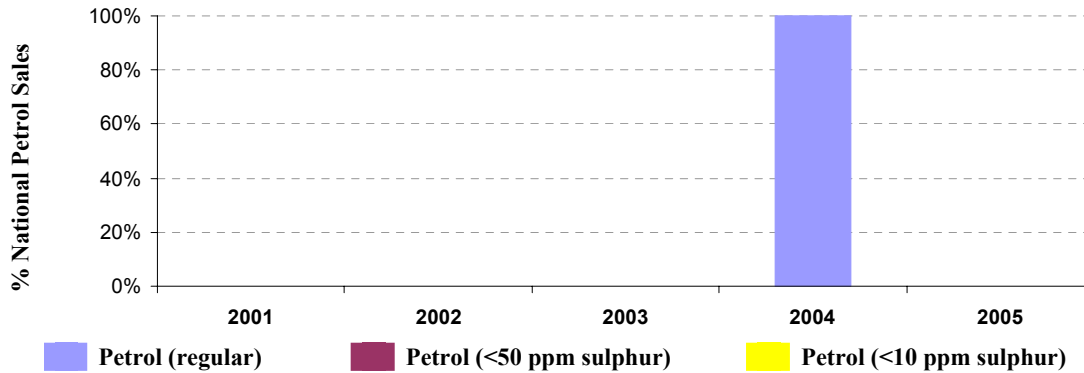
### 20.3 TEMPORAL TRENDS

The following Figure 20.2 to Figure 20.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

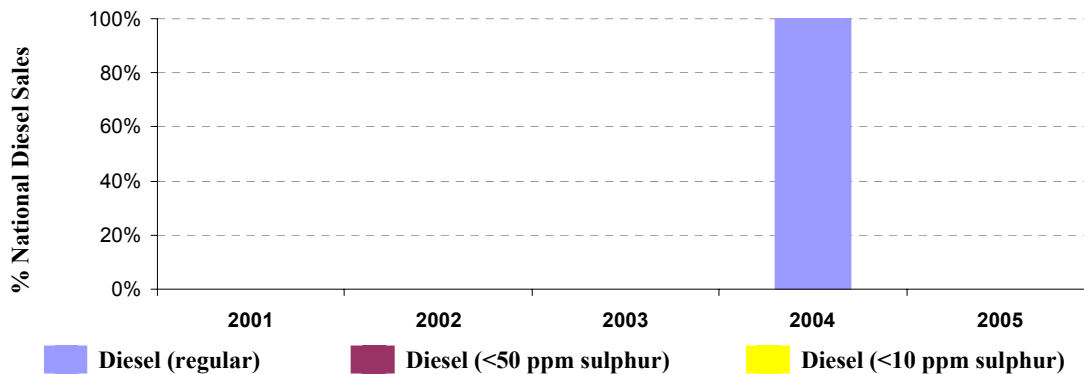
**Figure 20.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 20.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 20.4: Temporal trends in national sales of low sulphur diesel (%)**



## 21 Portugal

### 21.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
7	95<RON<98	<150 ppm	Euro super	Yes	7
10	RON 98	<150 ppm	Super Plus	Yes	10
13	Diesel	<350 ppm	Gasóleo	Yes	13

#### 21.1.1 Sales

Figure 21.1: National fuel sales proportions by fuel type (%)

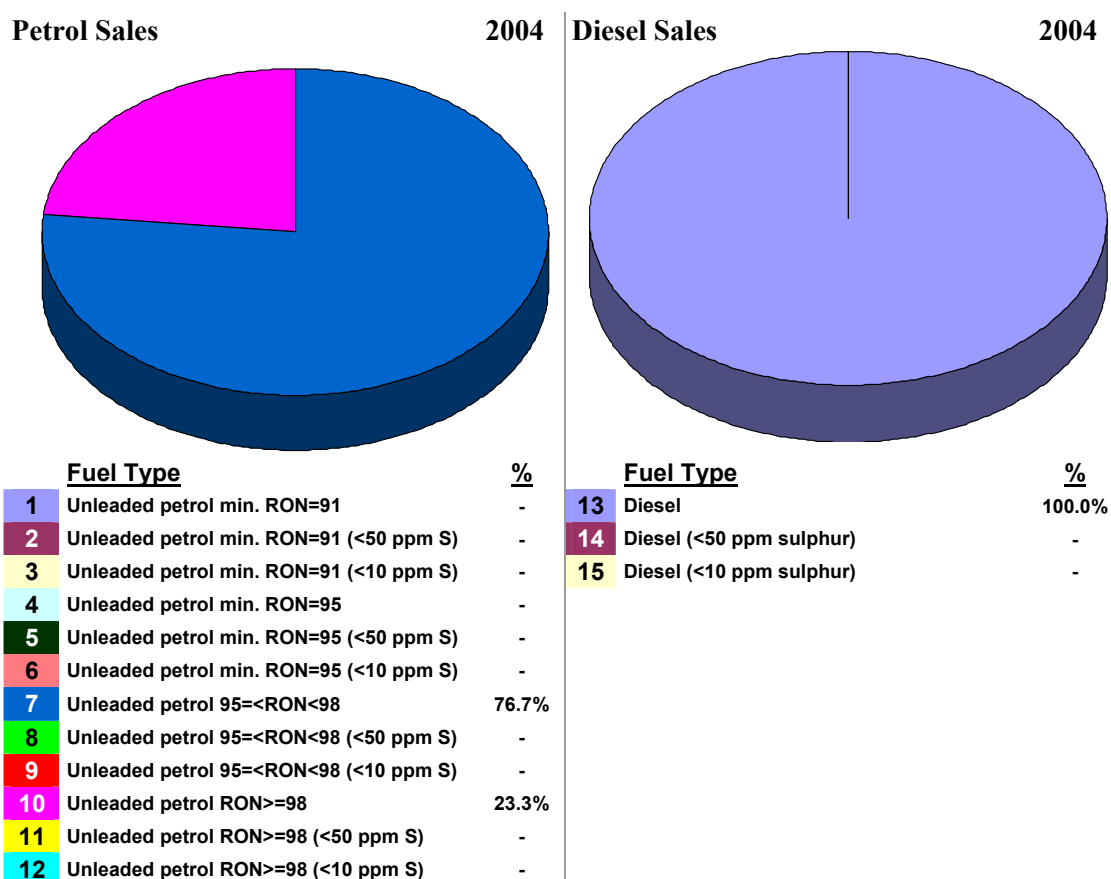


Figure 21.1 shows that of the fuel marketed in 2004 in Portugal, none was of low sulphur (<50 ppm) grade. The majority (77%) of petrol grades were RON 95-98 (up from 65% in 2001), with the remainder being at RON>98.

### 21.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None available in 2004.

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

**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.

*[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**

<b>PT</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>2004</b>
<b>Petrol</b>	447	57	61	71		38
<b>Diesel</b>	272	296	261	241		113

## 21.2 FUEL QUALITY MONITORING 2004

### 21.2.1 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 out tests, taking samples in the refineries and terminals, and randomly across the country in retail sites.

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

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

**Collection of sales data:** The information is compiled in electronic format by the fuel companies, who send it to DGE.

**Other details:** \*Portugal is studying alternative methodologies, in order to comply with EN14274 in the future.

### 21.2.2 Sampling and reporting

Portugal was in most respects compliant with the sampling and reporting requirements in 2004, however they are yet to implement a monitoring system in full compliance with the requirements of EN 14274. The following Table 21.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
7	95<RON<98	7	76.7%	10	14	-	No	12 of 18	(2)
10	RON 98	10	23.3%	8	14	-	No	12 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>18</b>	<b>28</b>	-	<b>No</b>	<b>12 of 18</b>	<b>(2)</b>
13	Diesel	13	100.0%	10	14	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>10</b>	<b>14</b>	-	<b>No</b>	<b>5 of 5</b>	

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

- (1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)
- (2) 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. However, 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, however Portugal have stated no other oxygenates are added to the fuel. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.
- (3) The implementation of the EN 14274 is still in progress and changes in sampling methodologies are still being made.

### 21.2.3 Compliance with fuel quality limit values

#### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

None.

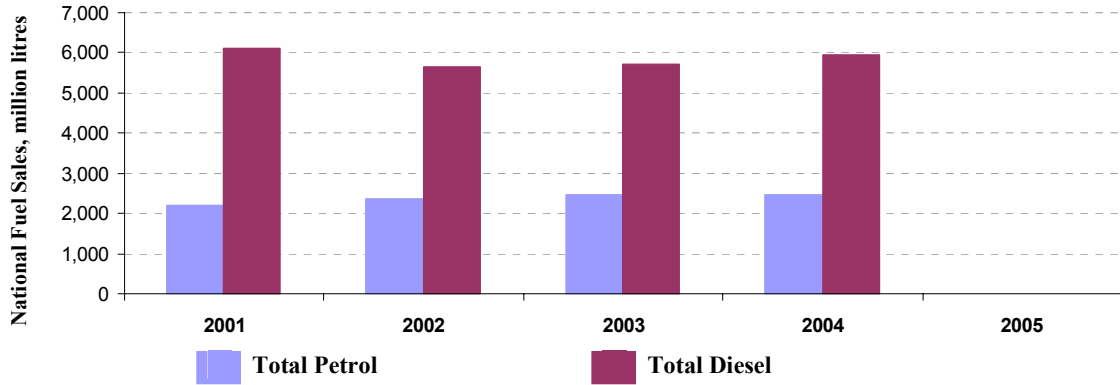
#### **Diesel**

None.

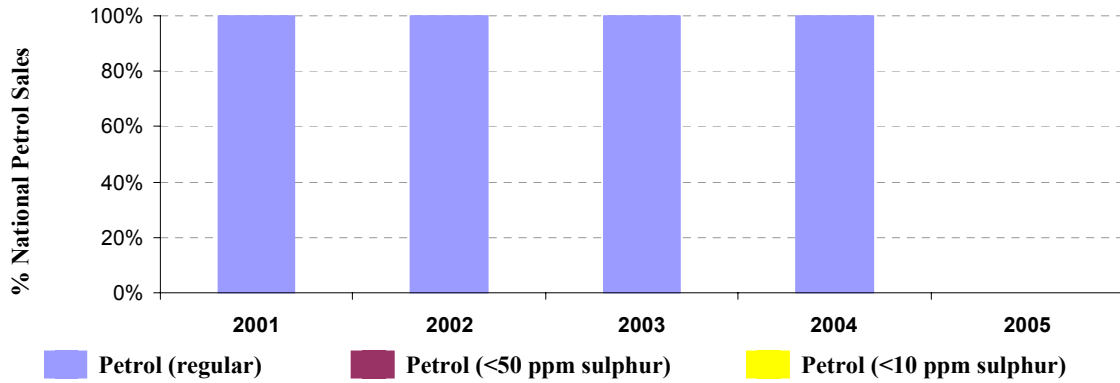
### 21.3 TEMPORAL TRENDS

The following Figure 21.2 to Figure 21.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2004, the sales of petrol increased by 12%, while sales of diesel decreased by 3%. No low sulphur fuels were available.

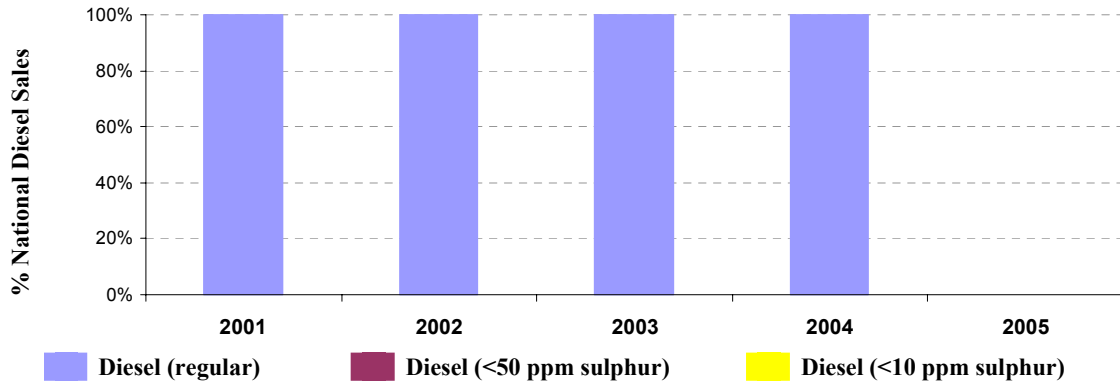
**Figure 21.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 21.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 21.4: Temporal trends in national sales of low sulphur diesel (%)**



## 22 Slovakia

### 22.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	RON 91	<150 ppm	NORMAL 91	Yes	1
3	RON 91	<10 ppm	NORMAL 91	Yes	1
4	RON 95	<150 ppm	SUPER 95	Yes	4
5	RON 95	<50 ppm	SUPER 95	Yes	4
6	RON 95	<10 ppm	SUPER 95	Yes	4
10	RON 98	<150 ppm	SUPER PLUS 98	Yes	10
12	RON 98	<10 ppm	SUPER PLUS 98	Yes	10
13	Diesel	<350 ppm	Diesel	Yes	13
14	Diesel	<50 ppm	Diesel	Yes	13
15	Diesel	<10 ppm	Diesel	Yes	13

#### 22.1.1 Sales

Figure 22.1: National fuel sales proportions by fuel type (%)

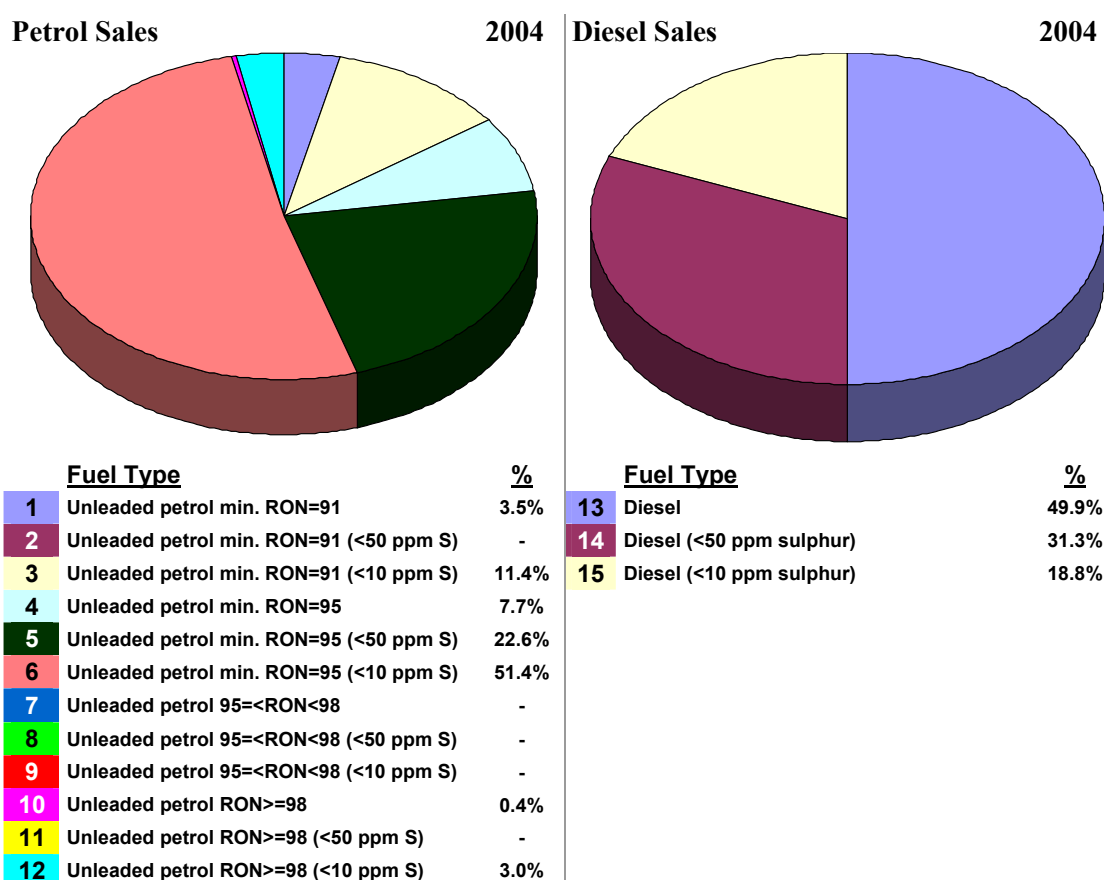


Figure 22.1 shows that significant quantities of low and zero sulphur petrol and diesel were available in 2004. The majority (80%) of petrol sold was of RON 95 grade (comprising of 8% regular grade, 23% low sulphur and 51% sulphur free). RON 91 and RON 98 grades comprised 15 % and 3% respectively. Total sales of petrol grades of sulphur-free quality accounted for 66% of national sales in 2004. Half of the diesel fuel sold was low sulphur (31%) or sulphur-free (19%) quality. (N.B. there are actually only 4 official national grades, however Slovakia has provided estimated sales data for fuels complying with different sulphur levels).

### 22.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were available in significant quantities for petrol and diesel across Slovakia in 2004.

**Are sulphur-free grades clearly labelled differently / marketed separately?** The sulphur-free fuels (<10 ppm sulphur) were not labelled at refuelling stations.

**Average sulphur content of all petrol and diesel sold:** Table 22.1 shows the average content of fuel sold in 2004 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**

SK	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				8		38
<i>Diesel</i>				117		113

## 22.2 FUEL QUALITY MONITORING 2004

### 22.2.1 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:** Starting from the date of joining the EU in May 2004, 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.

### 22.2.2 Sampling and reporting

Slovakia was fully compliant with the sampling and reporting requirements in 2004. The following Table 22.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
1	RON 91	1	3.5%	53	61	100	Yes	All of 18	
3	RON 91 <10ppm S	1	11.4%	0	0				
4	RON 95	4	7.7%	56	58	100	Yes	All of 18	
5	RON 95 <50 ppm S	4	22.6%	0	0				
6	RON 95 <10 ppm S	4	51.4%	0	0				
10	RON 98	10	0.4%	3	7	4	Yes	All of 18	
12	RON 98 <10 ppm S	10	3.0%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>112</b>	<b>126</b>	<b>204</b>	<b>Yes</b>	<b>All of 18</b>	
13	Diesel	13	49.9%	57	50	100	Yes	All of 5	
14	Diesel <50 ppm S	13	31.3%	0	0				
15	Diesel <10 ppm S	13	18.8%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>57</b>	<b>50</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 22.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:*

RON and summer vapour pressure limit values (of min. 95, max. 60 kPa) were exceeded by 1 sample in each case, with values of 90.5 and 60.3 kPa respectively.

*Statistical significance:*

The tolerance limit for statistical significance for the RON test method is 90.6; therefore the sample was non-compliant with the Directive. The summer vapour pressure sample was within the tolerance limit of 61.8 kPa and was therefore compliant.

*Member State's notes:* The dealer was penalised as a result of the exceedance.

**RON 95 Petrol**

*Detail:* RON, summer vapour pressure and aromatics limit values (of min. 95, max. 60 kPa, 42 %v/v) were exceeded by 3, 1, 1 samples respectively, extremes of 94.3, 62.3 kPa and 44.1 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the RON test method is 94.6 and for summer vapour pressure is 61.8 kPa. Therefore these samples were non-compliant with the Directive. The aromatics sample was within the tolerance limit of 44.2 %v/v and was therefore compliant.

*Member State's notes:* The dealer were penalised as a result of the exceedances.

**RON 98 Petrol**

None.

**Diesel**

*Detail:* The sulphur content limit value (of max. 350 ppm) was exceeded by 2 samples, with values of 438.7 ppm and 1167 ppm.

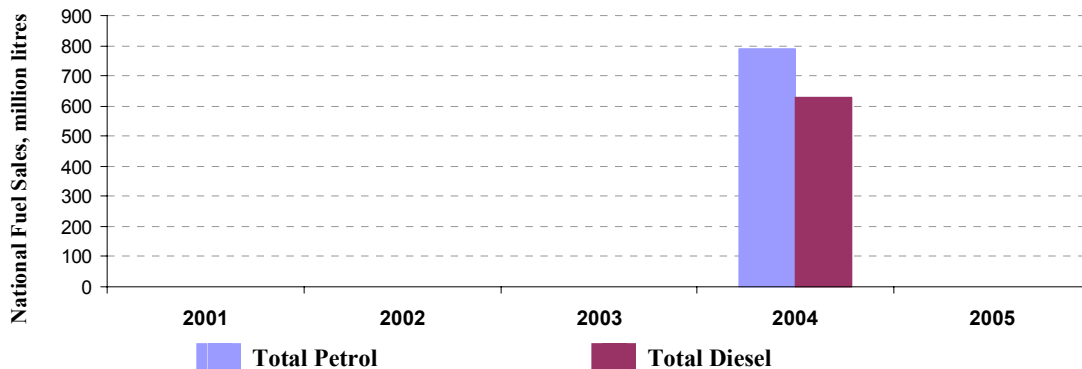
*Statistical significance:* The tolerance limit for statistical significance for the sulphur content test method used (EN ISO 20846) is 373.6 ppm; therefore the samples were non-compliant with the Directive.

*Member State's notes:* The dealers were penalised as a result of the exceedances.

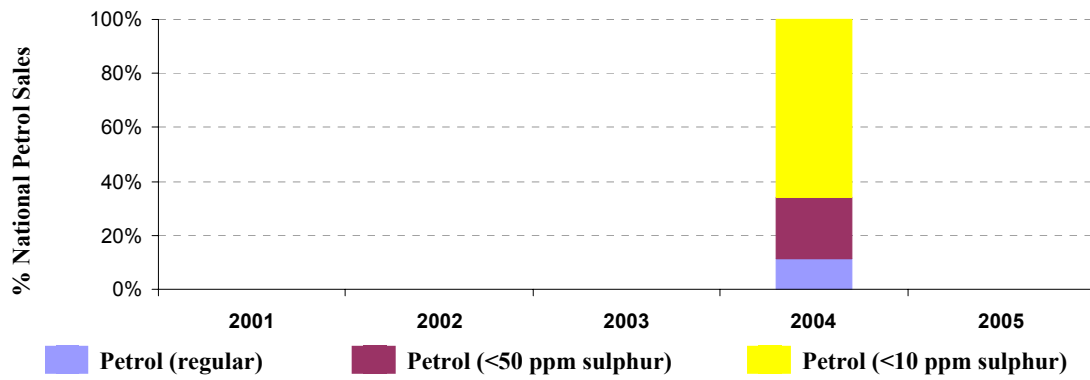
**22.3 TEMPORAL TRENDS**

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

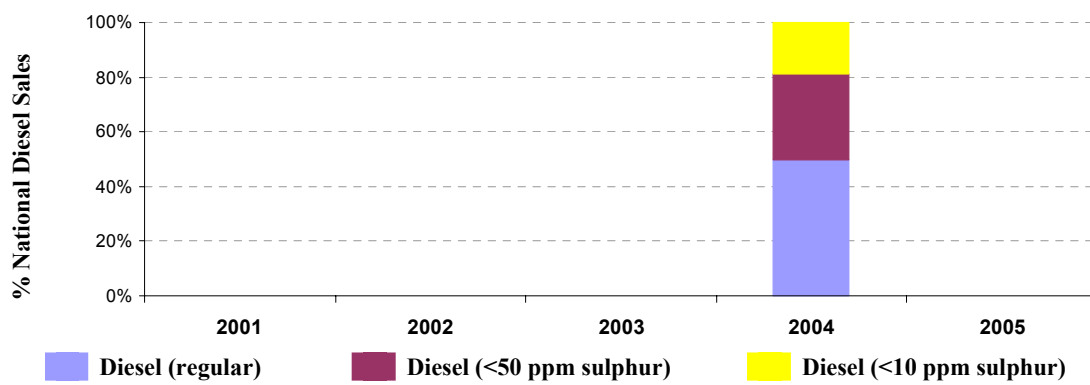
**Figure 22.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 22.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 22.4: Temporal trends in national sales of low sulphur diesel (%)**



## 23 Slovenia

### 23.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
7	95<RON<98	<150 ppm	NMB EURO SUPER	Yes	7
10	RON 98	<150 ppm	NMB SUPER +	Yes	10
13	Diesel	<350 ppm	EURO DIESEL	Yes	13

#### 23.1.1 Sales

Figure 23.1: National fuel sales proportions by fuel type (%)

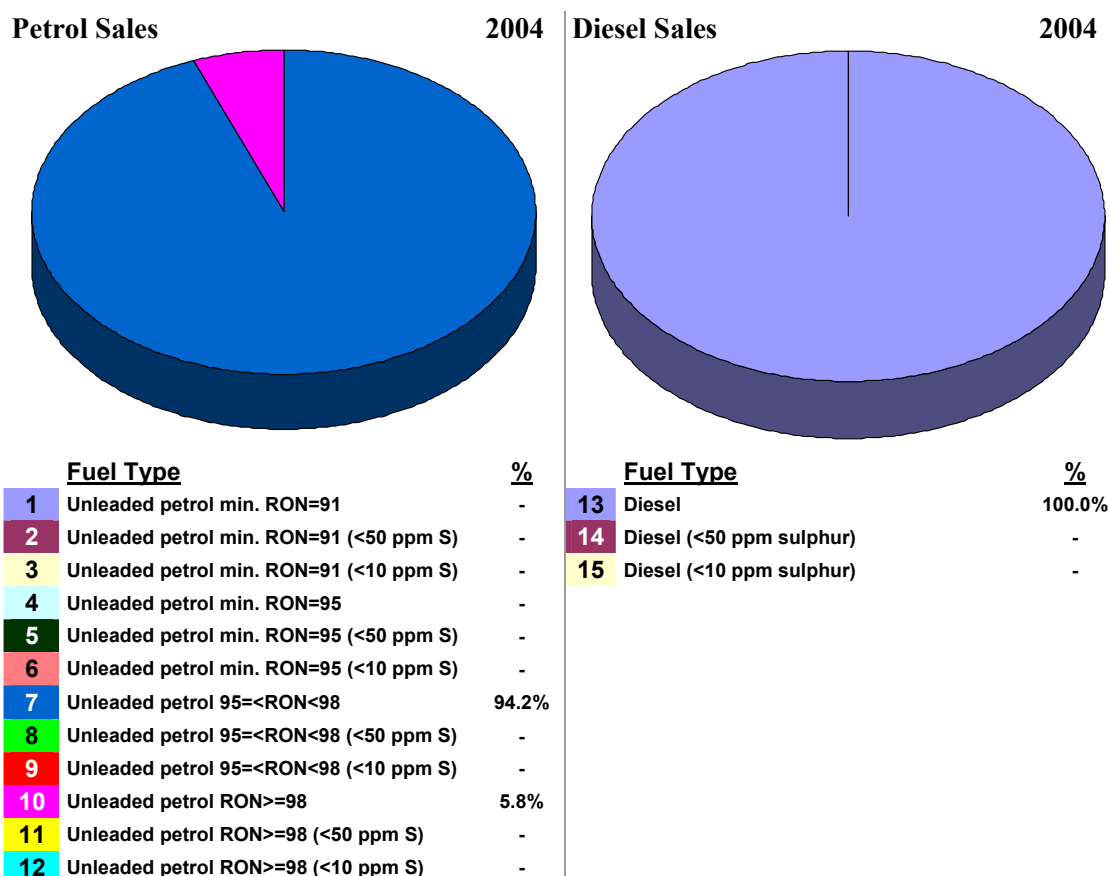


Figure 23.1 shows no low sulphur or sulphur free petrol and diesel grades were available in 2004. The majority of petrol sold was of RON 95-98 category, with the remainder being RON 98. Only one grade of diesel fuel was available.

### 23.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Very small quantities of Unleaded petrol RON  $\geq 98$  and  $< 10$  ppm Sulphur were sold on some district petrol pumps.

**Are sulphur-free grades clearly labelled differently / marketed separately?** Not known.

**Average sulphur content of all petrol and diesel sold:** Table 23.1 shows the average content of fuel sold in 2004 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 23.1: Annual trend in average sulphur content in petrol and diesel fuels**

SI	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>				39		38
<i>Diesel</i>				236		113

## 23.2 FUEL QUALITY MONITORING 2004

### 23.2.1 Description of system

**Responsible organisation(s):** Environmental Agency of the Republic of Slovenia

**Format of Fuel Quality Monitoring System (FQMS):** EN 14274 Statistical Model 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:** Starting from the date of joining the EU in May 2004, 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.

### 23.2.2 Sampling and reporting

Slovenia was almost fully compliant with the sampling and reporting requirements in 2004, as separate data tables were not submitted for summer and winter sample analysis. The following Table 23.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters

respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
7	95<RON<98	7	94.2%	52	45	100	No	All of 18	
10	RON 98	10	5.8%	6	6	6	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>58</b>	<b>51</b>	<b>106</b>	<b>No</b>	<b>All of 18</b>	
13	Diesel	13	100.0%	65	48	100	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>65</b>	<b>48</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 23.2.3 Compliance with fuel quality limit values

#### Exceedances of 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 and distillation at 100°C limit values (of max. 60 kPa, min. 46 %v/v) were exceeded by 8, 2 samples respectively, reaching extremes of 74.5 kPa and 42.3 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8 kPa and for distillation at 100°C is 43.6 %v/v. 6 of the vapour pressure samples and both the distillation samples were outside the tolerance limits and therefore non-compliant with the Directive.

*Member State's notes:* -

#### **RON 98 Petrol**

*Detail:* Summer vapour pressure limit value (of 60 kPa) was exceeded by 3 samples, with values 62.4, 63.6 and 60.5 kPa.

*Statistical significance:* The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8 kPa. Two of the samples were therefore non-compliant with the Directive.

*Member State's notes:* -

#### **Diesel**

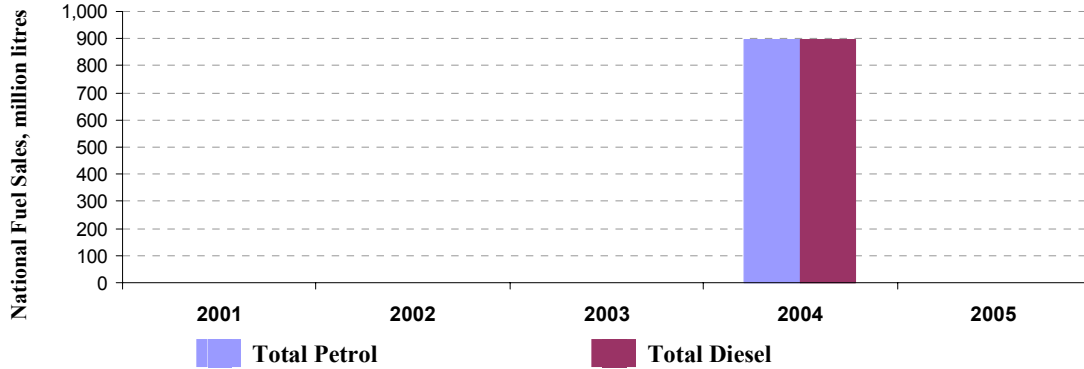
*Detail:* Cetane number limit value (of min. 51) was exceeded by 1 sample.

*Statistical significance:* The tolerance limit for statistical significance for the cetane number test method is 45.8. The sample was therefore non-compliant with the Directive.

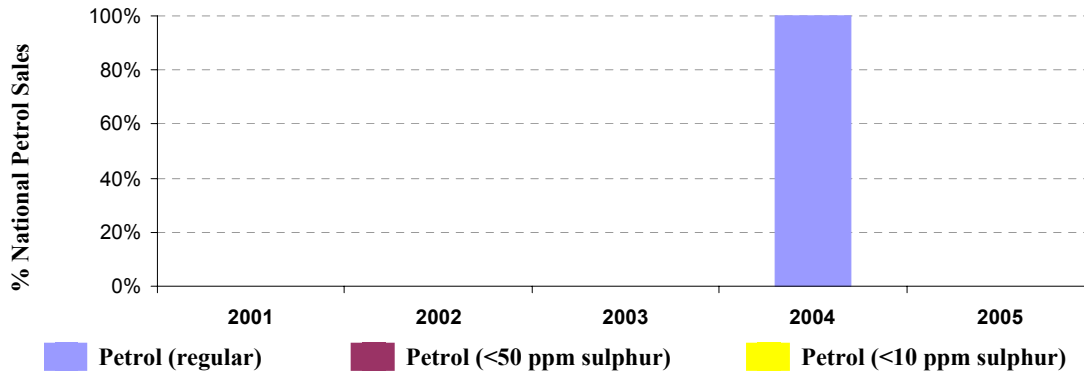
### 23.3 TEMPORAL TRENDS

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. Since this is the first year of reporting for the new EU Member States, no time trends can be identified at this stage.

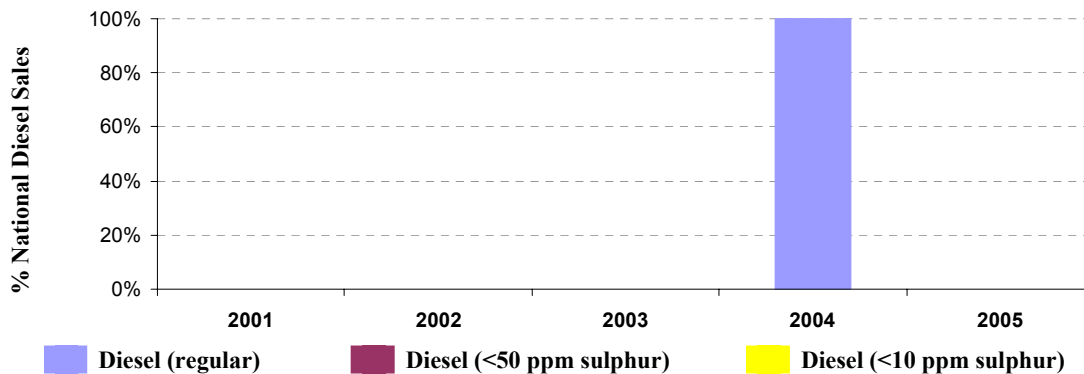
**Figure 23.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 23.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 23.4: Temporal trends in national sales of low sulphur diesel (%)**



## 24 Spain

### 24.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	RON 95	<150 ppm	Gasolina IO 95	Yes	4
7	95<RON<98	<150 ppm	Gasolina 97 IO	Yes	7
10	RON 98	<150 ppm	Gasolina 98 IO	Yes	10
13	Diesel	<350 ppm	Gasóleo de automoción	Yes	13

#### 24.1.1 Sales

Figure 24.1: National fuel sales proportions by fuel type (%)

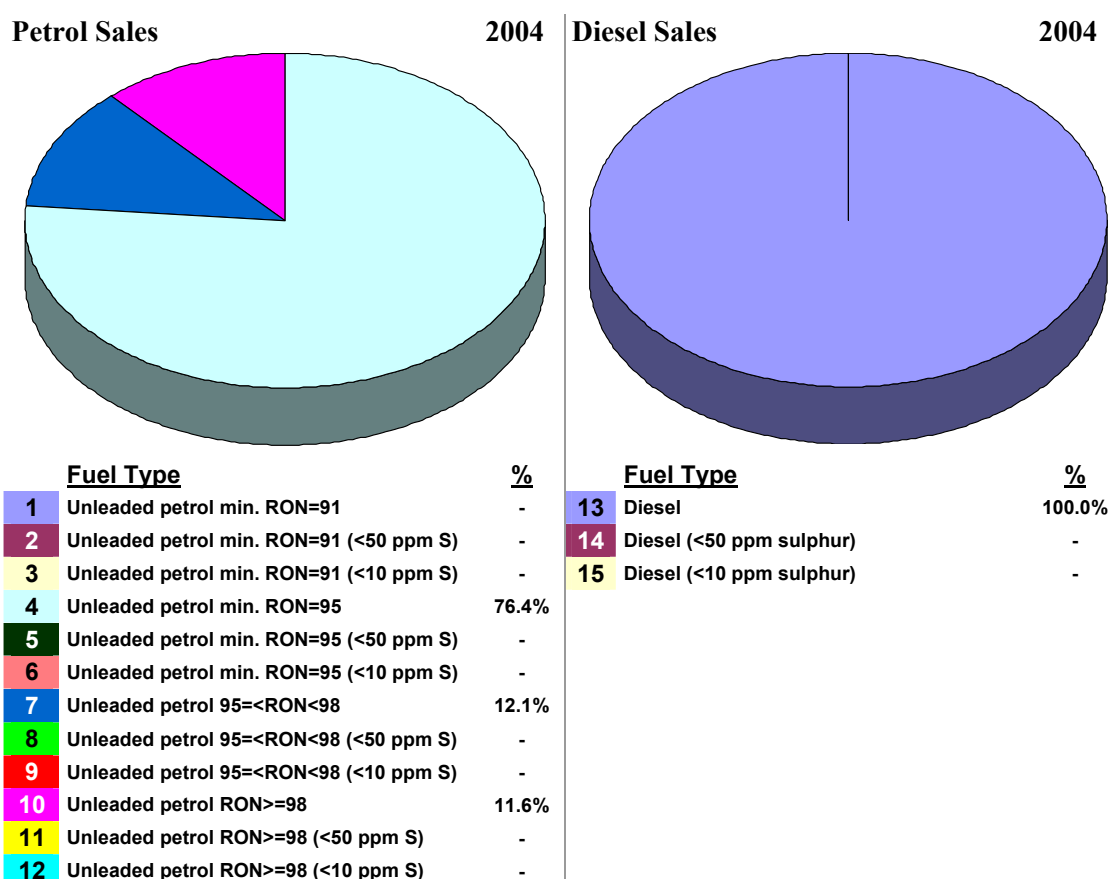


Figure 24.1 shows that the majority of fuel sold in Spain in 2004 was again RON 95 grade (76% compared to 73% in 2003 and 64% in 2001), with the rest comprising of RON 95-98 (12%, down again from 16%, 20% and 26% in 2003, 2002 and 2001) and RON>98 (12%, up from 9% in 2001). No low sulphur (<50 ppm) grades of fuel were available in Spain in 2004.



### 24.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Not available in 2004.

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

**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, see Table 24.1.

*[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 24.1: Annual trend in average sulphur content in petrol and diesel fuels**

ES	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	
<b>Fuel/Year</b>						<b>2004</b>
<i>Petrol</i>	96	103	103	100		38
<i>Diesel</i>	278	276	267	253		113

## 24.2 FUEL QUALITY MONITORING 2002

### 24.2.1 Description of system

**Responsible organisation(s):** Economy Ministry, Health & Consumer Ministry, C.L.H.S.A., National Consumer Institute.

**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 in total with a crude throughput of 65 MT/year. Imports of petrol and diesel for 2004 were 746 and 6,250 kT respectively. Exports of petrol and diesel in 2004 were 2,588 and 380 kT respectively.

### 24.2.2 Sampling and reporting

Spain was compliant with the sampling and reporting requirements in 2004, however they have not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 24.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
4	RON 95	4	76.4%	99	158	-	Yes	All of 18	
7	95<RON<98	7	12.1%	70	129	-	Yes	All of 18	
10	RON 98	10	11.6%	93	152	-	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>262</b>	<b>439</b>	-	<b>Yes</b>	<b>All of 18</b>	
13	Diesel	13	100.0%	103	173	-	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>103</b>	<b>173</b>	-	<b>Yes</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

### 24.2.3 Compliance with fuel quality limit values

#### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

None.

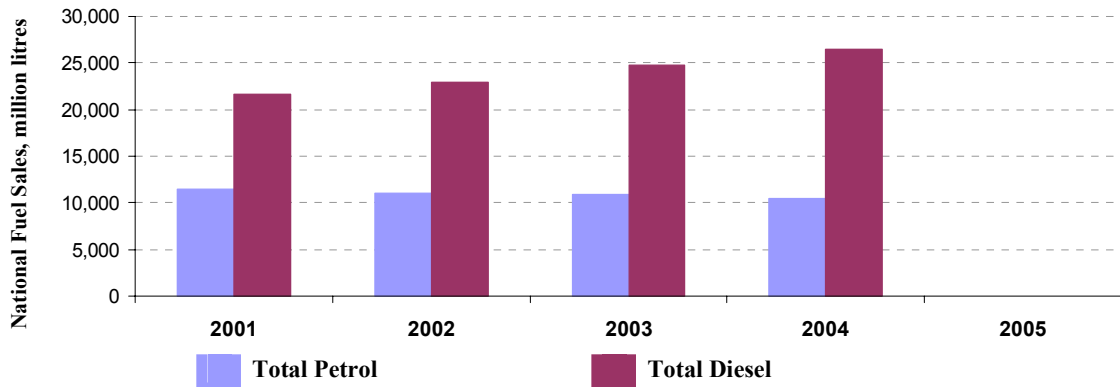
#### **Diesel**

None.

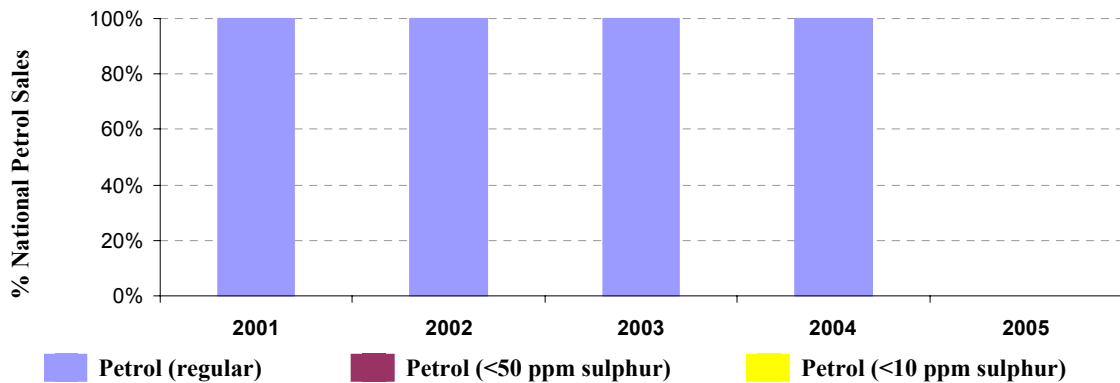
### 24.3 TEMPORAL TRENDS

The following Figure 24.2 to Figure 24.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales at decreased by 9% between 2001 and 2004, with diesel sales increasing by 22%. There were no low sulphur fuels on sale in Spain in 2004.

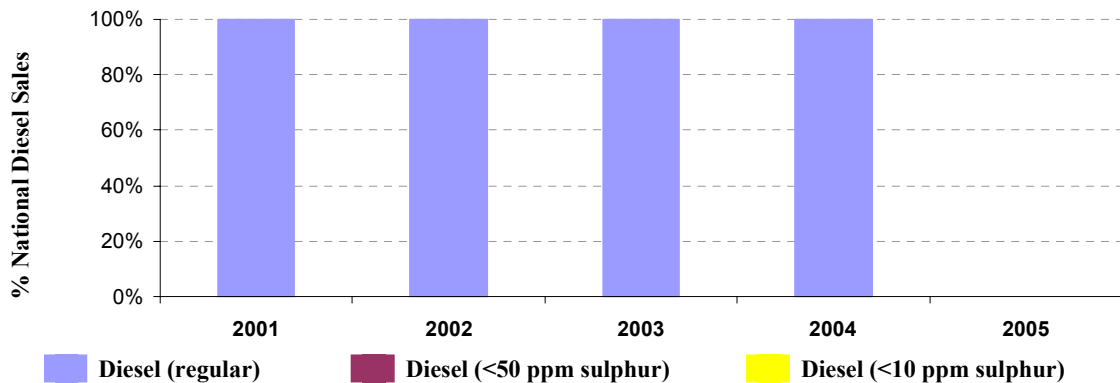
**Figure 24.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 24.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 24.4: Temporal trends in national sales of low sulphur diesel (%)**



## 25 Sweden

### 25.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
5	RON 95	<50 ppm	Unleaded 95, class 1	Yes	5
11	RON 98	<50 ppm	Unleaded gasoline 98, class 1	Yes	11
14	Diesel	<50 ppm	Diesel, class 1	Yes	15
15	Diesel	<10 ppm	Diesel, class 1	Yes	15

#### 25.1.1 Sales

Figure 25.1: National fuel sales proportions by fuel type (%)

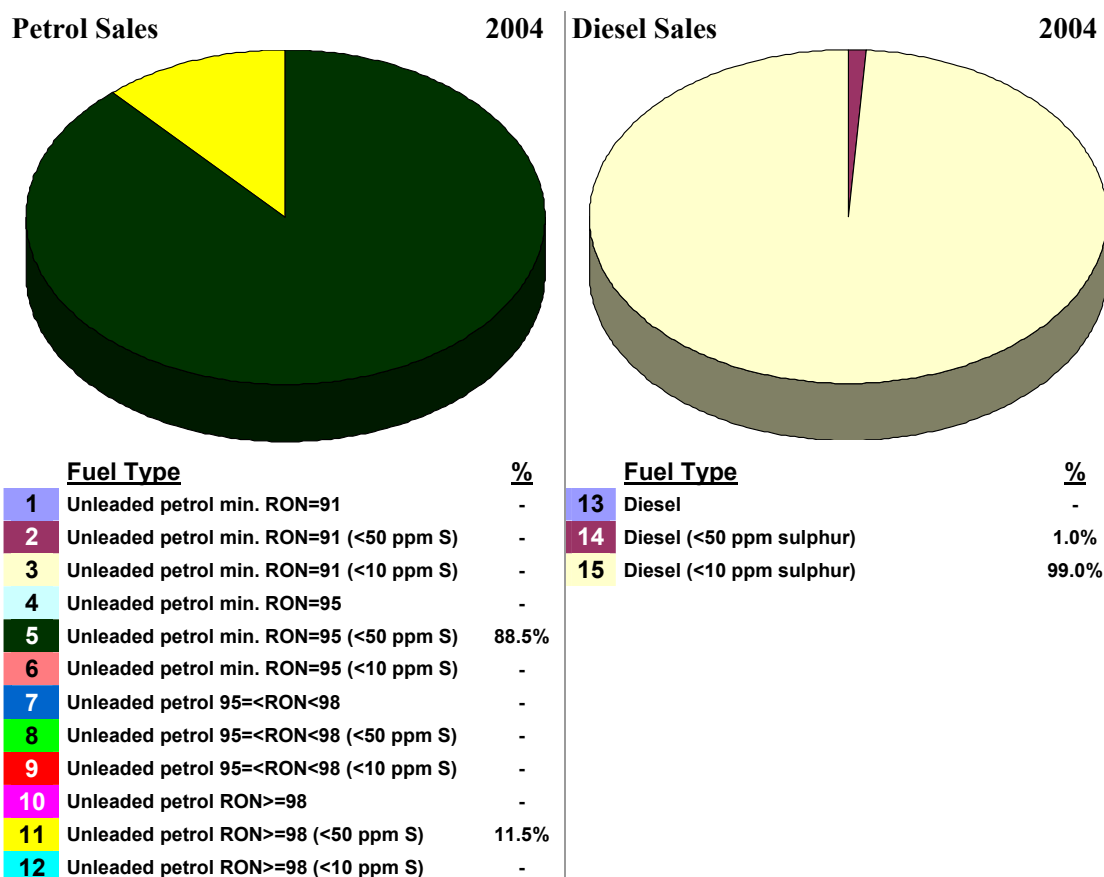


Figure 25.1 shows that all petrol sold in Sweden in 2004 (as in 2001) was low sulphur (<50 ppm), 89% being RON 95 (86% in 2001) and 12% RON 98. All diesel sold was sulphur-free grade (<10 ppm) in previous years, however 1% low sulphur grade was sold in 2004.

### 25.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur-free diesel fuel was available throughout the country in 2004. As early as 1996, 85% of all diesel fuel sold was sulphur-free and for the last 4 years virtually all diesel sold was sulphur-free. The average sulphur content of petrol is <10 ppm in 2004.

**Are sulphur-free grades clearly labelled differently / marketed 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 25.1. Whilst the required sulphur level for petrol is <50 ppm, most of fuel on sale in 2004 was sulphur free (<10 ppm).

[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**

SE	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	21	17	13	9		38
<i>Diesel</i>	1	2	2	2		113

## 25.2 FUEL QUALITY MONITORING 2004

### 25.2.1 Description of system

**Responsible organisation(s):** Swedish Environmental Protection Agency

**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)

**Location(s) of sampling:** All consignments of fuel to be delivered to market are analysed in order to provide a Certificate of Quality (CQ). In addition, as part of the quality control systems of Swedish oil companies, analysis was carried out on a large proportion of the fuel that was delivered to depots, including sensitive parameters to detect for contamination. No samples are taken at fuel dispensing sites.

**Time/frequency of sampling:** All year round - see above.

**Specification of test methods:** Analysing laboratories are accredited by SWEDAC (Swedish Board for Accreditation and Conformity Assessment), however no information was provided on the test methods themselves.

**Collection of sales data:** Reported by the oil companies in the market.

**Other details:** 3 national refineries and a number of international refineries serve the market.

## 25.2.2 Sampling and reporting

Sweden was in most respects compliant with the sampling and reporting requirements in 2004, however they have not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. In particular, the national system does not involve sampling at refuelling stations, as required by EN 14274. The following Table 25.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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 <sup>(1)</sup>			
5	RON 95 <50 ppm S	5	88.5%	357	360	-	No	12 of 18	(2)
11	RON 98 <50 ppm S	11	11.5%	90	54	-	No	12 of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>447</b>	<b>414</b>	<b>-</b>	<b>No</b>	<b>12 of 18</b>	<b>(2)</b>
14	Diesel <50 ppm S	15	1.0%	0	0	-			
15	Diesel <10 ppm S	15	99.0%	156	468	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>156</b>	<b>468</b>	<b>-</b>	<b>No</b>	<b>5 of 5</b>	

Notes: S = Summer; W = Winter

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) 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. However, 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.

## 25.2.3 Compliance with fuel quality limit values

### Exceedances of Directive 98/70/EC limit values

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

#### **Petrol**

None.

#### **Diesel**

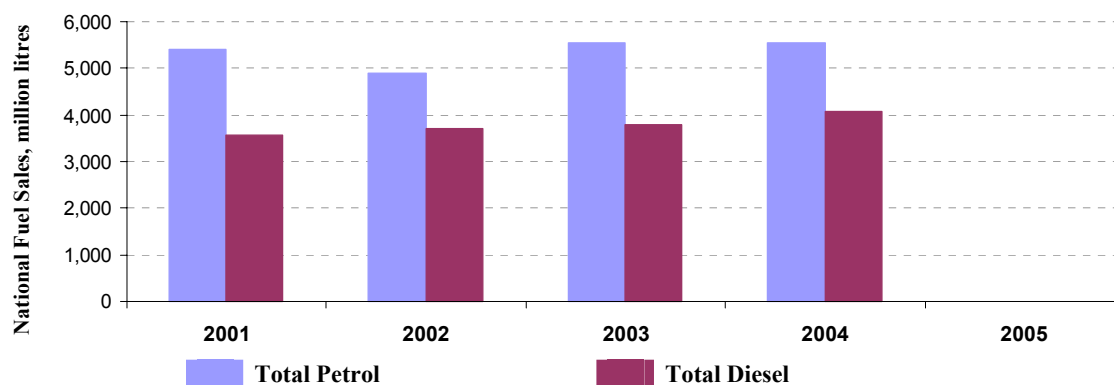
*Detail:* Some samples exceeded the minimum limit for cetane number (51.0), with the minimum being 50.2.

*Statistical significance:* No samples were outside of the zone of tolerance for the parameter test method (min. 48.5 for Cetane number) and were therefore compliant with the Directive.

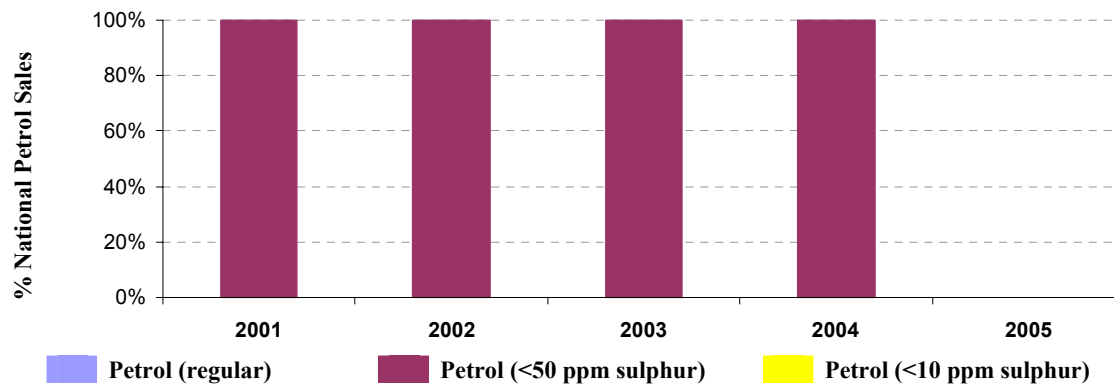
### 25.3 TEMPORAL TRENDS

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 sales increased by 2% between 2001 and 2004, with diesel sales increasing by 15%. All petrol sold in 2001 - 2004 was low sulphur (<50 ppm), and all diesel was sulphur free (<10 ppm) 2001-2003, with 1% fuel being low sulphur in 2004.

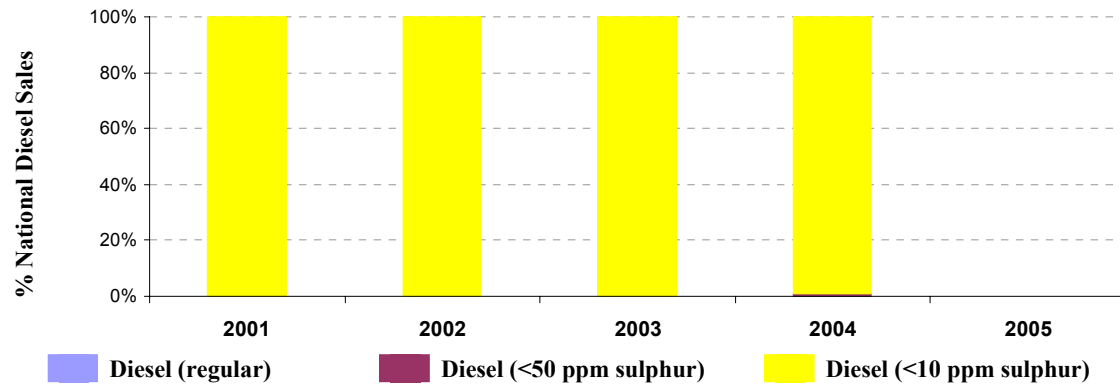
**Figure 25.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 25.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 25.4: Temporal trends in national sales of low sulphur diesel (%)**





## 26 United Kingdom

### 26.1 FUEL AVAILABILITY 2004

The following table lists the fuels that were reported to be available nationally in 2004, where full sales data were provided and the category (the reference number) under which sample analysis results were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data?	Reporting Category
5	RON 95	<50 ppm	ULS Premium Unleaded	Yes	5
8	95<RON<98	<50 ppm	Super Unleaded and LRP	Yes	8
14	Diesel	<50 ppm	ULS Diesel	Yes	14

#### 26.1.1 Sales

Figure 26.1: National fuel sales proportions by fuel type (%)

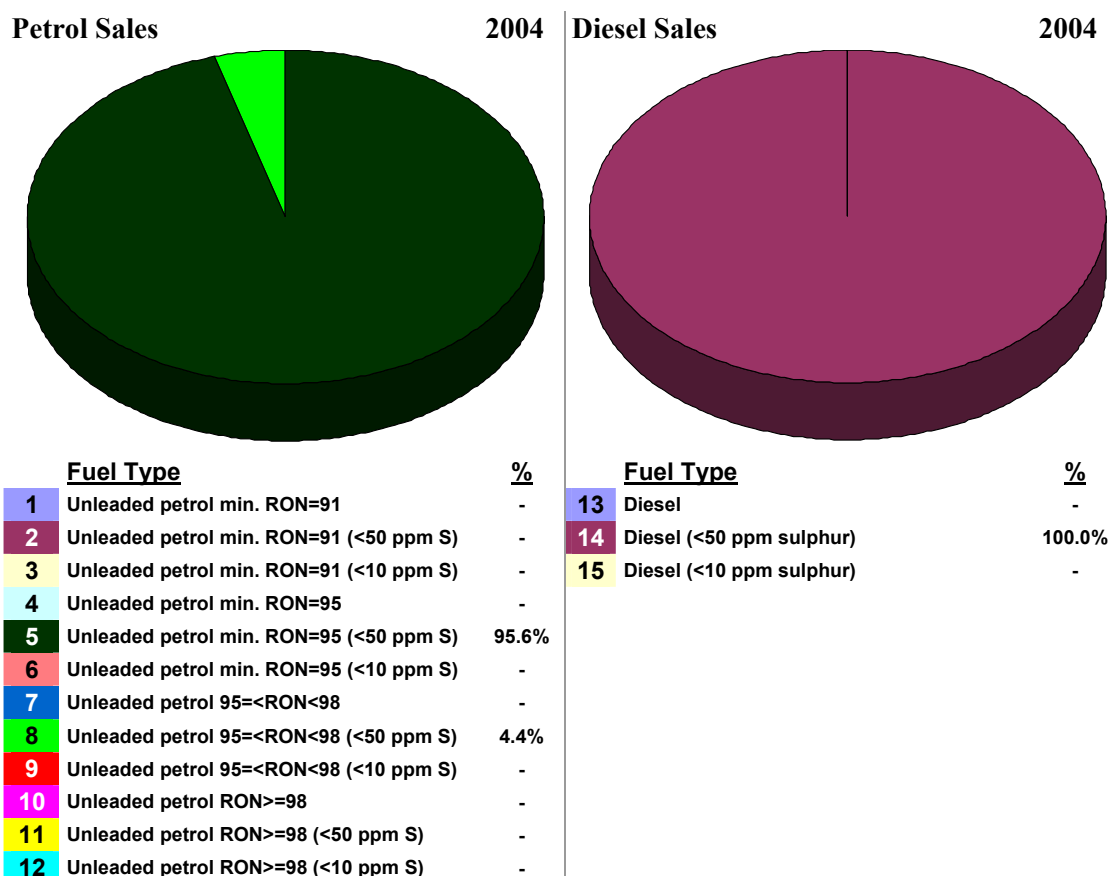


Figure 26.1 above shows the wide availability of low sulphur (<50 ppm) fuels on the UK market in 2004, with 100% of all petrol and diesel fuel sold being low sulphur, as in previous years. For petrol 96% of fuel sold is RON 95, as in 2002-3. The remaining 4% of fuel was accounted for by RON 98 fuel (includes LRP and Super Unleaded), down from 6% in 2001.

## 26.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** There were very limited supplies of petrol or diesel containing <10ppm sulphur marketed in the UK during 2004 (only sold in Edinburgh). Actual volume sales were essentially negligible compared to national sales volumes of fuel and these have not been separated in volume reporting from 2005 specification fuels. The UK had planned to introduce a tax incentive from September 2004, however, due to oil price pressures all tax increases on transport fuels (including differentials) have been suspended in the UK, this suspension has been continued into 2005, and the UK intends to implement other measures by year end 2005.

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 26.1.

[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 26.1: Annual trend in average sulphur content in petrol and diesel fuels**

UK	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<i>Petrol</i>	49	41	37	37		38
<i>Diesel</i>	40	40	38	35		113

## 26.2 FUEL QUALITY MONITORING 2004

### 26.2.1 Description of system

**Responsible organisation(s):** Department for Trade and Industry (DTI), United Kingdom Petroleum Industry Association (UKPIA) and Association of UK Oil Independents (AUKOI).

**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)

**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 (comprising of 441 samples in 2004).

**Time/frequency of sampling:** Every batch of fuel manufactured in refineries for consumption in the UK is tested. Oil marketers also conduct surveys to confirm that fuel is not contaminated in transport. This consists of sampling at inland terminals plus their own and competitors retail networks (public refuelling stations).

**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 DTI.

**Other details:** 9 refineries supply the market of the UK with fuel by the major international oil companies and this is supplemented by imports controlled by independent suppliers (<10% total fuels within UK). No product is released that does not meet the limit values in Directive 98/70/EC. The UK monitoring system uses a mixture of refinery and fuel depot out turn test results plus retail site sampling. When this system was first trialled the two data streams were run apart, with the retail site samples used to gain confidence in trusting refinery/terminal data. A very good correlation was found (using sulphur content as an indicator, deviation was typically <3 ppm). The overall basis for this approach is that the UK had switched in entirety to 2005 fuels Directive specification petrol and diesel (albeit with diesel density and T95 being tighter at 0.835 and 345 respectively), hence there is only one grade each of petrol and diesel going into the market. The refinery/terminal sampling does not allow for adulteration, however the UK customs department also action this separately, as mentioned in previous years reporting. This year the total number of retail site samples was 441. This is lower than previously due to one large group of samples not being available this year.

## 26.2.2 Sampling and reporting

The United Kingdom was compliant with the sampling and reporting requirements in 2004, and have provided information on the national monitoring system confidence level. The following Table 26.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Member States are required under the Directive to use a monitoring system based on European Standard EN 14274, unless their National System 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). Directive 98/70/EC specifies certain parameters that are to be analysed for the samples of petrol and diesel fuels (18 and 5 parameters respectively – see Appendix 2 for details on the limit values, test methods and tolerance limits).

**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>			
5	RON 95 <50 ppm S	5	95.6%	603	1890	-	No	All of 18	(2)
8	95<RON<98 <50 ppm S	8	4.4%	87	257	-	No	All of 18	(2)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>690</b>	<b>2147</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	<b>(2)</b>
14	Diesel <50 ppm S	14	100.0%	523	1508	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>523</b>	<b>1508</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

(1) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)

(2) Report delayed due to late delivery of information from one fuel supplier

### 26.2.3 Compliance with fuel quality limit values

#### Exceedances of 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:* Some samples exceeded the limit values for RON (min. 95) with 94.6, MON (min. 85) with 84.5, summer vapour pressure (max. 70 kPa) with 71.7 and benzene (1.0 %v/v) with 1.1 %v/v. Some samples exceeded the limit values for olefins (18.0 %v/v) with values reaching 20.6 %v/v.

*Statistical significance:* The samples for RON, MON and summer vapour pressure were all within tolerance limits for the test methods and therefore were compliant. The samples for olefins and benzene were also within tolerance limits – see Member State comments below.

*Member State's notes:* The samples were within the tolerance limit values for olefins (for ASTM D1319 a max of 20.7 %v/v for samples containing oxygenates and 21.8 %v/v for oxygenate free samples) and were therefore compliant. For the samples exceeding the benzene limits the IR method EN 238 (= IP 429) that was used has R = 0.17 and therefore the tolerance limit is a max of 1.10 %v/v. These samples were also therefore compliant.

##### **Petrol RON 97/LRP**

*Detail:* Some samples exceeded the limit values for summer vapour pressure (max. 70 kPa) with 70.9 and benzene (1.0 %v/v) with 1.1 %v/v. Some samples exceeded the limit values for olefins (18.0 %v/v) with values reaching 20 %v/v.

*Statistical significance:* All samples were within the tolerance limits for the test methods.

*Member State's notes:* See comments for RON 95 fuel.

##### **Diesel**

*Detail:* Some samples exceeded the limit value for Cetane number (min. 51.0) with values as low as 50.5.

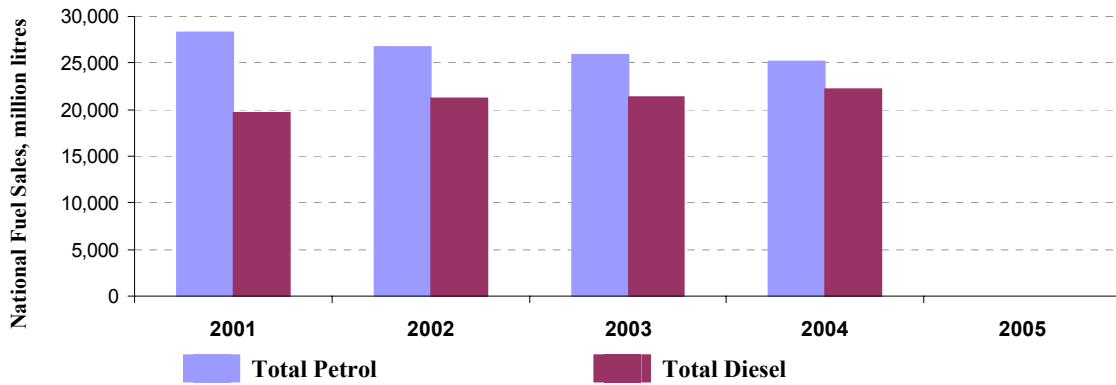
*Statistical significance:* These were within the tolerance limit for the test method (48.5) and were therefore compliant with the Directive.

*Member State's notes:* -

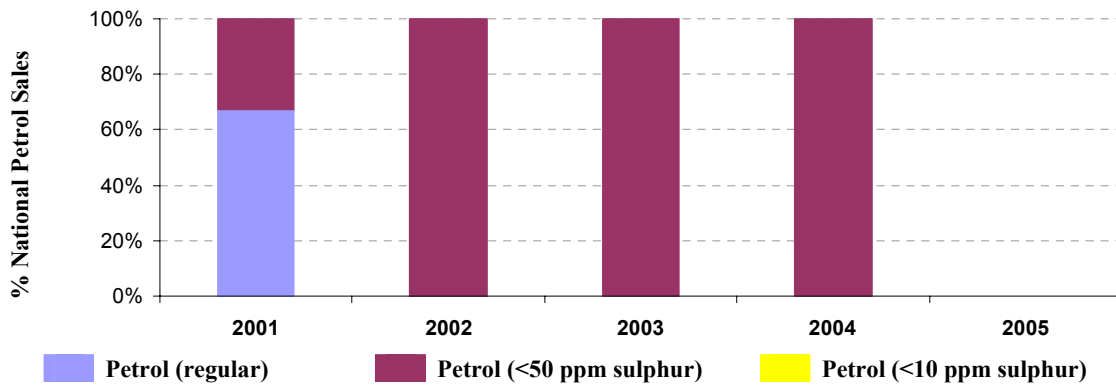
### 26.3 TEMPORAL TRENDS

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. Between 2001 and 2004, total petrol sales fell by 11% and diesel sales rose by 13%. There was also significant transfer from standard petrol to low-sulphur petrol (<50 ppm), with a complete transfer to low-sulphur petrol in 2002.

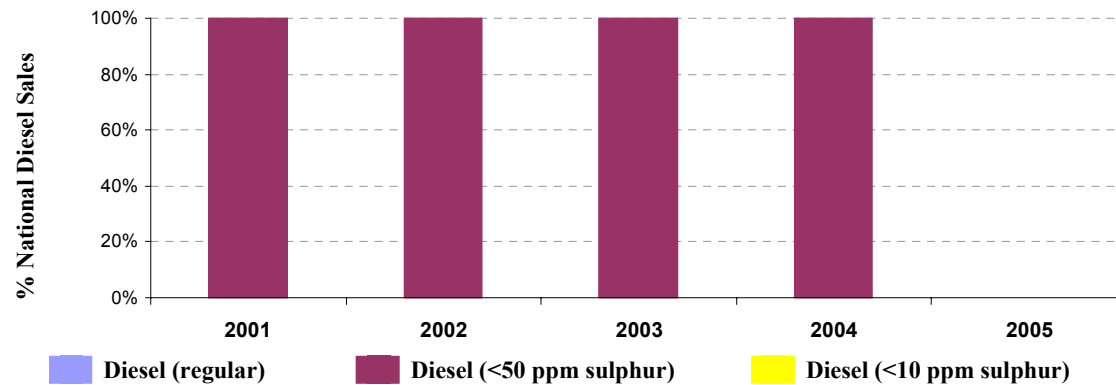
**Figure 26.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 26.3: Temporal trends in national sales of low sulphur petrol (%)**



**Figure 26.4: Temporal trends in national sales of low sulphur diesel (%)**



## 27 EU Summary

### 27.1 FUEL AVAILABILITY 2004

#### 27.1.1 Sales

Figure 27.1: EU Fuel sales proportions by fuel type (%)

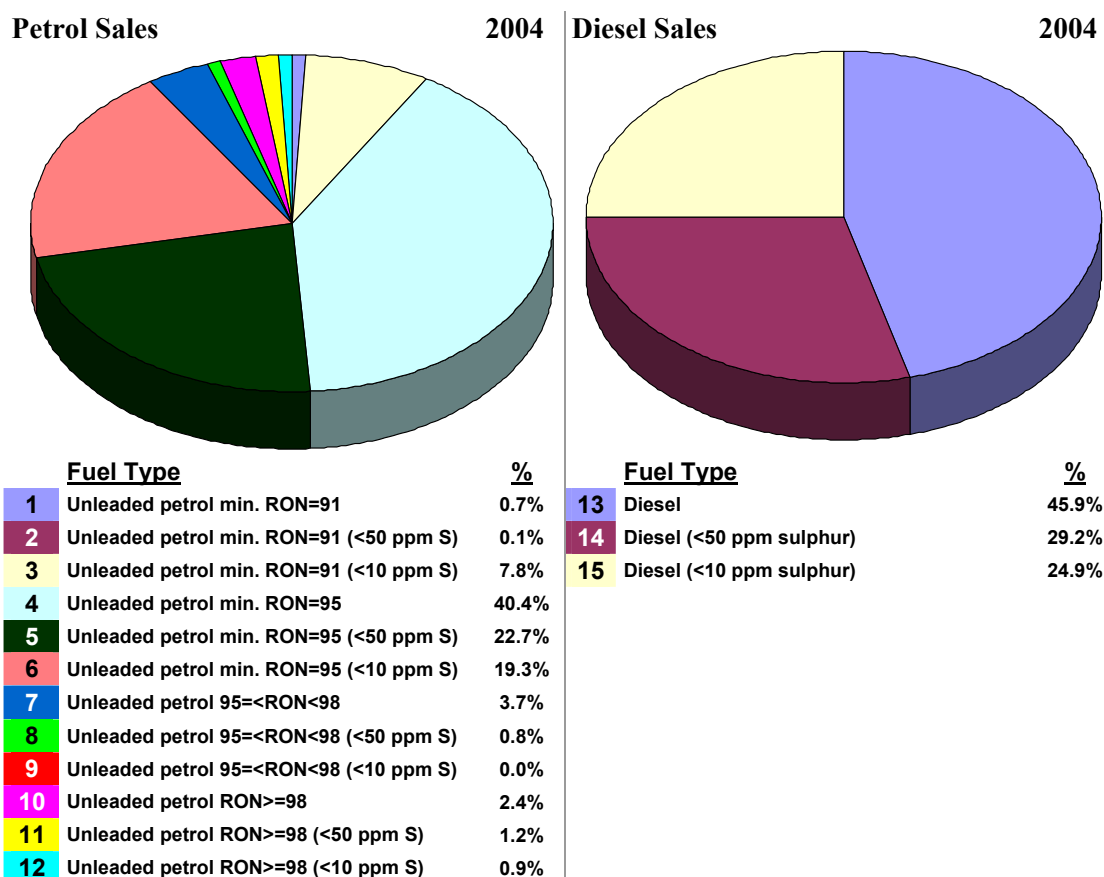


Figure 27.1 (see also Table 27.1) shows the 2004 data (excluding France as no submission was provided for 2004). Whilst a wide variety of RON and sulphur grade fuels were available across the EU in 2004, the majority of sales still comprised RON 95 (82.4%, with 40.4% regular, 22.7% low sulphur and 19.3% sulphur free). Of all petrol sold, 47% was regular sulphur grade, 25% low sulphur (<50 ppm) and 28% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 46%, 29% and 25%. Compared to 2001 the quantities of <50 ppm and <10 ppm fuels have increased significantly. The primary reason for the much larger portion of <10 ppm fuels available in 2003/4 is the complete transfer of the German market to sulphur free fuels. If data from France were included in the 2003/4 analyses the proportions of low sulphur and sulphur free fuels could be significantly lower (assuming similar sales in France to 2002). Sales from the new EU10 Member States comprised 10.0% and 10.3% of total petrol and diesel sales in the EU respectively. Compared to the EU15, much smaller proportions of low sulphur grades were sold in the EU10, with over 90% of petrol and diesel sold being regular grades.

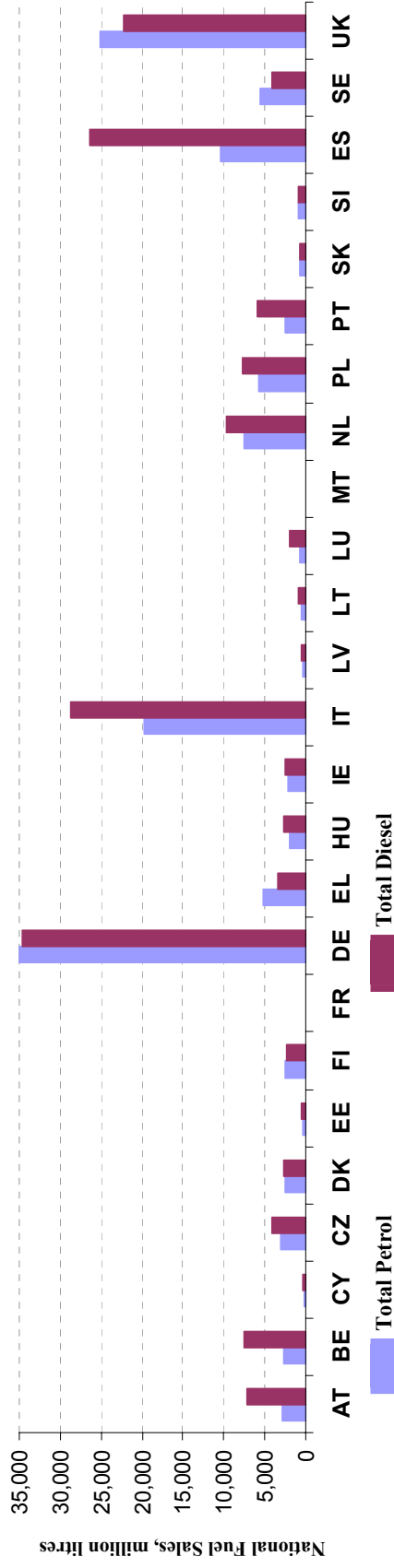
**Table 27.1: 2004 EU fuel sales by fuel type (million litres) (Sales for CY, LV and MT are not for the full calendar year, only for May-Dec 2004).**

ID No.	Million litres Fuel grade	Austria AU	Belgium BE	Denmark DK	Finland FI	France FR	Germany DE	Greece EL	Ireland IE	Italy IT	Luxembourg LU	Netherlands NL	Portugal PT	Spain ES	Sweden SE	UK UK	EU15 EU15	EU15 % Total
1	Unleaded petrol min. RON=91	-	-	520	-	-	-	-	-	-	8	-	-	-	-	-	528	0.4%
2	Unleaded petrol min. RON=91 (<50 ppm S)	92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92	0.1%
3	Unleaded petrol min. RON=91 (<10 ppm S)	672	-	-	-	-	10,013	-	-	-	-	-	-	-	-	-	10,685	8.6%
4	Unleaded petrol min. RON=95	-	-	2,029	2,208	-	-	3,849	2,201	19,704	573	7,501	-	7,976	-	-	45,447	36.4%
5	Unleaded petrol min. RON=95 (<50 ppm S)	121	1,830	-	-	-	-	-	-	-	-	-	-	-	-	24,094	30,950	24.8%
6	Unleaded petrol min. RON=95 (<10 ppm S)	1,899	-	-	-	-	23,887	-	-	-	-	-	-	-	-	-	26,381	21.2%
7	Unleaded petrol 95=<RON<98	-	-	-	-	-	-	916	-	-	-	-	1,890	1,259	-	-	4,064	3.3%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,097	1,097	0.9%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	4	0.0%
10	Unleaded petrol RON>=98	-	-	20	303	-	-	399	-	-	-	-	574	1,209	640	-	2,506	2.0%
11	Unleaded petrol RON>=98 (<50 ppm S)	-	-	-	-	-	-	61	-	-	167	-	-	-	-	-	1,654	1.3%
12	Unleaded petrol RON>=98 (<10 ppm S)	104	-	-	-	-	1,188	-	-	-	-	-	-	-	-	-	1,292	1.0%
	<b>Petrol (regular)</b>	0	0	2,569	2,512	0	0	5,164	2,201	19,704	582	7,501	2,464	10,445	640	0	52,546	42.1%
	<b>Petrol (&lt;50 ppm sulphur)</b>	213	2,616	0	0	0	0	61	0	0	167	0	0	0	4,905	25,191	33,793	27.1%
	<b>Petrol (&lt;10 ppm sulphur)</b>	2,676	0	0	0	0	35,088	0	4	0	0	0	0	0	0	0	38,362	30.8%
	<b>Total Petrol</b>	2,889	2,616	2,569	2,512	0	35,088	5,225	2,204	19,704	749	7,501	2,464	10,445	5,545	25,191	124,701	100.0%
13	<b>Diesel</b>	215	-	-	-	-	-	3,055	-	28,777	-	-	5,940	26,447	-	-	64,434	40.4%
14	<b>Diesel (&lt;50 ppm sulphur)</b>	1,645	7,579	2,658	2,363	-	-	319	2,474	-	1,947	9,724	-	-	42	22,252	51,004	32.0%
15	<b>Diesel (&lt;10 ppm sulphur)</b>	5,291	-	-	-	-	34,642	13	-	-	-	-	-	-	4,031	-	43,977	27.6%
	<b>Total Diesel</b>	7,150	7,579	2,658	2,363	0	34,642	3,387	2,474	28,777	1,947	9,724	5,940	26,447	4,073	22,252	159,415	100.0%

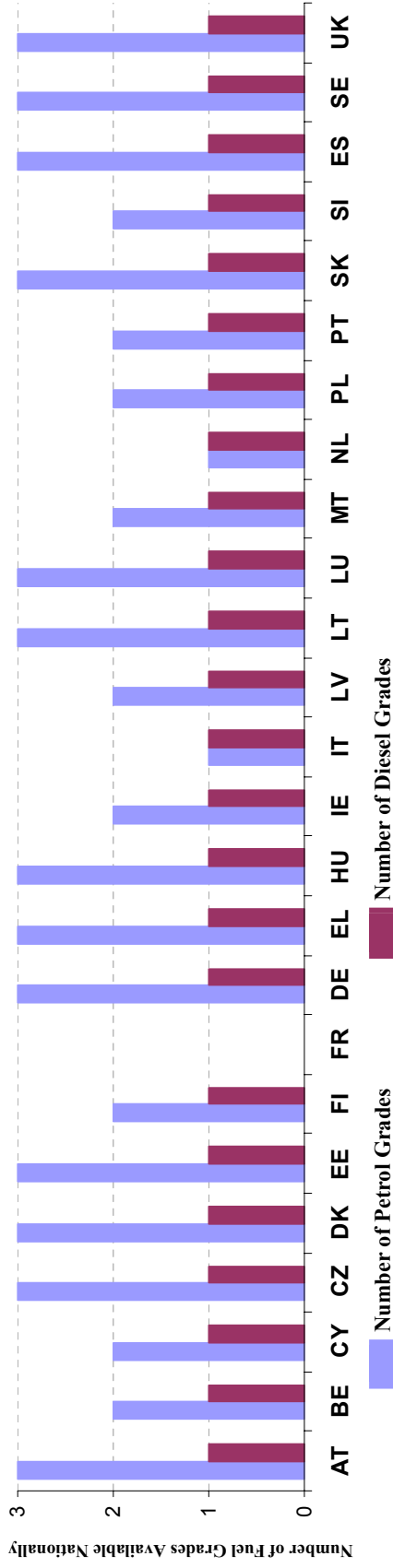
ID No.	Million litres Fuel grade	Cyprus CY	Czech Republic CZ	Estonia EE	Hungary HU	Latvia LV	Lithuania LT	Malta MT	Poland PL	Slovakia SK	Slovenia SI	EU10 EU10	EU10 % Total
1	Unleaded petrol min. RON=91	-	322	20	12	-	60	-	-	28	-	441	3.2%
2	Unleaded petrol min. RON=91 (<50 ppm S)	-	-	-	-	-	37	-	-	-	-	37	0.3%
3	Unleaded petrol min. RON=91 (<10 ppm S)	-	-	-	-	-	-	-	-	90	-	90	0.6%
4	Unleaded petrol min. RON=95	216	2,714	322	1,812	-	-	43	5,331	61	-	10,498	75.4%
5	Unleaded petrol min. RON=95 (<50 ppm S)	-	-	-	-	-	348	-	-	179	-	527	3.8%
6	Unleaded petrol min. RON=95 (<10 ppm S)	-	-	-	-	-	-	-	-	407	-	407	2.9%
7	Unleaded petrol 95=<RON<98	-	-	-	-	254	-	19	-	-	845	1,118	8.0%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	-	-	-	-	-	-	-	-	-	-	0	0.0%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	-	-	-	-	-	-	-	-	-	-	0	0.0%
10	Unleaded petrol RON>=98	45	35	51	168	32	-	-	393	3	52	779	5.6%
11	Unleaded petrol RON>=98 (<50 ppm S)	-	-	-	-	-	-	-	-	-	-	8	0.1%
12	Unleaded petrol RON>=98 (<10 ppm S)	-	-	-	-	-	1	-	-	24	-	25	0.2%
	<b>Petrol (regular)</b>	261	3,070	393	1,992	286	60	61	5,724	92	897	12,836	92.2%
	<b>Petrol (&lt;50 ppm sulphur)</b>	0	0	0	0	0	392	0	0	179	0	571	4.1%
	<b>Petrol (&lt;10 ppm sulphur)</b>	0	0	0	0	0	1	0	0	520	0	522	3.7%
	<b>Total Petrol</b>	261	3,070	393	1,992	286	453	61	5,724	791	897	13,928	100.0%
13	<b>Diesel</b>	272	4,171	492	2,710	458	35	63	7,677	315	894	17,086	93.6%
14	<b>Diesel (&lt;50 ppm sulphur)</b>	-	-	-	-	-	687	-	-	197	-	884	4.8%
15	<b>Diesel (&lt;10 ppm sulphur)</b>	-	-	-	-	-	159	-	-	119	-	277	1.5%
	<b>Total Diesel</b>	272	4,171	492	2,710	458	881	63	7,677	630	894	18,248	100.0%

Figure 27.2: National fuel sales by fuel type across the EU (million litres)\*



\* Fuel sales volumes for CY, LV and MT are not for the full calendar year, only for May-Dec 2004.

Figure 27.3: Number of fuel grades available nationally by fuel type across the EU





Similarly to 2001 - 2003, the largest total sales of fuels (of submissions received) in 2004 were made in Germany, Italy, Spain and the United Kingdom (Figure 27.2). Whilst diesel sales are dominant in many Member States, the relative sales of petrol and diesel vary.

As in 2001 - 2003, there is also still a degree of variation in the number of grades of fuel reported to be available across the EU (Figure 27.3) in 2004, with more petrol grades available, despite the larger quantities of diesel sold. The distinction between petrol grades is mainly a result of different octane levels (RON category) rather than different sulphur levels. Seven EU15 Member States (two more than in 2001) defined *national fuel grades* for low (<50 ppm) or sulphur free (<10 ppm) fuels in 2004. Reporting of fuel sales is again improved in 2004. None of the new EU10 Member States, who joined in May 2005, had separate national low sulphur fuel grades in 2004.

**27.1.2 Sulphur content**

Already in 2001 - 2002 low sulphur fuels were available in many countries across the EU, even though mandatory introduction was not required until 2005 (see Figure 27.4 and Figure 27.5). Compared to 2002, Greece introduced petrol and diesel fuels of the <50 ppm quality and Belgium introduced a <50 ppm petrol grade in 2003. Italy and Portugal are yet to introduce separately marketed low (<50 ppm) or sulphur free (<10 ppm) fuels.

For petrol fuels in the EU15, 5 Member States had fully moved over to low or sulphur free petrol in 2004, with sulphur free petrol only available in Austria, Ireland and Germany (as in 2001-2003). In 2004, Austria had moved completely to lower sulphur petrol, but only Germany had fully switched to sulphur free petrol. For diesel fuels in the EU15, 9 Member States had fully moved over to low or sulphur free diesel fuel in 2004 (compared to 3 in 2001). Sulphur free diesel was available in Austria for the first time in 2004; in Germany it has been available from 2003 and in Sweden virtually all diesel has been sulphur-free since 1999. Of the new Member States, Lithuania and Slovakia have provided information on the sales of low sulphur fuels sold in their territories in 2004, although specific separate grades were not available.

Separate low or sulphur-free fuel grades, or separate sales figures were not available in 2004 in some Member States. However, 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. This can be seen in Figure 27.6, 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 27.2 demonstrates that the annual average sulphur content of petrol and diesel fuels sold in the EU is decreasing, and together with Figure 27.6 shows that much of the fuel sold already complies with the 2005 sulphur limit (<50 ppm sulphur in petrol and diesel fuels).

**Table 27.2: Annual trend in average sulphur content in petrol and diesel fuels**

EU	Average Sulphur Content, ppm				EU15	EU10	EU15*	
	2001	2002	2003*	2004*	2004*	2004	2001	2002
<i>Petrol</i>	68	51	37	38	35	64	65	44
<i>Diesel</i>	223	169	125	113	109	149	207	136

\*Excludes France, who did not report in 2003 and 2004.

Figure 27.4: National sales of low sulphur petrol grades across the EU (%)

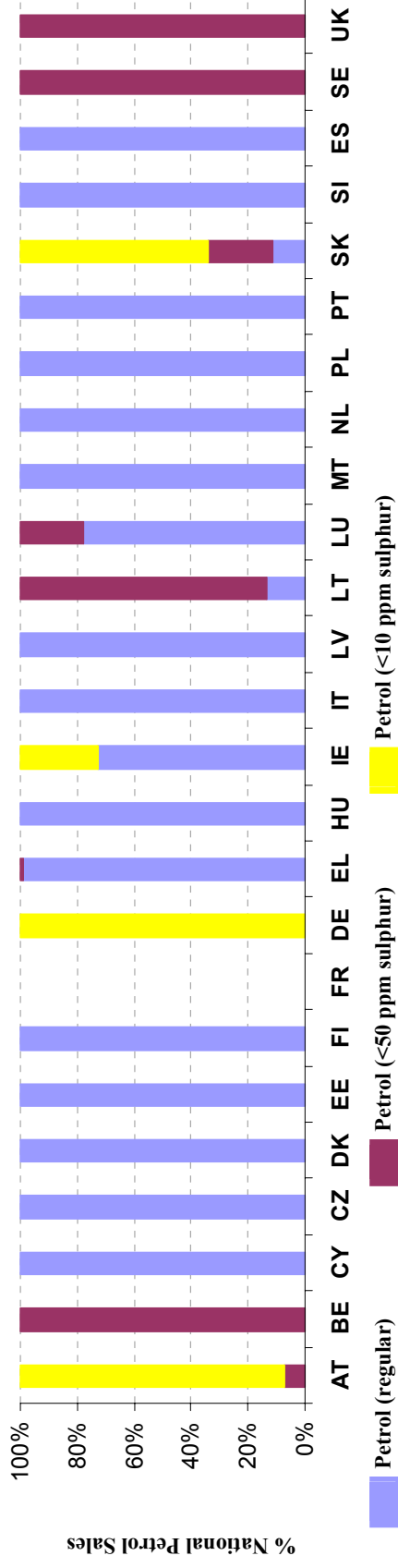


Figure 27.5: National sales of low sulphur diesel grades across the EU (%)

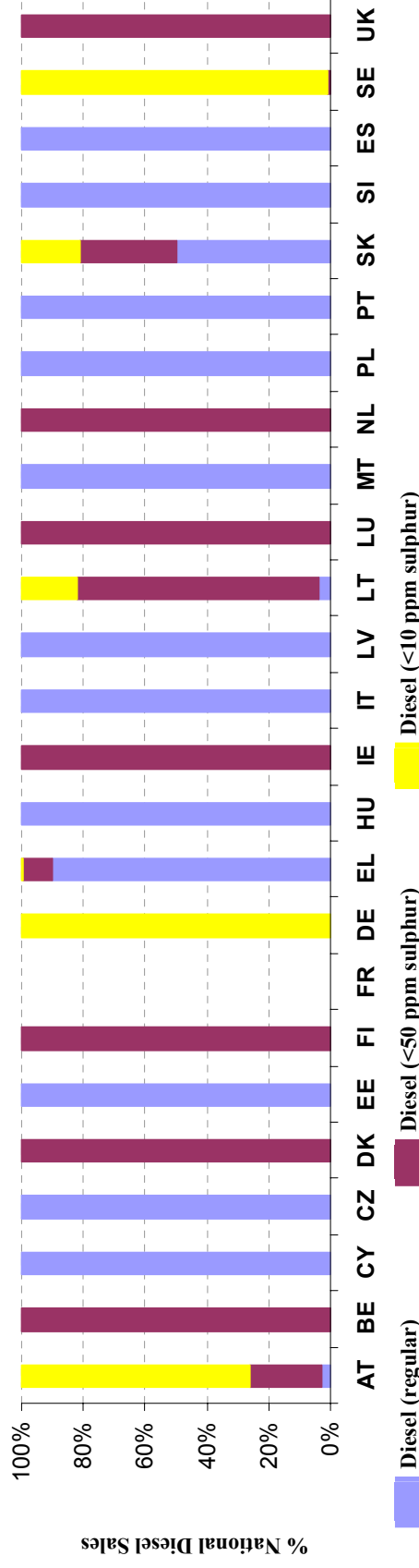
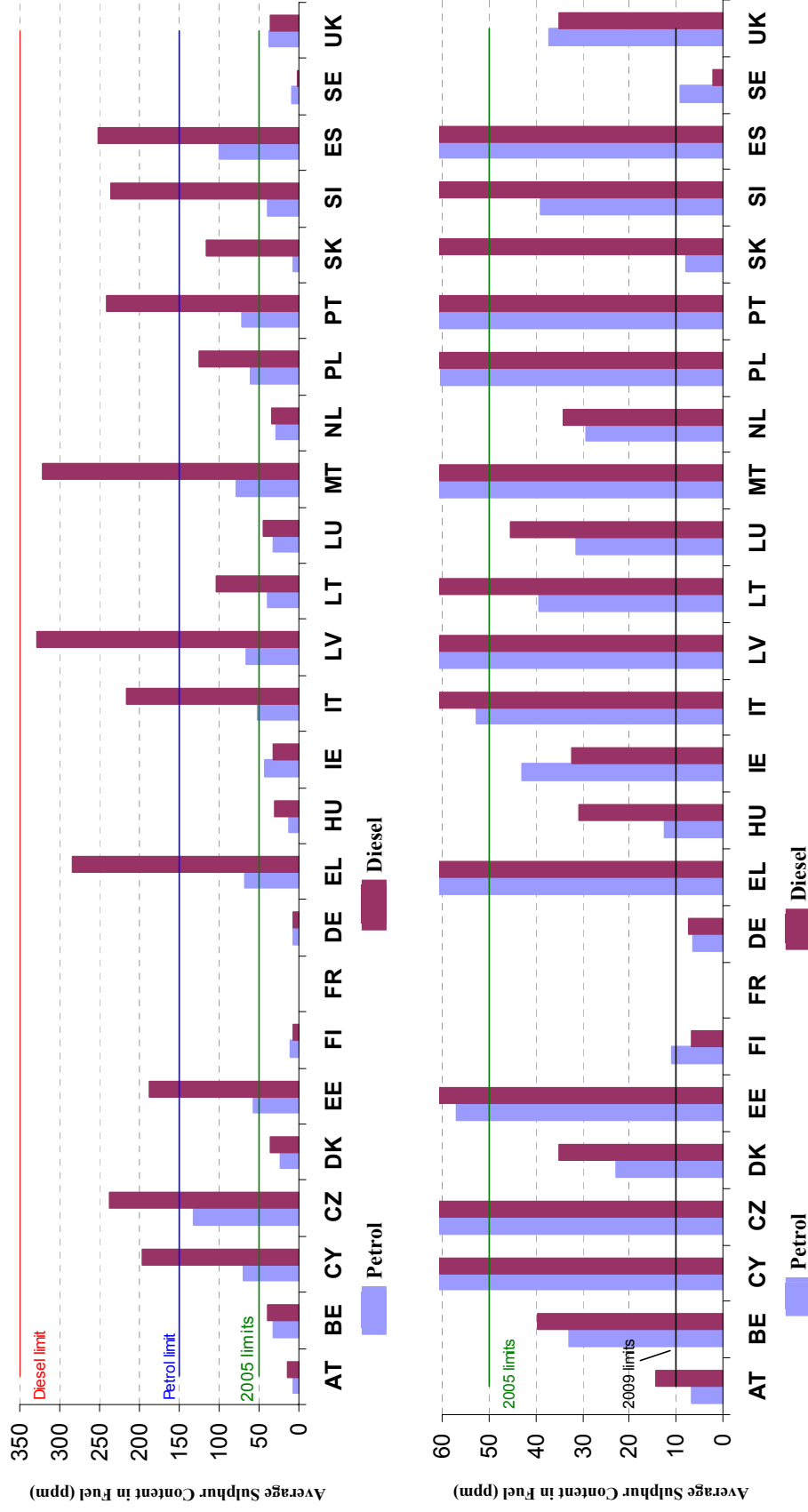


Figure 27.6: Average sulphur content of petrol and diesel grades across the EU (%)



## 27.2 FUEL QUALITY MONITORING 2004

### 27.2.1 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>11</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 explains 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>12</sup>) from 1 January 2004. (A discussion of the changes resulting from these new standards was provided in section 1.2.3.1). Since 2001 - 2003, a significant number of changes have been made to Monitoring Systems. Austria, Finland, Greece, Ireland, Italy and the Netherlands have now moved their systems to ones based upon EN 14274. Portugal has stated it is still in the process of changing its system to comply with EN 14274. 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.

### 27.2.2 Sampling and reporting

There was still a wide range of sampling intensities across the EU in 2004 (Figure 27.7), 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), see Table 27.3.

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<sup>11</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

<sup>12</sup> EN 14275:2003 - Automotive fuels - Assessment of petrol and diesel fuel quality - Sampling from retail site station pumps and commercial site fuel dispensers.

**Table 27.3: Sampling requirements for different Fuel Quality Monitoring Systems**

Model	Samples per grade and per 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 (greater than 15million tonnes automotive fuel sales per year). Using these criteria it can be seen in Figure 27.7 and Table 27.4 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 chain. For example, the systems of Luxembourg and Sweden only take samples from refineries and/or terminals, whilst Greece, 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 Czech Republic, Finland, Germany, Greece, Italy, Lithuania, Slovakia and Slovenia can be stated to fully comply with EN 14274. Austria just falls short of full compliance as no samples of Super Plus (RON 98) grade were taken in 2004. For the Netherlands there appears to be a misunderstanding: the standard outlines the need to perform the FQMS twice a year (once for each of the winter and summer periods) with a minimum number of samples to be taken in both of these periods. The reason for this dual reporting is that there are differences between summer and winter fuel grades, however the Netherlands only carried out enough samples to meet requirements for one of these periods, with a combined full-year analysis reported. Hungary has not performed analyses on sufficient numbers of samples to comply with EN 14274, even taking into account a reduction in the required number of samples due to the reduced sampling period which applied (9 months, May-December 2004).

From the perspective of selecting the suitable statistical model where EN 14274 is used, the case is not so clear. Definitions of the three models from the standard are presented in Box 1, with the corresponding total sampling requirements previously identified in Table 27.3. In the macro region model (A), regions are defined with similar fuel sales and number of supply sources. For very small countries like Luxembourg, 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 (where 50 samples are taken randomly in the country). For the new EU countries it seems that Malta and Cyprus would most likely fulfil the criteria for model C, however for the other EU countries information on volume and supply structure should be obtained/provided.

**Table 27.4: 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. <sup>(5)</sup>		Samples Taken		Compliance with EN 14274 Sampling No.		Notes
			Petrol	Diesel			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	
	(1)	(2)			(3)								
AT	C	Small	No	No	S	50	204	100	200	100	No	Yes	(a)
BE	N	Small	No	No	S	-	-	-	4810	5045	-	-	
CY	N	Small	No	No	S, T	-	-	-	72	64	-	-	
CZ	C	Small	No	No	S	50	152	75	780	700	Yes	Yes	
DK	N	Small	No	No	S	-	-	-	40	20	-	-	
EE	N	Small	No	Yes	S	-	-	-	123	652	-	-	
FI	A	Small	Yes	Yes	S	50	200	100	226	103	Yes	Yes	
FR													
DE	N	Large	No	No	S	-	-	-	417	212	-	-	
EL	A	Small	Yes	No	S, T, R	50	210	100	268	138	Yes	Yes	
HU	C	Small	No	No	S	50	83	75	21	18	No	No	
IE	C	Small	No	No	S, T, R	50	101	100	97	73	No	No	
IT	A	Large	Yes	Yes	S	100	200	200	256	269	Yes	Yes	
LV	N	Small	No	No	S, T	-	-	-	127	239	-	-	
LT	C	Small	Yes	Yes	S, T	50	152	75	275	391	Yes	Yes	
LU	N	Small	No	No	T	-	-	-	16	8	-	-	
MT	N	Small	Yes	Yes	S, T	-	-	-	17	14	-	-	
NL	B	Small	No	No	S	100	200	200	100	100	No	No	
PL	N	Small	No	No	S	-	-	-	343	157	-	-	
PT	N	Small	No	No	S, T, R	-	-	-	46	24	-	-	(b)
SK	C	Small	Yes	Yes	S	50	153	75	238	107	Yes	Yes	
SI	A	Small	No	No	S	50	80	75	109	113	Yes	Yes	
ES	N	Large	Yes	Yes	S, T, R	-	-	-	701	276	-	-	
SE	N	Small	No	No	T, R	-	-	-	861	624	-	-	
UK	N	Large	No	No	S, T, R	-	-	-	2837	2031	-	-	

**Notes:**

- (1) S = Refuelling Stations; T = Terminals / Depots; R = Refinery
- (2) Small countries are defined in EN 14274 as with less than 15 million tonnes automotive fuel dispensed per year.
- (3) N = National Fuel Quality Monitoring System (FQMS);  
A, B or C = FQMS based on EN 14274 Statistical Model A, B or C
- (4) There are reduced sampling requirements for grades comprising of less than 10% total sales
- (5) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)
- (a) Samples of Super Plus 98 were not tested in 2004 because of low sales and no exceedances in 2003.
- (b) The implementation of the EN 14274 is still in progress and changes in sampling methodologies are still being made.

Figure 27.7: Fuel Quality Monitoring sampling rate across the EU in 2004 (average number of samples per fuel grade)

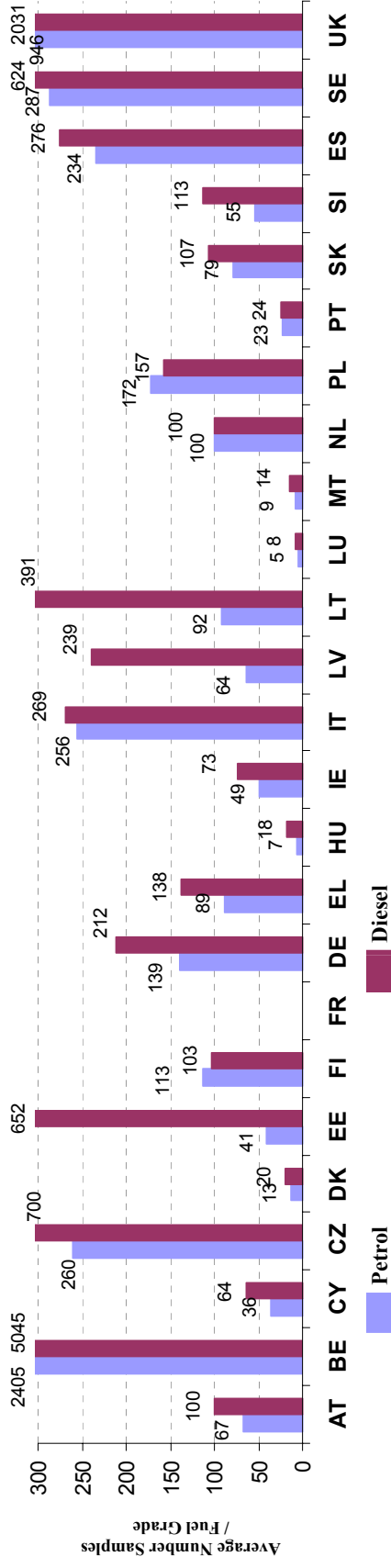
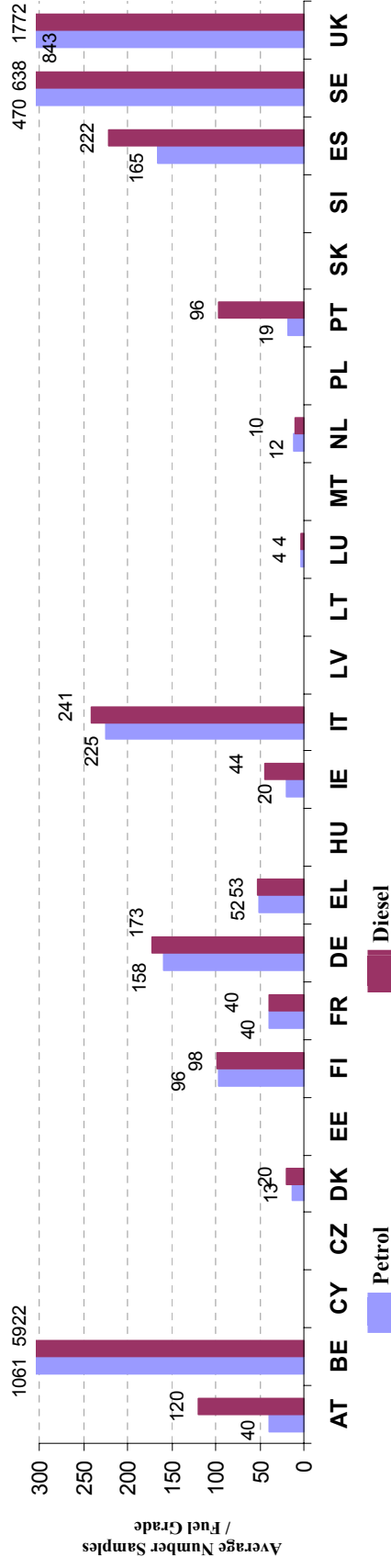


Figure 27.8: Fuel Quality Monitoring sampling rate across the EU in 2001 (average number of samples per fuel grade)



**Box 1: Models for the FQMS defined in EN 14274:2004**

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 one non-macro regions is not possible, having considered the procedures and emissions could have European Standard, then the country shall be considered as one region for sampling purposes.

Several small-sized Member States were using Model C in 2004 (see Table 27.4), despite having clearly defined separate regions according to the NUTS classification system<sup>13</sup> at Level 2 (800,000 – 3 million people). These include 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. 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.

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. In general, however, significant progress seems to have been made by all countries in improving monitoring system methodologies and increasing the number of samples taken and analysed. Figure 27.7 illustrates this, showing improvements in sampling rate in 2004 of EU15 countries in contrast to the 2001 sampling in Figure 27.8 – notably in Greece, Ireland and the Netherlands.

<sup>13</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)



### 27.2.3 Compliance with 98/70/EC limit values

#### 27.2.3.1 Petrol reporting

In 2004, 13 of the Member States (6 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 and 9 in 2002 and 2003 from EU15 Member States. Of these, the main parameters of concern were again research octane number (RON, 34+ samples), summer vapour pressure (DVPE, 43+ samples) and distillation - evaporation at 100°C (17+ 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. However, both the Czech Republic and Poland reported significant numbers of samples exceeding limit values. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### 27.2.3.2 Diesel reporting

For diesel, 8 of the Member States (2 of the EU15) reported at least one sample that was non-compliant with Directive 98/70/EC. This is compared to 4 in 2001, 6 in 2002 and 5 in 2003 from EU15 Member States. Of these, the parameters of concern were sulphur content (22 samples), distillation 95% point (24 samples), cetane number (7+ 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. However, both the Czech Republic and Poland reported significant numbers of samples exceeding limit values. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### 27.2.3.3 Overall Summary

Table 27.5 summarises the compliance of Member States with Directive 98/70/EC for the year 2004 reporting in terms of the results of the analysis of samples against limit values and the reporting format and content. As in 2001 - 2003 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, 11 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). Giving the benefit of doubt for measurement of oxygenates (for 7 Member States, see notes 3/4 of the table), 21 Member States also provided complete reporting across the range of parameters specified for monitoring in the Directive. Detail on specific exceedances is provided in the individual country chapters.

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 decreased this year, however some of the new Member States (particularly Czech Republic and Poland) had a significant proportion of non-compliant samples in 2004.

**Table 27.5: Summary of Member State compliance with 98/70/EC for 2004 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 30/6/2005) <sup>(2)</sup>	Notes
	Petrol	Diesel	Petrol	Diesel		
Austria	1 / 200				<2 months	
Belgium	>14 / 4810	>2 / 5045	1 / 18		<5 months	(3)
Cyprus	4 / 72		6 / 18		<1 month	(4)
Czech Republic	>86 / 780	>40 / 700				
Denmark						
Estonia	4 / 123	35 / 652	11 / 18			(5)
Finland	3 / 226					
France					Not received	
Germany	4 / 417				<2 months	
Greece			7 / 18		<1 month	(4)
Hungary			6 / 18			(4)
Ireland	11 / 97				<2 months	
Italy	6 / 256	6 / 269			<1 month	(6)
Latvia	>1 / 127	>2 / 239			<1 month	
Lithuania			11 / 18	2 / 5	<1 month	(7) (8)
Luxembourg					<5 months	
Malta			4 / 18	1 / 5	<1 month	(9) (10)
Netherlands			6 / 18		<1 month	(4)
Poland	28 / 343	11 / 157				
Portugal			6 / 18			(4)
Slovakia	5 / 238	2 / 107			<1 month	
Slovenia	8 / 109	1 / 113			<1 month	
Spain					<3 months	
Sweden			6 / 18			(4)
UK					<3 months	(11)
<b>No. Countries</b>	<b>13</b>	<b>8</b>	<b>10</b>	<b>2</b>	<b>17</b>	

**Notes:**

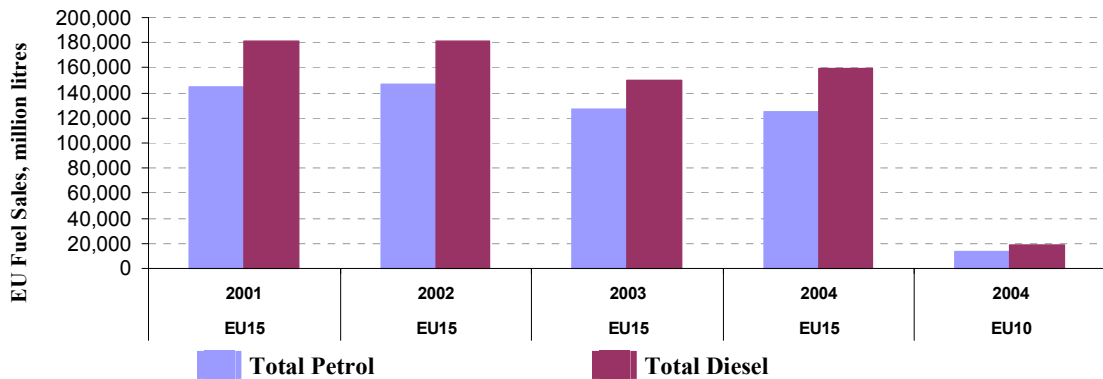
- (1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete. Where it has not been possible to establish from submissions the number of samples exceeding the limit value a '>' symbol indicates that the number of samples exceeding limits 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) Oxygen content has not been reported
- (4) 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. However, 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 Italy and Portugal have stated no other oxygenates are added to the fuel. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.
- (5) The only petrol parameters measured were RON, DVPE, Distillation, Benzene, Sulphur and Lead.
- (6) Test method EN 1601 employed by Italy for the determination of oxygenate content in petrol samples requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all sample chromatograms showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME); no other oxygenates were detected beside one of these ethers.
- (7) The only petrol parameters measured were RON, Distillation, Aromatics, Benzene and Sulphur. Lithuania have stated the equipment needed for the additional tests were not available in 2004, however arrangements have been made so that 2005 reporting will be complete.
- (8) Cetane number and PAH have not been measured for diesel, however the necessary equipment is available for 2005 monitoring analysis.
- (9) Oxygen content and 3 of the oxygenates were not reported, see comment (3) for clarification on oxygenates test method.
- (10) Cetane index has been measured instead of Cetane number.
- (11) Report delayed due to late delivery of information from one fuel supplier.

### 27.3 TEMPORAL TRENDS

The following Figure 27.9 to Figure 27.11 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales in the European Union. These exclude France in 2003 and 2004 (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). Total sales and then appear to dip in 2003, because France provided no data. Assuming similar sales in France as 2002, total petrol sales are again essentially unchanged in 2003, but there would be a 2% increase for diesel). Sales for 2004 show petrol +9% and diesel +18% compared to 2003.

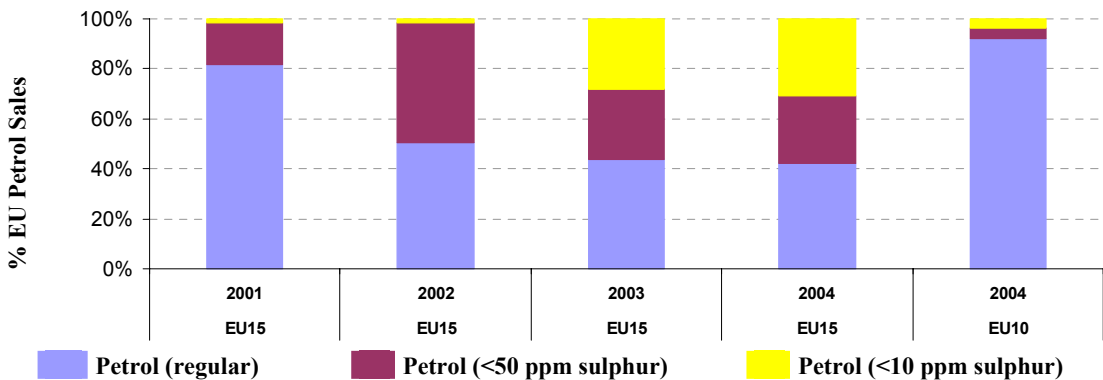
In the EU15 sales of low sulphur (<50 ppm) and sulphur-free (<10 ppm) petrol have changed from 28% each of total sales in 2003 to 27% and 31% respectively in 2004. Sales of low sulphur and sulphur free diesel have changed from 30% and 25% in 2003 to 32% and 28% in 2004. Sales of low and sulphur-free petrol are much lower in the new EU10, each comprising 4% of total sales. The corresponding low sulphur and sulphur-free diesel figures for the EU10 are 5% and 2% respectively in 2004.

**Figure 27.9: Temporal trends in EU Sales of petrol and diesel (million litres)\***



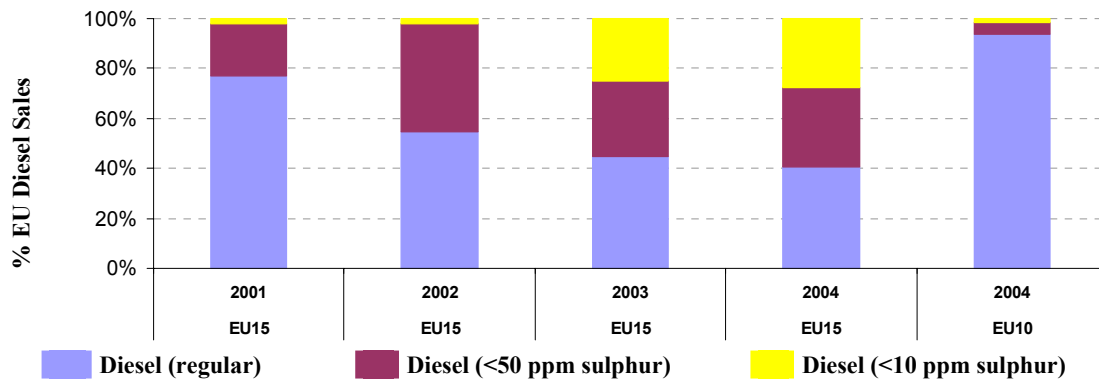
\* Excludes France in 2003 and 2004, as no submissions were provided.

**Figure 27.10: Temporal trends in EU Sales of low sulphur petrol (%)\***



\* Excludes France in 2003 and 2004, as no submissions were provided.

**Figure 27.11: Temporal trends in EU Sales of low sulphur diesel (%)\***



\* Excludes France in 2003 and 2004, as no submissions were provided.

## 28 DISCUSSION and CONCLUSION

### 28.1 DISCUSSION

#### 28.1.1 2004 Reporting Submissions

##### 28.1.1.1 *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 2001-2003 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. In some cases submissions contained insufficient explanation and necessitated further communications with the designated national contact to obtain clarifications. This naturally caused some delay 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 so far received for 2004 reporting have been in electronic format. However, whilst most submissions for 2004 reporting were received by, or close to the 30th June deadline, a number of Member States have still reported well after this deadline. Submissions from Belgium and Luxemburg were the last to arrive in November 2005. France has already stated it would not be supplying a report for 2003 and 2004 monitoring.

Extended electronic reporting forms (in Microsoft Excel) were recommended, specified and improved in the 2001, 2002 and 2003 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. This has again reduced the need for additional clarifications from Member States and facilitated report production.

Responses have been received from most Member State contacts for most points of clarification regarding the submissions on 2004 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 in reports from Member States opting to use their own National Systems (as opposed to one based upon EN 14274<sup>14</sup>) is an explanation of the 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

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<sup>14</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

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.

#### *28.1.1.2 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 be made available to Member States and potentially the wider general public once the 2005 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 2005 submissions has facilitated accurate updating of the database for 2004 fuel quality.

### **28.1.2 Reporting Format**

It was clear from previous 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 1.2.3.1) 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 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 exceedances of limit values, and descriptions of the statistical confidence of National Systems in relation to EN 14274 requirements. Information is also generally poor on the availability of sulphur-free fuels, discussed further in a later section (28.1.2.2). In addition there has been an issue in previous years of how to deal with exceedances of distillation limit values in the absence of reproducibility information – this issue is discussed in the next section.

#### *28.1.2.1 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 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.

### 28.1.2.2 Reporting on availability and analyses on sulphur-free fuels

From current indications in most cases <10 ppm fuels do not appear to be labelled. This is a problem as 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 could hamper the introduction of vehicles using technology requiring the fuels before full mandatory introduction in 2009. As a result the full potential offered for reductions in CO<sub>2</sub> from the road transport sector would not be realised.

Following on from this, as regards analysis of fuels, the current reporting provisions do not encourage specific reporting of compliance with the 10 ppm limit value of fuels sold as sulphur-free. Within current reporting arrangements, 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.

Concerning the geographical availability of sulphur-free fuels, the format and detail of information provision is not specified in Commission Decision 2002/159/EC or the European Standard on FQMS (EN 14274). Recent amendments to the Directive (Directive 2003/17/EC) include a mandatory introduction of sulphur free fuels (<10 ppm sulphur in petrol and diesel) to be marketed within Member State territories from 2005 *"on an appropriately balanced geographical basis"*<sup>15</sup>, with a complete conversion to sulphur free fuels by 2009, subject to a review for diesel fuel in 2005<sup>16</sup>. Within this amendment it is also stated that *"The Commission shall develop guidance for recommending what.... constitutes availability on an appropriately balanced geographical basis"*<sup>17,18</sup>. Member States are also required to report annually on this availability under the amended Directive<sup>19</sup>.

AEA Technology Environment was commissioned to develop this guidance, including appropriate provisions for reporting, through consultation with Member States and stakeholders. The complete final version of the guidance text is provided in the final report for the work<sup>20</sup>. The Commission has subsequently published a Recommendation<sup>21</sup> based on this work, which is included in Appendix 5. The requested format for reporting from 2004 (Appendix 4) incorporated these recommendations.

Currently, relatively little detail is provided by the majority of Member States on the availability of sulphur free fuels, and in many cases introduction has not yet begun. More

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<sup>15</sup> Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC

<sup>16</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>17</sup> Recital (10) of Directive 2003/17/EC

<sup>18</sup> Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC

<sup>19</sup> Article 8 of Directive 98/70/EC, as amended by Directive 2003/17/EC

<sup>20</sup> *Recommendations on the Options for Defining Geographical Availability of Sulphur Free Fuels*, Final report produced for the European Commission, DG Environment. Nikolas Hill, AEA Technology Environment, August 2004.

<sup>21</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.

information is expected to be available in Member State submissions from 2005 reporting. A more detailed assessment of introduction status should then be possible.

## 28.2 CONCLUSION AND RECOMMENDATIONS

Revisions to the reporting format outlined in Commission Decision 2002/159/EC, as well as that laid out in the European Standard EN 14274: 2003, have enhanced the usefulness of the information and facilitated analysis of EU trends. However, there are still a few areas for improvement:

- 1) 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 not been provided in most cases for 2004 monitoring and needs to be provided in future.
- 2) Where EN 14274 Statistical 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 country size /possibility of division of the territory into regions.
- 3) In relation to the availability of sulphur free fuels:
  - a) More detailed information in reporting is expected for 2005 monitoring, preferably this will be in line with measurement options from the Commission Recommendation (Appendix 5). This should ensure enough information is provided for understanding national situations whilst at the same time minimising the volume of information requested and providing flexibility for Member States' own measurement criteria or other additional supporting information.
  - b) It is necessary for these fuels to be clearly labelled to ensure that the consumer has the opportunity to choose them. Member States may need to take action to ensure this (if it is not already applied) in 2005 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.
- 4) It would also be valuable for Member States to report separately the results of sulphur content analyses that were carried out on fuels sold as sulphur-free to further confirm their quality. It is proposed these analyses would 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.

Following the success of the Excel reporting templates, a revised template for reporting on 2005 monitoring has been produced (see Appendix 6), 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. The use of the template should further assist Member States in their data reporting and again facilitate accurate data collation and analysis for the 2005 summary report.



# Appendices

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## 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 2004 Fuel Quality Submission Tables
- Appendix 4 Fuel Quality Monitoring Reporting Format for 2004 onwards
- Appendix 5 Commission Recommendation 2005/27/EC
- Appendix 6 Proposed 2005 Excel Reporting Template

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*EU FQM - 2004 Summary Report*  
AEAT/ED51182/R2 Final

# **Appendix 1: Commission Decision of 18/02/2002- 2002/159/EC**

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# 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 ( $95 \leq \text{RON} < 98$ )	
Unleaded petrol ( $\text{RON} \geq 98$ )	
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>
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## 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	



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# **Appendix 2: Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits**

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## 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)	--	95		EN-ISO 5164	2005	0.7		
(RON 91 fuel only)	--	91		EN-ISO 5164	2005	0.7		94.6
Motor Octane Number (MON)	--	85		EN-ISO 5163	2005	0.9		84.5
(RON 91 fuel only)	--	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	% (v/v)		18.0	ASTM D1319	95a	4.6		20.7
				EN 14517	2004	2.6		19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	95a	5.1		24.0
				EN 14517	2004	3.0		22.8
-- Aromatics	% (v/v)		42.0	ASTM D1319	95a	3.7		44.2
				EN 14517	2004	2.0		43.2
			35.0	ASTM D1319	95a	3.7		37.2
				EN 14517	2004	1.7		36.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.17		1.10
				EN 14517	2004	0.05		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			
				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			
				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 ISO 8754	1995			
				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.

**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 ISO 8754	1995			
				EN 24260	1994	42.4		375.0
				EN ISO 20846	2004	40.0		373.6
				EN ISO 20847	2004	17.9		360.6
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 20884	2004	30.9		368.2
				EN ISO 14596	1998	20.0		62
				EN ISO 8754	1995			
				EN 24260	1994	6.8		54.0
Sulphur content (sulphur free, from 2005)	mg/kg		10	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 ISO 8754	1995			
				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: 2002 Member State Fuel Quality Submission Tables

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- Introduction to reporting tables
- 1 Petrol Reporting
- 2 Diesel Reporting

AEAT in Confidence

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## 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):  $\text{Mean of 2 data sets} = ((m_1 * n_1) + (m_2 * n_2)) / N$

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:** 2004  
**Period:** Full-year  
**FuelID:** Regular unleaded petrol min. RON=91 (<50 ppm su  
**National Fuel Grade:** Normal

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	100	91	96.2	92.867	0.945810005	91	0	95	--	--
MOTOR OCTANE NO.	--	100	82.1	85.6	83.253	0.628201698	82.5	0	85	--	--
VAPOUR PRESSURE, DVPE											
Summer + Winter period	kPa										60
Summer period	kPa	50	56.6	63.4	59.45	6.485062585	45	60	--	--	60
Winter period	kPa								--	--	--
DISTILLATION:											
evaporated at 100	%(v/v)	100	48.3	67.3	54.705	4.301852432	46	71	46.0	--	--
evaporated at 150	%(v/v)	100	80.6	94.7	85.86	2.806701936	75	0	75.0	--	--
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	100	1.6	18	13.32	3.050649873	0	0	--	--	18.0
aromatics	%(v/v)	100	25.3	39.1	30.885	2.513453699	0	0	--	--	42.0
benzene	%(v/v)	100	0.46	0.94	0.7458	0.085496364	0	1	--	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	0.7	0.227	0.154955191	0	2.7	--	--	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
Tetra-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	0	3.65	1.30688172	0.746402937	0	0	--	--	15
Other oxygenates	%(v/v)	100	0	0	0	0	0	0	--	--	10
SULPHUR CONTENT	mg/kg	100	3.235624777	31.95091559	8.064800947	3.486190142	0	150	--	--	150
LEAD CONTENT	g/l	100	0	0	0	0	0	0	--	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Austria  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95 (<50 ppm sulphur)  
**National Fuel Grade:** Super

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	100	94.6	96.4	95.7	0.464778648	95	0	95	--	--
MOTOR OCTANE NO.	--	100	84.8	86.6	85.375	0.319208301	85	0	85	--	--
VAPOUR PRESSURE, DVPE											
Summer + Winter period	kPa										
Summer period	kPa	50	55.8	61.3	59.442	1.134269521	45	60	--	60	60
Winter period	kPa								--	--	--
DISTILLATION:											
evaporated at 100	%(v/v)	100	48.8	62.6	53.103	3.252177359	46	71	46.0	--	--
evaporated at 150	%(v/v)	100	79	91.3	85.129	2.601332021	75	0	75.0	--	--
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	100	0.9	15.1	11.009	2.610356027	0	0	--	18.0	--
aromatics	%(v/v)	100	30.7	40.5	35.332	2.422949201	0	0	--	42.0	--
benzene	%(v/v)	100	0.49	0.89	0.7222	0.096980473	0	1	--	1.0	--
OXYGEN CONTENT	%(m/m)	100	0	1.4	0.562	0.335983405	0	2.7	--	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	--
Tetra-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	0	7.66	3.160515464	1.795796812	0	0	--	15	--
Other oxygenates	%(v/v)	100	0	0	0	0	0	0	--	10	--
SULPHUR CONTENT	mg/kg	100	1.967318425	25.66215103	6.682869837	2.770266892	0	150	--	150	--
LEAD CONTENT	g/l	100	0	0	0	0	0	0	--	0.005	--

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Austria

Year: 2004

Period:

FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)

National Fuel Grade 0

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		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	--	--	42.0
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	0	0	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	0	0	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	0	0	7
Iso-butyl alcohol	%(v/v)	0	0	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	0	0	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	0	0	0	6.682869837	0	0	0	--	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Belgium  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95 (<50 ppm sulphur)  
**National Fuel Grade** 95 octane

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values				
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	2633	85.2	100.2	96.6	0.7589	95	0	95	--	--
MOTOR OCTANE NO.	--	55	76	88.1	85.1	1.5351	85	0	85	--	--
VAPOUR PRESSURE, DVPE											
Summer + Winter period	kPa										60
Summer period	kPa	1181	50	70	57.5	0.056	0	60	--	--	60
Winter period	kPa								--	--	--
DISTILLATION:											
evaporated at 100	%(v/v)	2633	65.1	66.4	53.15	3.707	46	0	46.0	--	--
evaporated at 150	%(v/v)	2633	56.4	97.8	86.14	2.7316	75	0	75.0	--	--
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	2629	0.7	21.1	10.85	3.485	0	18	--	--	18.0
aromatics	%(v/v)	2628	22.5	45.3	34.94	3.8287	0	42	--	--	42.0
benzene	%(v/v)	78	0.4	1	0.75	0.0189	0	1	--	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	--	2.7
OXYGENATES:											
Methanol	%(v/v)	2629	0	0.5	0	0	0	3	--	--	3
Ethanol	%(v/v)	2629	0	0.2	0	0	0	5	--	--	5
Iso-propyl alcohol	%(v/v)	2629	0	9.2	0	0	0	10	--	--	10
Tetra-butyl alcohol	%(v/v)	2629	0	0.3	0	0	0	7	--	--	7
Iso-butyl alcohol	%(v/v)	2629	0	0.5	0	0	0	10	--	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2629	0	18.2	0	0	0	15	--	--	15
Other oxygenates	%(v/v)	2629	0	2.7	0	0	0	10	--	--	10
SULPHUR CONTENT	mg/kg	71	5	50	35.74	21.11	0	150	--	--	150
LEAD CONTENT	g/l	19	0	0.005	0	0	0	0.005	--	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l.



## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Belgium  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98 (<50 ppm sulphur)  
**National Fuel Grade** 98 octane

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values			
			Min.	Max.	Mean		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2175	95	100.6	99.3	0.5963	95	0	95	--
MOTOR OCTANE NO.	--	32	84.4	88.3	87.42	0.9924	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									60
Summer period	kPa	1005	50	78.5	57.5	1.934	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2174	11.2	63.2	52.35	3.5561	46	0	46.0	--
evaporated at 150	%(v/v)	2174	19.4	99.1	86.76	2.671	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2164	0.7	20	6.85	2.6536	0	18	--	18.0
aromatics	%(v/v)	2164	3.47	43.3	31.42	3.1533	0	35	--	42.0
benzene	%(v/v)	194	0.07	2.9	0.59	0.212	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2156	0	0.5	0	0	0	3	--	3
Ethanol	%(v/v)	2156	0	0.5	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2156	0	7.4	0	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	2156	0	0.5	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	2156	0	0.8	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2156	0	23.1	0	0	0	15	--	15
Other oxygenates	%(v/v)	2156	0	6.6	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	195	7	76	26.6	11.89	0	50	--	150
LEAD CONTENT	g/l	49	0	0.005	0	0	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Cyprus  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** UNLEADED RON 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	19	95	96.6	0.5	95	0	95	--
MOTOR OCTANE NO.	--	9	85	85	0	85	0	85	--
VAPOUR PRESSURE, DVPE Summer + Winter period	kPa								60
Summer period	kPa	4	53.7	60.6	4.9	45	60	--	60
Winter period	kPa							--	--
DISTILLATION: evaporated at 100	%(v/v)	39	46	67	5.8	0	0	46.0	--
evaporated at 150	%(v/v)	39	75.8	92	4.8	0	0	75.0	--
HYDROCARBON ANALYSIS: olefins	%(v/v)	9	8.2	12.8	1.6	0	0	--	18.0
aromatics	%(v/v)	9	24.7	33.8	3	0	0	--	42.0
benzene	%(v/v)	9	0.7	1	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	1	0.7	0.7	0	0	2.7	--	2.7
OXYGENATES: Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	3.5	11.2	3.1	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	13	40	120	0	0	150	--	150
LEAD CONTENT	g/l	22	0.002	0.003	0	0	0.005	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Cyprus  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** UNLEADED RON 98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	11	98	98.8	0.3	95	--
MOTOR OCTANE NO.	--	4	86	86.6	0.3	85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	6	55.6	60	5.8	45	60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	36	47.7	63	4.4	46	46.0
evaporated at 150	%(v/v)	38	67.4	92	5.3	75	75.0
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	4	9.4	12.1	1.1	0	18.0
aromatics	%(v/v)	4	25.1	29.8	2.2	0	42.0
benzene	%(v/v)	4	0.8	0.9	0.1	0	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	2.7
OXYGENATES:							
Methanol	%(v/v)	0	0	0	0	0	3
Ethanol	%(v/v)	0	0	0	0	0	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	11.8	15	1.5	0	15
Other oxygenates	%(v/v)	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	11	20	130	34.4	0	150
LEAD CONTENT	g/l	17	0.002	0.002	0	0	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Czech Republic

Year: 2004

Period: Full-year

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade SPECIÁL BA-91(223 samples)/NORMAL BA-91 (46 samples)

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Max.	Mean	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	269	91.5	101.6	93.7	1.4	91	0	95	--
MOTOR OCTANE NO.	--	269	81.6	88	83.7	1	82	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									60
Summer period	kPa	117	52.3	78.7	60.7	5	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	269	40.3	62.5	51.9	3.2	46	0	46.0	--
evaporated at 150	%(v/v)	269	74	89.8	79.6	2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	269	1.7	25.1	12.9	5.3	0	21	--	18.0
aromatics	%(v/v)	269	26.2	58.8	32.1	3.2	0	42	--	42.0
benzene	%(v/v)	269	0.3	25.2	0.8	1.7	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	269	0	3.9	0.4	0.6	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	6.3	0.1	0.7	0	3	--	3
Ethanol	%(v/v)	0	0	0.9	0	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	269	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	5.3	0	0.4	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	13.1	1.5	1.8	0	15	--	15
Other oxygenates	%(v/v)	0	0	0.7	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	269	100	264	137.6	31.4	0	150	--	150
LEAD CONTENT	g/l	269	0	0	0	0	0	0.005	--	0.005

Notes: The limit of detection for lead content is 0.005g/l, and therefore values reported as 0 will fall into the range 0-0.005g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Czech Republic  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** SUPER BA 95

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	492	87.5	96.1	99.1	1	0	0	95	--
MOTOR OCTANE NO.	--	492	80.5	85.2	89.5	0.6	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									60
Summer period	kPa	213	48.6	58.7	77.5	2.8	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	492	41	49.2	61.1	2.6	0	0	46.0	--
evaporated at 150	%(v/v)	0	74	79.3	88.1	2.2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	11.4	21.8	4.8	0	0	--	18.0
aromatics	%(v/v)	492	27.8	35.1	44	2.6	0	0	--	42.0
benzene	%(v/v)	0	0.3	0.6	38361	0.4	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	492	0	1.1	5.2	0.8	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0.2	8.5	0.9	0	0	--	3
Ethanol	%(v/v)	0	0	0	4	0.2	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	492	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0.1	9.3	0.6	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	5.4	15	3.3	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	6.9	0.3	0	0	--	10
SULPHUR CONTENT	mg/kg	492	100	131.5	219	29	0	0	--	150
LEAD CONTENT	g/l	492	0	0	0	0	0	0	--	0.005

Notes: The limit of detection for lead content is 0.005g/l, and therefore values reported as 0 will fall into the range 0-0.005g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Czech Republic  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** SUPER PLUS BA-98

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	19	98.5	99.4	99.9	0.4	98	0	95	--
MOTOR OCTANE NO.	--	19	87.6	87.9	88.8	0.3	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									60
Summer period	kPa	5	54.6	59.7	66.5	3.9	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	19	47	52.7	61.5	3.8	46	0	46.0	--
evaporated at 150	%(v/v)	19	74.3	84.7	86.8	2.7	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	7.9	13	3.2	0	18	--	18.0
aromatics	%(v/v)	19	29.1	38.7	42.1	3.1	0	42	--	42.0
benzene	%(v/v)	0	0.2	0.5	0.9	3.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	19	1.7	2.4	2.7	0.3	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0.3	0.1	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
Tetra-butyl alcohol	%(v/v)	19	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)	0	9.2	13.3	15.1	1.9	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	19	100	100	100	0	0	150	--	150
LEAD CONTENT	g/l	19	0	0	0	0	0	0.005	--	0.005

**Notes:** The limit of detection for lead content is 0.005g/l, and therefore values reported as 0 will fall into the range 0-0.005g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Denmark  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Regular unleaded petrol min. RON=91  
**National Fuel Grade** RON 92

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values			
			Min.	Max.	Mean		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	93.7	93.9	93.8	0.1	0	0	95	--
MOTOR OCTANE NO.	--	2	83.3	85.1	84.2	1.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									60
Summer period	kPa	3	57.6	58.5	58.2	0.5	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	51.5	66.2	60.1	5.6	0	0	46.0	--
evaporated at 150	%(v/v)	6	89.6	93.4	91.8	1.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	0.6	11.4	6.8	4.5	0	0	--	18.0
aromatics	%(v/v)	6	27.4	38.7	33.4	3.9	0	0	--	42.0
benzene	%(v/v)	6	0.8	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	0	0.16	0.08	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0.1	0.05	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0.2	0.1	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)	3	0.1	0.2	0.15	0.1	0	0.3	--	15
Other oxygenates	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	8	78	46	32	0	0	--	150
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Denmark  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** RON 95

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	2	95.1	95.4	95.6	0	0	0	95	--
MOTOR OCTANE NO.	--	2	85	85.2	85.3	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	14	57.4	58.4	60.2	0	0	60	--	60
Summer + Winter period	kPa									60
Summer period	kPa									60
Winter period	kPa									--
DISTILLATION:	%(v/v)	30	48.6	56.1	66.6	0	0	0	46.0	--
evaporated at 100	%(v/v)	30	83.6	90.1	94	0	0	0	75.0	--
evaporated at 150	%(v/v)									--
HYDROCARBON ANALYSIS:	%(v/v)	30	0.8	5.2	11.1	0	0	0	--	18.0
olefins	%(v/v)	30	27	35.1	41.8	0	0	0	--	42.0
aromatics	%(v/v)	30	0.6	0.8	0.9	0	0	0	--	1.0
benzene	%(v/v)	2	0	0.04	0.08	0	0	0	--	2.7
OXYGEN CONTENT	%(m/m)									
OXYGENATES:	%(v/v)	2	0	0	0	0	0	0	--	3
Methanol	%(v/v)	2	0	0	0	0	0	0	--	5
Ethanol	%(v/v)	2	0	0.1	0.2	0	0	0	--	10
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Iso-butyl alcohol	%(v/v)	30	0.1	0.2	0.3	0	0	0.3	--	15
Ethers with 5 or more C atoms per molecule	%(v/v)	2	0	0	0	0	0	0	--	10
Other oxygenates	%(v/v)									
SULPHUR CONTENT	mg/kg	30	1	17	72	0	0	0	--	150
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

**Notes:**  
 Vapour pressure only measured in summer (August) The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1%(v/v). The limit of detection for Other oxygenates is 0.3%(v/v), and therefore values reported as 0 will fall into the range 0-0.3%(v/v). The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Denmark  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade RON 98

PARAMETER	Unit	Number of Samples	National Specification			EC Limit values		
			Min.	Max.	Mean	Standard deviation	Min.	Max.
RESEARCH OCTANE NO.	--	2	97.1	98.9	98	1.3	95	--
MOTOR OCTANE NO.	--	2	86.1	86.5	86.3	0.3	85	--
VAPOUR PRESSURE, DVPE								
Summer + Winter period	kPa							60
Summer period	kPa	1	57.6	57.6	57.6	0	--	60
Winter period	kPa							--
DISTILLATION:								
evaporated at 100	%(v/v)	4	53	59.3	55.1	2.9	46.0	--
evaporated at 150	%(v/v)	4	89.4	90.9	90.4	0.7	75.0	--
HYDROCARBON ANALYSIS:								
olefins	%(v/v)	4	0.8	9.9	5.4	4.4	--	18.0
aromatics	%(v/v)	4	31.4	38.6	36.1	3.2	--	42.0
benzene	%(v/v)	4	0.7	1	0.9	0.2	--	1.0
OXYGEN CONTENT	%(m/m)	2	1.8	2.4	2.1	0.4	--	2.7
OXYGENATES:								
Methanol	%(v/v)	2	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0.1	0.05	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	5.4	13.4	9.7	3.3	--	15
Other oxygenates	%(v/v)	2	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	4	4	21	13	7	--	150
LEAD CONTENT	g/l	2	0	0	0	0	--	0.005

Notes: The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Estonia  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** unleaded petrol 95

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	114	92	98.8	95.7	0.7	0	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
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	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
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
Tetra-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 oxygenates	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0	0	0	0	0	0	--	150
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: Finland  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	27	95.5	96.6	97.9	0.5	0	0	95	--
MOTOR OCTANE NO.	--	27	84.8	85.7	86.5	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa									
Summer + Winter period	kPa	54	59.4	65.5	80.7	3	0	0	--	70
Summer period	kPa								--	70
Winter period	kPa								--	--
DISTILLATION:	%(v/v)									
evaporated at 100	%(v/v)	54	47.8	53.7	61.5	2.9	0	0	46.0	--
evaporated at 150	%(v/v)	54	81	86.5	89.1	2.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	54	2.6	6.7	11.2	1.9	0	0	--	18.0
aromatics	%(v/v)	54	23.7	28.8	33.2	2.1	0	0	--	42.0
benzene	%(v/v)	54	0.3	0.6	0.9	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	54	1.8	2.1	2.6	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	54	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	54	0	0	0.5	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	54	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	54	0	0	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)	54	10.4	12.2	14.6	0.9	0	0	--	15
Other oxygenates	%(v/v)	54	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	54	5.9	12.9	35.7	7.1	0	0	--	150
LEAD CONTENT	g/l	54	0	0	0	0	0	0	--	0.005

**Notes:**  
 The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l. FN 1: The determination of RON -number has been done by an external contractor (R value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). The lowest MON-number 84.8 is below the limit value but within the allowed tolerance limit 84.5. FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776\*X<sup>1/3</sup>);

FN 4: The DVPE limit value 70 kPa and the tolerance limit 71.9 were exceeded in one sample which was taken on the first of June when the fuel quality had not been changed yet. The replicate sample was taken and analysed after two weeks and the test result of this sample were within acceptable limits. FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values. FN 6: 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

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Finland  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** 0

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	37	95.1	96.2	97.1	0	96.2	0	95	--
MOTOR OCTANE NO.	--	37	85.2	85.8	86.5	0	85.8	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	0	--	70
Summer + Winter period	kPa	0	0	0	0	0	0	0	--	70
Summer period	kPa	0	0	0	0	0	0	0	--	--
Winter period	kPa	0	0	0	0	0	0	0	--	--
DISTILLATION:	%(v/v)	46	45.4	54.8	62.9	4.4	54.8	0	46.0	--
evaporated at 100	%(v/v)	46	79.5	85.6	89.6	3	85.6	0	75.0	--
evaporated at 150	%(v/v)	46	4.2	7.2	12.2	1.4	7.2	0	--	18.0
olefins	%(v/v)	46	19.3	26.6	32.8	3.4	26.6	0	--	42.0
aromatics	%(v/v)	46	0.4	0.6	0.9	0.2	0.6	0	--	1.0
benzene	%(v/v)	46	2	2.2	2.6	0.1	2.2	0	--	2.7
OXYGEN CONTENT	%(m/m)	46	0	0	0	0	0	0	--	--
OXYGENATES:										
Methanol	%(v/v)	46	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	46	0	0.3	4.3	1	0.3	0	--	5
Iso-propyl alcohol	%(v/v)	46	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	46	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	46	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	46	4.5	11.6	14.6	1.9	11.6	0	--	15
Other oxygenates	%(v/v)	46	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	49	5.2	9.4	22.6	2.8	9.4	0	--	150
LEAD CONTENT	g/l	46	0	0	0	0	0	0	--	0.005

**Notes:**  
 The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l. FN 1: The determination of RON -number has been done by an external contractor (R-value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776·X<sup>2</sup>(1/3)).

FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values.  
 FN 6: 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 with the lowest distillation percent 45.4 v/v % at 100 celsius degree was below the limit value 46.0 v/v %, but within the allowed tolerance limit 43.6 v/v %.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Finland  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Max.	Mean	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	64	95.1	97.9	96.3	0	0	95	--	
MOTOR OCTANE NO.	--	64	84.8	86.5	85.8	0	0	85	--	
VAPOUR PRESSURE, DVPE	kPa								70	
Summer + Winter period	kPa	54	59.4	80.7	65.5	0	0	--	70	
Summer period	kPa							--	--	
Winter period	kPa							--	--	
DISTILLATION:	%(v/v)	100	45.4	62.9	54.2	0	0	46.0	--	
evaporated at 100	%(v/v)	100	79.5	89.6	86.1	0	0	75.0	--	
evaporated at 150										
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	2.6	12.2	6.9	0	0	--	18.0	
aromatics	%(v/v)	100	19.3	33.2	27.8	0	0	--	42.0	
benzene	%(v/v)	100	0.3	0.9	0.6	0	0	--	1.0	
OXYGEN CONTENT	%(m/m)	100	1.8	2.6	2.2	0	0	--	2.7	
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0	0	0	--	3	
Ethanol	%(v/v)	100	0	4.3	0.2	0	0	--	5	
Iso-propyl alcohol	%(v/v)	100	0	0	0	0	0	--	10	
Tetra-butyl alcohol	%(v/v)	100	0	0	0	0	0	--	7	
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	--	10	
Ethers with 5 or more C atoms per molecule	%(v/v)	100	4.5	14.6	11.9	0	0	--	15	
Other oxygenates	%(v/v)	100	0	0	0	0	0	--	10	
SULPHUR CONTENT	mg/kg	103	5.2	35.7	11.2	0	0	--	150	
LEAD CONTENT	g/l	100	0	0	0	0	0	--	0.005	

**Notes:**  
 The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2%(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5%(v/v). The limit of detection for lead content is 0.007g/l, and therefore values reported as 0 will fall into the range 0-0.007g/l. FN 1: The determination of RON -number has been done by an external contractor (R value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). The lowest MON-number 84.8 is below the limit value but within the allowed tolerance limit 84.5. FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776\*X<sup>1/3</sup>);  
 FN 4: The DVPE limit value 70 kPa and the tolerance limit were exceeded in one sample which was taken on the first of June when the fuel quality had not been changed yet. The replicate sample was taken and analysed after two weeks and the test result of this sample were within acceptable limits. FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values. FN 6: 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 X=70).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Finland  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade** 0

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Mean	Max.	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	25	98	99	99.5	0	0	0	95	--
MOTOR OCTANE NO.	--	25	86.4	87.8	88.3	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	54	58.8	65.9	81.7	0	0	0	--	70
Summer + Winter period	kPa									70
Summer period	kPa									70
Winter period	kPa									--
DISTILLATION:										
evaporated at 100	%(v/v)	53	44.5	49.9	54.8	0	0	0	46.0	--
evaporated at 150	%(v/v)	53	82.9	87.2	89.9	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	54	2.6	7.5	13	0	0	0	--	18.0
aromatics	%(v/v)	54	24.9	28.8	35.1	0	0	0	--	42.0
benzene	%(v/v)	54	0.3	0.5	0.9	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	54	2.1	2.3	2.7	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	54	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	54	0	1.2	4.3	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	54	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	54	0	0	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)	54	5.1	10.5	15.3	0	0	0	--	15
Other oxygenates	%(v/v)	54	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	54	4.9	9.5	22.5	0	0	0	--	150
LEAD CONTENT	g/l	54	0	0	0	0	0	0	--	0.005

**Notes:**  
 The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.007g/l, and therefore values reported as 0 will fall into the range 0-0.007g/l. FN 1: The determination of RON -number has been done by an external contractor (R-value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776·X<sup>2</sup>(1/3); X=70).  
 FN 4: The DVPE limit value 70 kPa and the tolerance limit 71.9 were exceeded in two samples which were taken on the first of June when the fuel quality had not been changed yet. The replicate samples were taken and analysed after two weeks and the test results of these samples were within acceptable limits. FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values. FN 6: 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. FN 7: The lowest distillation percent 44.5 vv % at 100 celsius degree was below the limit value 46.0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Finland  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade** 0

PARAMETER	Unit	Number of Samples	National Specification		Mean	Standard deviation	EC Limit values	
			Min.	Max.			Min.	Max.
RESEARCH OCTANE NO.	--	37	97.6	100.9	98.9	0.6	95	--
MOTOR OCTANE NO.	--	37	86.5	88.2	87.6	0.4	85	--
VAPOUR PRESSURE, DVPE								
Summer + Winter period	kPa							70
Summer period	kPa	0	0	0	0	0	--	70
Winter period	kPa						--	--
DISTILLATION:								
evaporated at 100	%(v/v)	46	46.4	56.2	51.2	3.1	46.0	--
evaporated at 150	%(v/v)	46	80.3	89	85.9	2.3	75.0	--
HYDROCARBON ANALYSIS:								
olefins	%(v/v)	46	3.1	15	7.3	2.5	--	18.0
aromatics	%(v/v)	46	11.5	36.2	28.5	3.9	--	42.0
benzene	%(v/v)	46	0.2	0.7	0.5	0.1	--	1.0
OXYGEN CONTENT	%(m/m)	46	1.9	2.7	2.3	0.2	--	2.7
OXYGENATES:								
Methanol	%(v/v)	46	0	0	0	0	--	3
Ethanol	%(v/v)	46	0	4.5	1	1.6	--	5
Iso-propyl alcohol	%(v/v)	46	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	46	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	46	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	46	2.9	15	10.8	3.7	--	15
Other oxygenates	%(v/v)	46	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	49	3.4	13.1	7	1.9	--	150
LEAD CONTENT	g/l	46	0	0	0	0	--	0.005

**Notes:**

The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l. FN 1: The determination of RON -number has been done by an external contractor (R-value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776·X<sup>2</sup>(1/3); X=70).

FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values.

FN 6: 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.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Finland  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade** 0

PARAMETER	Unit	Number of Samples	National Specification			EC Limit values		
			Min.	Max.	Mean	Standard deviation	Min.	Max.
RESEARCH OCTANE NO.	--	62	97.6	100.9	99	0.5	95	--
MOTOR OCTANE NO.	--	62	86.4	88.3	87.7	0.4	85	--
VAPOUR PRESSURE, DVPE	kPa							
Summer + Winter period								70
Summer period	kPa	54	58.8	81.7	65.9	4.3	--	70
Winter period	kPa						--	--
DISTILLATION:	%(v/v)							
evaporated at 100	%(v/v)	99	44.5	56.2	50.5	2.7	46.0	--
evaporated at 150	%(v/v)	99	80.3	89.9	86.6	3.6	75.0	--
HYDROCARBON ANALYSIS:								
olefins	%(v/v)	100	2.6	15	7.4	2.4	--	18.0
aromatics	%(v/v)	100	11.5	36.2	28.7	3.1	--	42.0
benzene	%(v/v)	100	0.2	0.9	0.5	0.1	--	1.0
OXYGEN CONTENT	%(m/m)	100	1.9	2.7	2.3	0.2	--	2.7
OXYGENATES:								
Methanol	%(v/v)	100	0	0	0	0	0	3
Ethanol	%(v/v)	100	0	4.5	1.1	1.6	0	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	100	0	0	0	0	0	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	2.9	15.3	10.6	3.7	0	15
Other oxygenates	%(v/v)	100	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	103	3.4	22.5	8.3	3	0	150
LEAD CONTENT	g/l	100	0	0	0	0	0	0.005

**Notes:**

The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v). The limit of detection for Other oxygenates is 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for lead content is 0.001g/l, and therefore values reported as 0 will fall into the range 0-0.001g/l. FN 1: The determination of RON -number has been done by an external contractor (R-value 0.6). FN 2: The determination of MON -number has been done by an external contractor (R value 0.9). FN 3: The calculation of R was done according to EN 13016-1 (R= 0.776·X<sup>2</sup>(1/3); X=70).

FN 4: The DVPE limit value 70 kPa and the tolerance limit 71.9 were exceeded in two samples which were taken on the first of June when the fuel quality had not been changed yet. The replicate samples were taken and analysed after two weeks and the test results of these samples were acceptable limits. FN 5: The R value used by the Customs Laboratory is 25.6 and the maximum tolerance limit is 165.1. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values. FN 6: 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.FN 7: The lowest distillation percent 44.5 v/v % at 100 celsius degree was below the limit value 46.0 v/v



## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Germany  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Regular unleaded petrol min. RON=91 (<10 ppm su  
**National Fuel Grade:** Benzin Normal

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	51	91.6	96.1	1	91	0	95	--
MOTOR OCTANE NO.	--	121	82.3	86.5	1	82.5	0	85	--
VAPOUR PRESSURE, DVPE	kPa	92	52.1	65.7	3.5	45	0	--	60
Summer + Winter period	kPa								60
Summer period	kPa								--
Winter period	kPa								--
DISTILLATION:	%(v/v)	135	49	69.4	5.89	0	0	46.0	--
evaporated at 100	%(v/v)	135	80.3	98.2	6.36	0	0	75.0	--
evaporated at 150									
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	123	0.9	18	5	0	0	--	18.0
aromatics	%(v/v)	145	11.2	39.2	8.21	0	0	--	42.0
benzene	%(v/v)	145	0.2	1.04	0.3	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	114	0	2.2	0	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	99	0	0	0	0	0	--	3
Ethanol	%(v/v)	42	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	57	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	57	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	57	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	114	0	7.1	0	0	0	--	15
Other oxygenates	%(v/v)	99	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	145	2	27	3.4	50	0	--	150
LEAD CONTENT	g/l	27	0	2.5	0	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.0025g/l, and therefore values reported as 0 will fall into the range 0-0.0025g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Germany  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95 (<10 ppm sulphur)  
**National Fuel Grade:** Super

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values			
			Min.	Max.	Mean		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	57	92.2	97.2	95.7	0.8	0	0	95	--
MOTOR OCTANE NO.	--	160	84.5	86.8	85.17	0.53	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									
Summer period	kPa	120	52.7	64.3	58.71933333	3.89	45	0	--	60
Winter period	kPa								--	60
DISTILLATION:										
evaporated at 100	%(v/v)	172	45.5	67	54.52976744	3.7	0	0	46.0	--
evaporated at 150	%(v/v)	168	85.6	96.2	86.08630952	4.8	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	159	1	18	8.949811321	5.4	0	0	--	18.0
aromatics	%(v/v)	186	8.2	43.5	19.35296	4.3	0	0	--	42.0
benzene	%(v/v)	186	0.1	1	0.670591398	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	152	0.1	2.6	1.197526882	1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	115	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	70	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	70	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	70	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	70	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	162	0	12	0	0	0	0	--	15
Other oxygenates	%(v/v)	77	0	0.2	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	186	2	12	6.437311828	1.9	50	0	--	150
LEAD CONTENT	g/l	46	0.0025	0.004	0	0	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.0025g/l, and therefore values reported as 0 will fall into the range 0-0.0025g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Germany  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98 (<10 ppm sulphur)  
**National Fuel Grade:** Super Plus

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	37	97.9	101.4	2.1	98	0	95	--
MOTOR OCTANE NO.	--	74	85.4	89.1	1.6	88	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	63	54.1	62	1.8	45	0	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	80	45.8	65.1	5.6	0	0	46.0	--
evaporated at 150	%(v/v)	80	80.2	94.8	3.892490657	0	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	80	0.8	9.9	2.9	0	0	--	18.0
aromatics	%(v/v)	86	11.3	41.9	3.9	0	0	--	42.0
benzene	%(v/v)	86	0.1	0.89	0.3	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	74	2	2.8	0.4	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	55	0	0	0	0	0	--	3
Ethanol	%(v/v)	24	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	24	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	39	0	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	39	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	65	0	14.8	0	0	0	--	15
Other oxygenates	%(v/v)	43	0	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	86	1.3	11.9	3.66	10	0	--	150
LEAD CONTENT	g/l	21	0	0	0	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.0025g/l, and therefore values reported as 0 will fall into the range 0-0.0025g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Greece  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	44	93.5	96.5	0.664678855	0	0	95	--
MOTOR OCTANE NO.	--	44	85	85.1	0.026365165	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	44	52.1	60.1	1.393657235	0	0	--	60
Summer + Winter period	kPa	44	59.08536565						60
Summer period	kPa	44	57.37142857	64	3.560301831	0	0	46.0	--
Winter period	kPa	44	87.09761905	91	2.343281844	0	0	75.0	--
DISTILLATION:	%(v/v)	44	49	64					
evaporated at 100	%(v/v)	44	81.5	91					
evaporated at 150	%(v/v)	44	5	14.8	2.76853864	0	0	--	18.0
HYDROCARBON ANALYSIS:	%(v/v)	44	7.6	41.9	5.735313259	0	0	--	42.0
olefins	%(v/v)	44	0.52	1	0.122403126	0	0	--	1.0
aromatics	%(v/v)	44	0	0		0	0	--	2.7
benzene	%(v/v)	44	0	0					
OXYGEN CONTENT	%(m/m)	44	0	0					
OXYGENATES:	%(v/v)	44	0	0					
Methanol	%(v/v)	44	0	0	0	0	0	--	3
Ethanol	%(v/v)	44	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	44	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	44	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	44	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	44	3	11	2.9384997	0	0	--	15
Other oxygenates	%(v/v)	44	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	44	10	110	29.50376165	0	0	--	150
LEAD CONTENT	g/l	44	0.001	0.003	0.00202439	0	0	--	0.005

**Notes:** The deviations that were noticed in octane number RON are due to the fact that a sample, taken from the gas station Adipora in July, was found with octane number RON 93.5 because it was adulterated with solvents of low RON. To the culprits were applied, from the responsible authorities, the penalties foreseen by the relevant national legislation.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Greece  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** 95

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation		National Specification		EC Limit values	
					Max.	Min.	Max.	Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	72	95	96.585	95.53729167	0.571840331	0	0	95	--	
MOTOR OCTANE NO.	--	72	85	86	85.02535211	0.13279233	0	0	85	--	
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	0	--	60	
Summer + Winter period	kPa								--	60	
Summer period	kPa								--	--	
Winter period	kPa								--	--	
DISTILLATION:											
evaporated at 100	%(v/v)	72	49	68	58.86760663	3.53314003	0	0	46.0	--	
evaporated at 150	%(v/v)	72	80	93	89.30566338	2.426454634	0	0	75.0	--	
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	72	2	15.3	11.04861111	3.17627619	0	0	--	18.0	
aromatics	%(v/v)	72	24.8	41.9	30.37361	3.692206984	0	0	--	42.0	
benzene	%(v/v)	72	0.7	1	0.919166667	0.091123658	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	
Tetra-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)	72	0	10	4.969014085	1.97133686	0	0	--	15	
Other oxygenates	%(v/v)	0	0	0	0	0	0	0	--	10	
SULPHUR CONTENT	mg/kg	72	10	122	64.53521127	28.80070981	0	0	--	150	
LEAD CONTENT	g/l	72	0.001	0.003	0.001957746	0.000818302	0	0	--	0.005	

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Greece  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	116	93.5	96.585		95	--
MOTOR OCTANE NO.	--	116	85	86		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	44	0	60.1		--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	116	49	68		46.0	--
evaporated at 150	%(v/v)	116	80	93		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	116	2	15.3		--	18.0
aromatics	%(v/v)	116	7.6	41.9		--	42.0
benzene	%(v/v)	116	0.52	1		--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0		--	2.7
OXYGENATES:							
Methanol	%(v/v)	44	0	0		--	3
Ethanol	%(v/v)	44	0	0		--	5
Iso-propyl alcohol	%(v/v)	44	0	0		--	10
Tetra-butyl alcohol	%(v/v)	44	0	0		--	7
Iso-butyl alcohol	%(v/v)	44	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	116	0	11		--	15
Other oxygenates	%(v/v)	44	0	0		--	10
SULPHUR CONTENT	mg/kg	116	10	122		--	150
LEAD CONTENT	g/l	116	0.001	0.003		--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	43	96	97.6	96.5	0.518804743	0	0	0	95	--
MOTOR OCTANE NO.	--	43	85	86	85.065	0.228203688	0	0	0	85	--
VAPOUR PRESSURE, DVPE											
Summer + Winter period	kPa	43	55	60	58.86	1.254489374	0	0	0	--	60
Summer period	kPa	43	50.8	64	57.3775	4.128356443	0	0	0	46.0	60
Winter period	kPa	43	83	91.5	87.34	2.392059514	0	0	0	75.0	--
DISTILLATION:											
evaporated at 100	%(v/v)	43	9	16.2	13.1	1.863000062	0	0	0	--	18.0
evaporated at 150	%(v/v)	43	21	39	28.54146	3.292109932	0	0	0	--	42.0
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	43	0.6	1	0.870731707	0.116969873	0	0	0	--	1.0
aromatics	%(v/v)	43	0	0	0	0	0	0	0	--	2.7
benzene	%(v/v)	43	0	0	0	0	0	0	0	--	2.7
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	0	--	2.7
OXYGENATES:											
Methanol	%(v/v)	0	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	43	3.5	14.9	8.5275	4.360427378	0	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	43	20	150	88.225	33.18826445	0	0	0	--	150
LEAD CONTENT	g/l	43	0.001	0.003	0.002125	0.000790569	0	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Winter  
 FuelID: Unleaded petrol 95 =< RON < 98  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	60	96	97.3	0.35929545	0	0	95	--
MOTOR OCTANE NO.	--	60	85	86	0.289463229	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period	kPa	0	0	0	0	0	0	--	60
Summer period	kPa							--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	60	49	68	4.316362599	0	0	46.0	--
evaporated at 150	%(v/v)	60	83	92	2.248024608	0	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	60	6	19.5	2.700814893	0	0	--	18.0
aromatics	%(v/v)	60	22.4	41.8	4.967483195	0	0	--	42.0
benzene	%(v/v)	60	0.55	1	0.09998306	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	60	3.5	13.4	2.799431761	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	60	20	150	30.56346565	0	0	--	150
LEAD CONTENT	g/l	60	0.001	0.003	0.000818615	0.002142857	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	103	96	97.6		95	--
MOTOR OCTANE NO.	--	103	85	86		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	43	0	60			60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	103	49	68		46.0	--
evaporated at 150	%(v/v)	103	83	92		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	103	6	19.5			18.0
aromatics	%(v/v)	103	21	41.8			42.0
benzene	%(v/v)	103	0.55	1			1.0
OXYGEN CONTENT	%(m/m)	0	0	0			2.7
OXYGENATES:							
Methanol	%(v/v)	0	0	0			3
Ethanol	%(v/v)	0	0	0			5
iso-propyl alcohol	%(v/v)	0	0	0			10
Tetra-butyl alcohol	%(v/v)	0	0	0			7
Iso-butyl alcohol	%(v/v)	0	0	0			10
Ethers with 5 or more C atoms per molecule	%(v/v)	103	3.5	14.9			15
Other oxygenates	%(v/v)	0	0	0			10
SULPHUR CONTENT	mg/kg	103	20	150			150
LEAD CONTENT	g/l	103	0.001	0.003			0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade 98

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	18	97	100	98.403125	0.512731065	0	0	95	--	
MOTOR OCTANE NO.	--	18	86	86.3	86.06428571	0.086983548	0	0	85	--	
VAPOUR PRESSURE, DVPE	kPa	18	53.4	60	56.8571	1.3645	0	0	--	60	
Summer + Winter period	kPa	18	53.4	60	56.8571	1.3645	0	0	--	60	
Summer period	kPa	18	53.4	60	56.8571	1.3645	0	0	--	60	
Winter period	kPa	18	53.4	60	56.8571	1.3645	0	0	--	60	
DISTILLATION:	%(v/v)	18	51.7	66	58.09	2.579006759	0	0	46.0	--	
evaporated at 100	%(v/v)	18	51.7	66	58.09	2.579006759	0	0	46.0	--	
evaporated at 150	%(v/v)	18	84.5	92	88.23666667	1.932567228	0	0	75.0	--	
HYDROCARBON ANALYSIS:	%(v/v)	18	4.3	13.6	10.98275862	2.309617928	0	0	--	18.0	
olefins	%(v/v)	18	4.3	13.6	10.98275862	2.309617928	0	0	--	18.0	
aromatics	%(v/v)	18	27	40.6	32.36452	2.74645813	0	0	--	42.0	
benzene	%(v/v)	18	0.35	1	0.854516129	0.13433388	0	0	--	1.0	
OXYGEN CONTENT	%(m/m)	18	0	0	0	0	0	0	--	2.7	
OXYGENATES:	%(v/v)	18	0	0	0	0	0	0	--	3	
Methanol	%(v/v)	18	0	0	0	0	0	0	--	3	
Ethanol	%(v/v)	18	0	0	0	0	0	0	--	5	
Iso-propyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	10	
Tetra-butyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	7	
Iso-butyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	10	
Ethers with 5 or more C atoms per molecule	%(v/v)	18	3.5	15	11.48214286	4.740140143	0	0	--	15	
Other oxygenates	%(v/v)	18	0	0	0	0	0	0	--	10	
SULPHUR CONTENT	mg/kg	18	20	140	70.89285714	25.93773068	0	0	--	150	
LEAD CONTENT	g/l	18	0.001	0.003	0.002214286	0.000629941	0	0	--	0.005	

Notes: The deviations that were noticed in octane number RON are due to the fact that a sample, taken from the gas station Adipora in August, was found with octane number RON 97.0 because it was adulterated with unleaded petrol RON 95. To the culprits were applied, from the responsible authorities, the penalties foreseen by the relevant national legislation.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade 98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	31	98	100	0.335402668	0	0	95	--
MOTOR OCTANE NO.	--	31	86	87	0.172823218	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	--	60
Summer + Winter period	kPa	0	0	0	0	0	0	--	60
Summer period	kPa	0	0	0	0	0	0	--	--
Winter period	kPa	0	0	0	0	0	0	--	--
DISTILLATION:	%(v/v)	31	52	63	3.123582507	0	0	46.0	--
evaporated at 100	%(v/v)	31	84.5	92	2.240017136	0	0	75.0	--
evaporated at 150	%(v/v)	31	84.5	92	2.240017136	0	0	75.0	--
HYDROCARBON ANALYSIS:	%(v/v)	31	7.5	16.2	1.70844013	0	0	--	18.0
olefins	%(v/v)	31	25.1	33.3	2.065072699	0	0	--	42.0
aromatics	%(v/v)	31	0.33	1	0.114935204	0	0	--	1.0
benzene	%(v/v)	31	0.33	1	0.114935204	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	--	2.7
OXYGENATES:	%(v/v)	0	0	0	0	0	0	--	--
Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	31	3.5	15	4.243754323	0	0	--	15
Other oxygenates	%(v/v)	31	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	31	20	120	20.73205686	0	0	--	150
LEAD CONTENT	g/l	31	0.001	0.003	0.002340909	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Greece  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade 98

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values		
			Min.	Max.	Mean		Min.	Max.	Min.
RESEARCH OCTANE NO.	--	49	97	100	98.3			95	--
MOTOR OCTANE NO.	--	49	86	87	86.1			85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	18	0	60	58.9			--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	49	51.7	66	58.4			46.0	--
evaporated at 150	%(v/v)	49	84.5	92	88.9			75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	49	4.3	16.2	11.2			--	18.0
aromatics	%(v/v)	49	25.1	40.6	31.1			--	42.0
benzene	%(v/v)	49	0.33	1	0.9			--	1.0
OXYGEN CONTENT									
OXYGENATES:	%(m/m)	18	0	0	0			--	2.7
Methanol	%(v/v)	18	0	0	0			--	3
Ethanol	%(v/v)	18	0	0	0			--	5
Iso-propyl alcohol	%(v/v)	18	0	0	0			--	10
Tetra-butyl alcohol	%(v/v)	18	0	0	0			--	7
Iso-butyl alcohol	%(v/v)	18	0	0	0			--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	49	3.5	15	10.6			--	15
Other oxygenates	%(v/v)	49	0	0	0			--	10
SULPHUR CONTENT	mg/kg	49	20	140	64.8			--	150
LEAD CONTENT	g/l	49	0.001	0.003	0			--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Hungary  
 Year: 2004  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade Premium unleaded, Esz-95

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	17	95	96.9	95.58	0.42	95	0	95	--
MOTOR OCTANE NO.	--	17	85.3	85.7	85.48	0.13	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	0	--	60
Summer + Winter period	kPa								--	60
Summer period	kPa								--	--
Winter period	kPa								--	--
DISTILLATION:	%(v/v)	17	51	54	52.24	0.9	46	71	46.0	--
evaporated at 100	%(v/v)	17	80	84	81.06	1.14	75	0	75.0	--
evaporated at 150										
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	17	6.4	11.5	9.75	1.22	0	18	--	18.0
aromatics	%(v/v)	17	28.9	34.8	31.46	2.13	0	42	--	42.0
benzene	%(v/v)	17	0.44	0.66	0.532	0.049	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	17	0.5	1.6	0.66	0.31	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	17	0.2	0.2	0.2	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	17	--	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)	17	2.6	8.1	3.58	1.59	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	17	5.8	41.5	12.99	9.33	0	150	--	150
LEAD CONTENT	g/l	17	0.0004	0.0012	0.00066	0.00019	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Hungary  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** Premium unleaded, Esz-95

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	17	95	96.9	95.58	0.42	95	0	95	--
MOTOR OCTANE NO.	--	17	85.3	85.7	85.48	0.13	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	0	--	60
Summer + Winter period	kPa								--	60
Summer period	kPa								--	--
Winter period	kPa								--	--
DISTILLATION:	%(v/v)	17	51	54	52.24	0.9	46	71	46.0	--
evaporated at 100	%(v/v)	17	80	84	81.06	1.14	75	0	75.0	--
evaporated at 150										
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	17	6.4	11.5	9.75	1.22	0	18	--	18.0
aromatics	%(v/v)	17	28.9	34.8	31.46	2.13	0	42	--	42.0
benzene	%(v/v)	17	0.44	0.66	0.532	0.049	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	17	0.5	1.6	0.66	0.31	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	17	0.2	0.2	0.2	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	17	--	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)	17	2.6	8.1	3.58	1.59	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	17	5.8	41.5	12.99	9.33	0	150	--	150
LEAD CONTENT	g/l	17	0.0004	0.0012	0.00066	0.00019	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Hungary  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade** Super unleaded, Esz-98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	99.2	99.7	0.22	98	0	95	--
MOTOR OCTANE NO.	--	4	88.4	88.7	0.15	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	--	60
Summer + Winter period	kPa	0	0	0	0	0	0	--	60
Summer period	kPa	0	0	0	0	0	0	--	--
Winter period	kPa	0	0	0	0	0	0	--	--
DISTILLATION:	%(v/v)	4	50	62	5.85	46	71	46.0	--
evaporated at 100	%(v/v)	4	83	90	3.3	75	0	75.0	--
evaporated at 150	%(v/v)	4	83	90	3.3	75	0	75.0	--
HYDROCARBON ANALYSIS:	%(v/v)	4	6	8	0.82	0	18	--	18.0
olefins	%(v/v)	4	6	8	0.82	0	18	--	18.0
aromatics	%(v/v)	4	29.5	35.7	2.85	0	42	--	42.0
benzene	%(v/v)	4	0.31	0.67	0.18	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	4	2.2	2.6	0.19	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	17	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	12	14.3	1.04	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	4	7.2	10.9	1.76	0	150	--	150
LEAD CONTENT	g/l	4	0.0007	0.0008	0.00005	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Hungary  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** Super unleaded, Esz-98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	99.2	99.7	0.22	98	0	95	--
MOTOR OCTANE NO.	--	4	88.4	88.7	0.15	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	--	60
Summer + Winter period	kPa	0	0	0	0	0	0	--	60
Summer period	kPa	0	0	0	0	0	0	--	--
Winter period	kPa	0	0	0	0	0	0	--	--
DISTILLATION:	%(v/v)	4	50	62	5.85	46	71	46.0	--
evaporated at 100	%(v/v)	4	83	90	3.3	75	0	75.0	--
evaporated at 150	%(v/v)	4	83	90	3.3	75	0	75.0	--
HYDROCARBON ANALYSIS:	%(v/v)	4	6	8	0.82	0	18	--	18.0
olefins	%(v/v)	4	6	8	0.82	0	18	--	18.0
aromatics	%(v/v)	4	29.5	35.7	2.85	0	42	--	42.0
benzene	%(v/v)	4	0.31	0.67	0.18	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	4	2.2	2.6	0.19	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	17	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	12	14.3	1.04	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	4	7.2	10.9	1.76	0	150	--	150
LEAD CONTENT	g/l	4	0.0007	0.0008	0.00005	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Ireland  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** Petrol 95 Unleaded

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	97	94.3	97.2	0.5	0	0	95	--
MOTOR OCTANE NO.	--	97	84.6	87.4	0.6	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period	kPa	41	54.4	99.8	14.8	0	0	--	70
Summer period	kPa							--	70
Winter period	kPa							--	--
DISTILLATION:	%(v/v)								
evaporated at 100	%(v/v)	96	42.8	71.5	4.6	0	0	46.0	--
evaporated at 150	%(v/v)	96	80.3	96.3	4.3	0	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	96	0	17.2	0.2	0	0	--	18.0
aromatics	%(v/v)	96	22.1	41.2	0.2	0	0	--	42.0
benzene	%(v/v)	96	0.3	1.1	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	96	0	1.34	0	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	96	0	0.1	0	0	0	--	3
Ethanol	%(v/v)	96	0	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	96	0	0.1	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	96	0	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	96	0	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	96	0	7.47	1	0	0	--	15
Other oxygenates	%(v/v)	96	0	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	96	0	155	42.1	0	0	--	150
LEAD CONTENT	g/l	96	0	0.004	0.001	0	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade -

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	164	94	99.1	0.6	95	0	95	--
MOTOR OCTANE NO.	--	89	84.8	88.6	0.6	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	164	51.3	63.5	2.2	0	60	--	60
Summer + Winter period	kPa								60
Summer period	kPa								60
Winter period	kPa								--
DISTILLATION:	%(v/v)	89	45.9	66.3	5.1	46	0	46.0	--
evaporated at 100	%(v/v)	89	79.9	93.9	3.5	75	0	75.0	--
evaporated at 150	%(v/v)								--
HYDROCARBON ANALYSIS:	%(v/v)	140	0.3	16.9	5.1	0	18	--	18.0
olefins	%(v/v)	140	23.7	40.6	3.4	0	40	--	42.0
aromatics	%(v/v)	168	0.47	0.96	0.1	0	1	--	1.0
benzene	%(v/v)	168	0	2.4	0.6	0	2.7	--	2.7
OXYGEN CONTENT	%(m/m)								
OXYGENATES:	%(v/v)	168	0	0	0	0	3	--	3
Methanol	%(v/v)	168	0	0	0	0	5	--	5
Ethanol	%(v/v)	168	0	0	0	0	10	--	10
Iso-propyl alcohol	%(v/v)	168	0	0	0	0	7	--	7
Tetro-butyl alcohol	%(v/v)	168	0	0	0	0	10	--	10
Iso-butyl alcohol	%(v/v)	168	0	13	3.1	0	15	--	15
Ethers with 5 or more C atoms per molecule	%(v/v)	168	0	0	0	0	10	--	10
Other oxygenates	%(v/v)	168	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	168	5	148	35.3	0	150	--	150
LEAD CONTENT	g/l	30	0	0.005	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 ASTM D1319-96a (aromatics and olefins) provides two different reproducibility statements for petrol, depending on the presence of oxygenates. The greatest part of Italian petroils contain oxygenates; therefore the following reproducibility was considered: 3.7 % (V/V) for aromatics and 4.6 % (V/V) for olefins. Although all oxygenates were not measured, no other oxygenates were added to petrol other than ethers with more than 5 carbon atoms per molecule. Test method EN 1601 employed by Italy for the determination of oxygenate content in petrol samples requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all sample chromatograms showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME); no other oxygenates were detected beside one of these ethers. Mean values for reproducibility were obtained for distillation curve. Evaporated at 100°C: R=4 % (V/V). Evaporated at 150°C: R=3.8 % (V/V).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2004  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade -

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	88	92.1	98.8	0.8	95	0	95	--
MOTOR OCTANE NO.	--	85	84.6	86.8	0.6	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	60	--	60
Summer + Winter period	kPa								
Summer period	kPa								60
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	85	46	69.8	5.9	46	0	46.0	--
evaporated at 150	%(v/v)	70	81.3	98.2	3.7	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	57	0.2	16.8	5.4	0	18	--	18.0
aromatics	%(v/v)	57	23.7	39.6	3.8	0	40	--	42.0
benzene	%(v/v)	88	0.29	0.92	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	88	0	2.1	0.5	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	88	0	0	0	0	3	--	3
Ethanol	%(v/v)	88	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	88	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	88	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	88	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	88	0	11.6	3.1	0	15	--	15
Other oxygenates	%(v/v)	88	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	64	1	148	35	0	150	--	150
LEAD CONTENT	g/l	22	0	0.005	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 ASTM D1319-96a (aromatics and olefins) provides two different reproducibility statements for petrol, depending on the presence of oxygenates. The greatest part of Italian petroils contain oxygenates; therefore the following reproducibility was considered: 3.7 % (V/V) for aromatics and 4.6 % (V/V) for olefins. Although all oxygenates were not measured, no other oxygenates were added to petrol other than ethers with more than 5 carbon atoms per molecule. Test method EN 1601 employed by Italy for the determination of oxygenate content in petrol samples requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all sample chromatograms showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME); no other oxygenates were detected beside one of these ethers. Mean values for reproducibility were obtained for distillation curve. Evaporated at 100°C: R=4 % (V/V). Evaporated at 150°C: R=3.8 % (V/V).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Italy  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade -

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	252	92.1	99.1	95.6			95	--
MOTOR OCTANE NO.	--	174	84.6	88.6	85.6			85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	164	0	63.5	57.8				60
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	174	45.9	69.8	54.5			46.0	--
evaporated at 150	%(v/v)	159	79.9	98.2	87.4			75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	197	0.2	16.9	7.5				18.0
aromatics	%(v/v)	197	23.7	40.6	31.9				42.0
benzene	%(v/v)	256	0.29	0.96	0.7				1.0
OXYGEN CONTENT									
OXYGENATES:	%(m/m)	256	0	2.4	0.6				2.7
Methanol	%(v/v)	256	0	0					3
Ethanol	%(v/v)	256	0	0					5
Iso-propyl alcohol	%(v/v)	256	0	0					10
Tetra-butyl alcohol	%(v/v)	256	0	0					7
Iso-butyl alcohol	%(v/v)	256	0	0					10
Ethers with 5 or more C atoms per molecule	%(v/v)	256	0	13	3.5				15
Other oxygenates	%(v/v)	256	0	0					10
SULPHUR CONTENT	mg/kg	232	1	148	52.5				150
LEAD CONTENT	g/l	52	0	0.005	0				0.005

Notes: Test method EN 1601 employed by Italy for the determination of oxygenate content in petrol samples requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all sample chromatograms showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME); no other oxygenates were detected beside one of these ethers.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Latvia  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade:** Petrol RON 95

PARAMETER	Unit	Number of Samples	Min.		Max.		Mean	Standard deviation	National Specification		EC Limit values	
									Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	127	95	99.9	97.45				0	0	95	--
MOTOR OCTANE NO.	--	127	85	85.7	85.52				0	0	85	--
VAPOUR PRESSURE, DVPE												
Summer + Winter period	kPa	127	63.5	90.3	76.9	6.9			0	70	--	60
Summer period	kPa										--	60
Winter period	kPa										--	--
DISTILLATION:												
evaporated at 100	%(v/v)	127	45.5	64.1	54.8				46	0	46.0	--
evaporated at 150	%(v/v)	127	81.1	95	88.05				75	0	75.0	--
HYDROCARBON ANALYSIS:												
olefins	%(v/v)	127	1.3	15.6	8.45				0	18	--	18.0
aromatics	%(v/v)	127	26.6	42	34.3				0	42	--	42.0
benzene	%(v/v)	127	0.2	0.9	0.55				0	1	--	1.0
OXYGEN CONTENT												
OXYGENATES:	%(m/m)	127	0.06	2.7	1.38				0	2.7	--	2.7
Methanol	%(v/v)	127	0	0.5	0.35				0	3	--	3
Ethanol	%(v/v)	127	0	0.6	0.35				0	5	--	5
Iso-propyl alcohol	%(v/v)	127	0	0.7	0.35				0	10	--	10
Tetra-butyl alcohol	%(v/v)	127	0	0.8	0.35				0	7	--	7
Iso-butyl alcohol	%(v/v)	127	0	0.9	0.35				0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	127	0.3	14.3	7.3				0	15	--	15
Other oxygenates	%(v/v)	127	0	0.5	0.35				0	10	--	10
SULPHUR CONTENT	mg/kg	127	14	117	65.5				0	150	--	150
LEAD CONTENT	g/l	127	0.0001	0.005	0.0025				0	0.005	--	0.005

Notes: The limit of detection for Oxygenates is 0.2%(v/v), and therefore values reported as 0 will fall into the range 0-0.2 %(v/v).

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Lithuania  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Regular unleaded petrol min. RON=91  
**National Fuel Grade** A-92 (RON 92)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	16	92	92.3	0.107819	92	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	82	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period	kPa	0	0	0	0	0	70	--	60
Summer period	kPa							--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	16	49	61	3.56838	46	0	46.0	--
evaporated at 150	%(v/v)	16	78	85	1.892969	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	35	24.2	36.3	3.192396	0	42	--	42.0
benzene	%(v/v)	41	0.47	0.94	0.10995	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	41	0.3	1.1	0.243025	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	4	150	44.7869	0	150	--	150
LEAD CONTENT	g/l	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:** 2004  
**Period:** Winter  
**FuelID:** Regular unleaded petrol min. RON=91  
**National Fuel Grade:** A-92 (RON 92)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	23	92	92.5	0.139167	92	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	82	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	20	66.5	88.8	6.354466	0	0	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	23	50	60	2.988023	46	0	46.0	--
evaporated at 150	%(v/v)	23	79	87	1.969129	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	3	14.6	15.9	0.7	0	18	--	18.0
aromatics	%(v/v)	14	25.7	28.9	1.064229	0	42	--	42.0
benzene	%(v/v)	29	0.52	0.87	0.095069	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	29	0.2	1.2	0.356424	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	3	0.5	0.6	0.057735	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	31	30	134	32.32283	0	150	--	150
LEAD CONTENT	g/l	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: 2004

Period: Full-year

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade A-92 (RON 92)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	39	92	92.5	92.1	95	--
MOTOR OCTANE NO.	--	0	0	0		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	20	0	88.8	78.7	--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	39	49	61	55.6	46.0	--
evaporated at 150	%(v/v)	39	78	87	82.3	75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	3	0	15.9	15.1	--	18.0
aromatics	%(v/v)	49	24.2	36.3	28.7	--	42.0
benzene	%(v/v)	70	0.47	0.94	0.7	--	1.0
OXYGEN CONTENT	%(m/m)	70	0.2	1.2	0.5	--	2.7
OXYGENATES:							
Methanol	%(v/v)	3	0	0.6	0.6	--	3
Ethanol	%(v/v)	0	0	0		--	5
Iso-propyl alcohol	%(v/v)	0	0	0		--	10
Tetra-butyl alcohol	%(v/v)	0	0	0		--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0		--	15
Other oxygenates	%(v/v)	0	0	0		--	10
SULPHUR CONTENT	mg/kg	71	4	150	77.8	--	150
LEAD CONTENT	g/l	0	0	0		--	0.005

Notes:



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Summer

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade A-95 (RON 95)

PARAMETER	Unit	Number of Samples	National Specification		Mean	Standard deviation	National Specification		EC Limit values	
			Min.	Max.			Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	37	95	95.6	95.2	0.132543	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa									
Summer + Winter period	kPa	0	0	0	0	0	0	70	--	60
Summer period	kPa								--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	37	40	61	50.32432	4.784547	46	0	46.0	--
evaporated at 150	%(v/v)	37	77	87	82.43243	2.65142	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	18	--	18.0
aromatics	%(v/v)	21	9.8	41.8	32.28571	7.20245	0	42	--	42.0
benzene	%(v/v)	51	0.35	0.8	0.539804	0.086128	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	51	0.9	2.3	1.319608	0.230668	0	2.7	--	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
Tetra-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 oxygenates	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	56	2	150	62.10714	45.88748	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Winter

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade A-95 (RON 95)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	81	95	95.4	0.096048	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period									60
Summer period	kPa	61	67.2	89.7	7.151304	0	90	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	81	46	64	4.84252	46	0	46.0	--
evaporated at 150	%(v/v)	81	76	89	2.473439	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	8	0.7	10.4	3.252581	0	18	--	18.0
aromatics	%(v/v)	21	9.8	41.8	7.20245	0	42	--	42.0
benzene	%(v/v)	54	0.31	0.75	0.103382	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	54	0.4	2	0.292946	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	7	0.6	0.8	0.069007	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	80	4	140	34.67293	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Full-year

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade A-95 (RON 95)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	118	95	95.6		95	--
MOTOR OCTANE NO.	--	0	0	0		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	61	0	89.7			60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	118	40	64		46.0	--
evaporated at 150	%(v/v)	118	76	89		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	8	0	10.4			18.0
aromatics	%(v/v)	42	9.8	41.8			42.0
benzene	%(v/v)	105	0.31	0.8			1.0
OXYGEN CONTENT							
OXYGENATES:	%(m/m)	105	0.4	2.3			2.7
Methanol	%(v/v)	7	0	0.8			3
Ethanol	%(v/v)	0	0	0			5
Iso-propyl alcohol	%(v/v)	0	0	0			10
Tetra-butyl alcohol	%(v/v)	0	0	0			7
Iso-butyl alcohol	%(v/v)	0	0	0			10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0			15
Other oxygenates	%(v/v)	0	0	0			10
SULPHUR CONTENT	mg/kg	136	2	150			150
LEAD CONTENT	g/l	0	0	0			0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Summer

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade A-98 (RON 98)

PARAMETER	Unit	Number of Samples	National Specification		Mean	Standard deviation	National Specification		EC Limit values	
			Min.	Max.			Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	1	98.4	98.4	98.4	0	98	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa									
Summer + Winter period	kPa	0	0	0	0	0	0	70	--	60
Summer period	kPa								--	60
Winter period	kPa								--	--
DISTILLATION:	%(v/v)									
evaporated at 100	%(v/v)	1	47	47	47	0	46	0	46.0	--
evaporated at 150	%(v/v)	1	86	86	86	0	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	18	--	18.0
aromatics	%(v/v)	4	38.8	41.9	40.95	1.443376	0	42	--	42.0
benzene	%(v/v)	4	0.45	0.69	0.5425	0.103722	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	4	2.4	3	2.6	0.270801	0	2.7	--	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
Tetra-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 oxygenates	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	4	14	87	46.875	31.34851	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Winter

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade A-98 (RON 98)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	7	98	98.6	0.18898	98	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	85	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	7	67.1	88.1	7.2334	0	90	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	7	46	50	1.573592	46	0	46.0	--
evaporated at 150	%(v/v)	7	82	87	1.527525	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	0	0	0	0	0	18	--	18.0
aromatics	%(v/v)	0	0	0	0	0	42	--	42.0
benzene	%(v/v)	5	0.41	0.56	0.061644	0	5	--	1.0
OXYGEN CONTENT	%(m/m)	5	2.4	2.6	0.089443	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	7	8	104	31.54739	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0.005	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Lithuania

Year: 2004

Period: Full-year

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade A-98 (RON 98)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	8	98	98.6	98.2	95	--
MOTOR OCTANE NO.	--	0	0	0		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	7	0	88.1	78.7	--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	8	46	50	48	46.0	--
evaporated at 150	%(v/v)	8	82	87	84.3	75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	0	0	0		--	18.0
aromatics	%(v/v)	4	0	41.9	41	--	42.0
benzene	%(v/v)	9	0.41	0.69	0.5	--	1.0
OXYGEN CONTENT							
OXYGENATES:	%(m/m)	9	2.4	3	2.6	--	2.7
Methanol	%(v/v)	0	0	0		--	3
Ethanol	%(v/v)	0	0	0		--	5
Iso-propyl alcohol	%(v/v)	0	0	0		--	10
Tetra-butyl alcohol	%(v/v)	0	0	0		--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0		--	15
Other oxygenates	%(v/v)	0	0	0		--	10
SULPHUR CONTENT	mg/kg	11	8	104	42	--	150
LEAD CONTENT	g/l	0	0	0		--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Luxembourg

Year: 2004

Period: Full-year

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade RON 91

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	1	96.5	96.5		95	--
MOTOR OCTANE NO.	--	0	0	0		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)	1	0	53.3		46.0	--
evaporated at 150	%(v/v)	1	0	86.8		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	1	0	13.2		--	18.0
aromatics	%(v/v)	1	0	32.1		--	42.0
benzene	%(v/v)	1	0	0.5		--	1.0
OXYGEN CONTENT	%(m/m)	1	0	0.3		--	2.7
OXYGENATES:							
Methanol	%(v/v)	1	0	0.09		--	3
Ethanol	%(v/v)	1	0	0.09		--	5
Iso-propyl alcohol	%(v/v)	1	0	0.09		--	10
Tetra-butyl alcohol	%(v/v)	1	0	0.09		--	7
Iso-butyl alcohol	%(v/v)	1	0	0.09		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	1	0	1.5		--	15
Other oxygenates	%(v/v)	1	0	0.09		--	10
SULPHUR CONTENT	mg/kg	1	0	30		--	150
LEAD CONTENT	g/l	1	0	0.0009		--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Luxembourg

Year: 2004

Period: Full-year

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Essence sans plomb (IOR minimal = 95)

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	8	0	97.2	96.7			95	--	
MOTOR OCTANE NO.	--	4	0	85.3	85.2			85	--	
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa									
Summer period	kPa	2	0	0	57.9			--	60	
Winter period	kPa							--	60	
DISTILLATION:										
evaporated at 100	%(v/v)	12	47.9	52.8	50.6			46.0	--	
evaporated at 150	%(v/v)	12	81.8	86	84.5			75.0	--	
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	8	0	13.5	10.6			--	18.0	
aromatics	%(v/v)	8	0	39.9	36.2			--	42.0	
benzene	%(v/v)	8	0	0.9	0.7			--	1.0	
OXYGEN CONTENT	%(m/m)	4	0	0.7	0.5			--	2.7	
OXYGENATES:										
Methanol	%(v/v)	4	0	0.09	0.1			--	3	
Ethanol	%(v/v)	4	0	0.09	0.1			--	5	
Iso-propyl alcohol	%(v/v)	4	0	0.09	0.1			--	10	
Tetra-butyl alcohol	%(v/v)	4	0	0.09	0.1			--	7	
Iso-butyl alcohol	%(v/v)	4	0	0.09	0.1			--	10	
Ethers with 5 or more C atoms per molecule	%(v/v)	4	0	3.6	2.6			--	15	
Other oxygenates	%(v/v)	4	0	0.09	0.1			--	10	
SULPHUR CONTENT	mg/kg	8	0	54	34.7			--	150	
LEAD CONTENT	g/l	4	0	0.0009	0			--	0.005	

Notes:



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Luxembourg

Year: 2004

Period: Full-year

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade Essence sans plomb (IOR >= 98, teneur en soufre < 50 mg/kg)

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	7	0	100.1		95	--
MOTOR OCTANE NO.	--	3	0	88		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	5	0	60			60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	7	48.9	54.8		46.0	--
evaporated at 150	%(v/v)	7	84.2	89.2		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	7	0	11			18.0
aromatics	%(v/v)	7	0	36.7			42.0
benzene	%(v/v)	7	0	0.6			1.0
OXYGEN CONTENT							
OXYGENATES:	%(m/m)	4	0	1.9			2.7
Methanol	%(v/v)	4	0	0.09			3
Ethanol	%(v/v)	4	0	0.09			5
Iso-propyl alcohol	%(v/v)	4	0	0.09			10
Tetra-butyl alcohol	%(v/v)	4	0	0.09			7
Iso-butyl alcohol	%(v/v)	4	0	0.09			10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	0	10.5			15
Other oxygenates	%(v/v)	4	0	0.1			10
SULPHUR CONTENT	mg/kg	7	0	35			150
LEAD CONTENT	g/l	4	0	0.0009			0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Malta  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** N/A

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	95	95.6	0.275	95	0	95	--
MOTOR OCTANE NO.	--	4	85	85.6	0.287	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	4	55.4	57.5	0.956	0	60	--	60
Summer + Winter period	kPa	4	55.4	57.5	0.956	0	60	--	60
Summer period	kPa	4	55.4	57.5	0.956	0	60	--	60
Winter period	kPa	4	55.4	57.5	0.956	0	60	--	60
DISTILLATION:	%(v/v)	4	46	54.5	3.794	46	0	46.0	--
evaporated at 100	%(v/v)	4	46	54.5	3.794	46	0	46.0	--
evaporated at 150	%(v/v)	4	82	88.5	3.119	75	0	75.0	--
HYDROCARBON ANALYSIS:	%(v/v)	4	6.1	14.9	4.037	0	18	--	18.0
olefins	%(v/v)	4	6.1	14.9	4.037	0	18	--	18.0
aromatics	%(v/v)	4	29	41.8	5.578	0	42	--	42.0
benzene	%(v/v)	4	0.7	0.9	0.096	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	2.7	--	2.7
OXYGENATES:	%(v/v)	4	0	0	0	0	3	--	3
Methanol	%(v/v)	4	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	4	0	0.2	0.1	0	10	--	10
Tetro-butyl alcohol	%(v/v)	4	0	0.6	0.29	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	0.2	5.3	2.087	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	4	150	150	0	0	150	--	150
LEAD CONTENT	g/l	4	0	0.002	0.001	0	0.005	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v) and therefore, values reported as 0 fall in the range 0-0.1%(v/v). For sulphur content, laboratory analysis results are all reported as <150mg/kg. Test method used for sulphur content is ASTM D4294-02. The limit of detection for lead content is 0.001g/l and therefore, values reported as 0 fall in the range 0-0.001g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Malta  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** N/A

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	9	94.8	96.3	0.474	95	95
MOTOR OCTANE NO.	--	9	84.6	85.7	0.347	85	85
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	0	0	0	0	0	60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	3	51	58	3.557	46	46.0
evaporated at 150	%(v/v)	3	84	89.4	3.009	75	75.0
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	8	7.5	18.4	4.216	0	18.0
aromatics	%(v/v)	8	24.5	40.7	5.349	0	42.0
benzene	%(v/v)	9	0.55	0.97	0.144	0	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	2.7
OXYGENATES:							
Methanol	%(v/v)	9	0	0	0	0	3
Ethanol	%(v/v)	0	0	0	0	0	5
Iso-propyl alcohol	%(v/v)	9	0	0.3	0.15	0	10
Tetra-butyl alcohol	%(v/v)	9	0	1.45	0.636	0	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	9	0	0.65	0.27	0	15
Other oxygenates	%(v/v)	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	9	150	150	0	0	150
LEAD CONTENT	g/l	9	0	0.002	0.001	0	0.005

**Notes:**  
 Vapour pressure: samples tested were all winter period (Samples 9, Min: 56.4, Max: 71.77, Mean: 65.397, Std Dev: 6.681). Maximum limit for vapour pressure in winter is 70.0 kPa. No exceedances were found. The limit of detection for Oxygenates is 0.1%(v/v) and therefore, values reported as 0 fall in the range 0-0.1%(v/v). For sulphur content, laboratory analysis results are all reported as <150mg/kg. Test method used for sulphur content is ASTM D4294-02.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Malta  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	13	94.8	96.3	95.3	95	--
MOTOR OCTANE NO.	--	13	84.6	85.7	85.2	85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa	4	0	57.5	56.8	--	60
Summer period	kPa	7	46	58	51.3	--	60
Winter period	kPa	7	82	89.4	86.1	--	--
DISTILLATION:							
evaporated at 100	%(v/v)	7	46	58	51.3	46.0	--
evaporated at 150	%(v/v)	7	82	89.4	86.1	75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	12	6.1	18.4	13.4	--	18.0
aromatics	%(v/v)	12	24.5	41.8	33.9	--	42.0
benzene	%(v/v)	13	0.55	0.97	0.7	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0		--	2.7
OXYGENATES:							
Methanol	%(v/v)	13	0	0	0	--	3
Ethanol	%(v/v)	0	0	0		--	5
Iso-propyl alcohol	%(v/v)	13	0	0.3	0.1	--	10
Tetra-butyl alcohol	%(v/v)	13	0	1.45	0.5	--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	0	5.3	1	--	15
Other oxygenates	%(v/v)	0	0	0		--	10
SULPHUR CONTENT	mg/kg	13	150	150	46.2	--	150
LEAD CONTENT	g/l	13	0	0.002	0	--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Malta  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade** N/A

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	96.8	98.4	0.714	95	0	95	--
MOTOR OCTANE NO.	--	4	86	86.7	0.31	85	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	0	0	0	0	0	0	--	60
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	4	50	51	0.957	46	0	46.0	--
evaporated at 150	%(v/v)	4	85	87	1	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	4	12.6	17.8	2.351	0	18	--	18.0
aromatics	%(v/v)	4	29.5	34.1	1.991	0	42	--	42.0
benzene	%(v/v)	4	0.54	0.79	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	4	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	4	0	0.27	0.135	0	10	--	10
Tetra-butyl alcohol	%(v/v)	4	0	1.1	0.55	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	0	0.3	0.15	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	4	150	150	0	0	150	--	150
LEAD CONTENT	g/l	4	0.001	0.001	0	0	0.005	--	0.005

**Notes:**  
 Vapour pressure: samples tested were all winter period (Samples 4, Min: 64.5, Max: 67.6, Mean: 66.5, Std.Dev: 1.467). Maximum limit for vapour pressure in winter is 70.0 kPa. No exceedences were found. The limit of detection for Oxygenates is 0.1%(v/v) and therefore, values reported as 0 fall in the range 0-0.1%(v/v). For sulphur content, laboratory analysis results are all reported as <150mg/kg. Test method used for sulphur content is ASTM D4294-02.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Malta  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade** N/A

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	96.8	98.4	0.714	95	0	95	--
MOTOR OCTANE NO.	--	4	86	86.7	0.31	85	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	0	0	0	0	0	0	--	60
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	4	50	51	0.957	46	0	46.0	--
evaporated at 150	%(v/v)	4	85	87	1	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	4	12.6	17.8	2.351	0	18	--	18.0
aromatics	%(v/v)	4	29.5	34.1	1.991	0	42	--	42.0
benzene	%(v/v)	4	0.54	0.79	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	4	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	4	0	0.27	0.135	0	10	--	10
Tetra-butyl alcohol	%(v/v)	4	0	1.1	0.55	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	0	0.3	0.15	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	4	150	150	0	0	150	--	150
LEAD CONTENT	g/l	4	0.001	0.001	0	0	0.005	--	0.005

**Notes:** Vapour pressure: samples tested were all winter period (Samples 4, Min: 64.5, Max: 67.6, Mean: 66.5, Std.Dev: 1.467). Maximum limit for vapour pressure in winter is 70.0 kPa. No exceedences were found. The limit of detection for Oxygenates is 0.1%(v/v) and therefore, values reported as 0 fall in the range 0-0.1%(v/v). For sulphur content, laboratory analysis results are all reported as <150mg/kg. Test method used for sulphur content is ASTM D4294-02.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Netherlands  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** Petrol

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	94.6	97.9	0.2	0	0	95	--
MOTOR OCTANE NO.	--	100	84.5	88.1	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	50	52.7	60.3	1	0	0	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	100	47.5	64.7	0.5	0	0	46.0	--
evaporated at 150	%(v/v)	100	77.1	97.1	1.1	0	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	100	0.2	14.6	0.4	0	0	--	18.0
aromatics	%(v/v)	100	25.1	40.4	2.1	0	0	--	42.0
benzene	%(v/v)	100	0.2	0.9	0.04	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	0	0	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	100	0	0	0	0	0	--	3
Ethanol	%(v/v)	100	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	100	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0.94	12.1	0.14	0	0	--	15
Other oxygenates	%(v/v)	100	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	100	3	56	1.77	0	0	--	150
LEAD CONTENT	g/l	100	0	0	0.0007	0	0	--	0.005

**Notes:** The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Poland  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** 95 Octane petrol

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	274	91.6	98.9	0.665	95	--
MOTOR OCTANE NO.	--	274	83.5	88.4	0.637	85	--
VAPOUR PRESSURE, DVPE	kPa						60
Summer + Winter period	kPa	274	50.7	84.6	7.123	0	60
Summer period	kPa						60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	274	43.4	82	3.794	46	46.0
evaporated at 150	%(v/v)	274	76.6	96	2.663	75	75.0
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	274	0.2	18	4.279	0	18.0
aromatics	%(v/v)	274	4.8	42.6	4.163	0	42.0
benzene	%(v/v)	274	0.3	1	0.676	0	1.0
OXYGEN CONTENT	%(m/m)	274	0	11.2	1.033	0	2.7
OXYGENATES:							
Methanol	%(v/v)	274	0	2.5	0.158	0	3
Ethanol	%(v/v)	274	0	4.5	1.084	0	5
Iso-propyl alcohol	%(v/v)	274	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	274	0	0.2	0.022	0	7
Iso-butyl alcohol	%(v/v)	274	0	3.5	0.323	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	274	0	56.7	5.246	0	15
Other oxygenates	%(v/v)	274	0	7.1	0.565	0	10
SULPHUR CONTENT	mg/kg	274	0	274	43.665	0	150
LEAD CONTENT	g/l	274	0	0.005	0.002	0	0.005

**Notes:** [1] the table does not include fuels with the following results: research octane number (RON) – 86.7; motor octane number (MON) – 81.3; vapour pressure – 59.8; fraction evaporating below 100 °C – 57; fraction evaporating below 150 °C – 90; content of olefinic hydrocarbon – 1.8; content of aromatic hydrocarbon – 20.3; benzene content – 0.4; oxygen content – 4.21; methanol content – 0; ethanol content – 0; isopropyl alcohol content – 0; iso-butyl alcohol content – 0; tert-butyl alcohol content – 0; content of ethers – 23.2; content of other oxygen-containing organic compounds – 0; sulphur content – 564; lead content – 0.005; [2] norm for the winter period



## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Poland  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade 98 Octane petrol

PARAMETER	Unit	Number of Samples	Standard deviation			National Specification			EC Limit values	
			Min.	Max.	Mean	Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	68	95.6	100	98.3	0.573	98	0	95	--
MOTOR OCTANE NO.	--	68	85.3	89.5	87.998	0.636	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa	0	48.4	80.4	59.562	6.503	0	60	--	60
Summer period	kPa	68	46.2	60	50.989	2.444	46	0	--	60
Winter period	kPa	68	78.1	95.5	81.234	2.219	75	0	--	--
DISTILLATION:										
evaporated at 100	%(v/v)	68	0.5	6.4	2.352	1.267	0	18	--	18.0
evaporated at 150	%(v/v)	68	31.1	40.5	36.077	2.588	0	42	--	42.0
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	68	0.3	2.4	0.648	0.247	0	1	--	1.0
aromatics	%(v/v)	68	1.39	2.4	1.689	0.177	0	2.7	--	2.7
benzene	%(v/v)	68	0	0	0	0	0	3	--	3
OXYGEN CONTENT										
Methanol	%(v/v)	68	0	0.2	0.003	0.025	0	5	--	5
Ethanol	%(v/v)	68	0	0	0	0	0	10	--	10
Iso-propyl alcohol	%(v/v)	68	0	0.1	0.003	0.018	0	7	--	7
Tetra-butyl alcohol	%(v/v)	68	0	0	0	0	0	10	--	10
Iso-butyl alcohol	%(v/v)	68	7.8	13.8	10.133	0.92	0	15	--	15
Ethers with 5 or more C atoms per molecule	%(v/v)	68	1	1.2	0.019	0.15	0	10	--	10
Other oxygenates	%(v/v)	68	0.01	180	54.078	43.542	0	150	--	150
SULPHUR CONTENT	mg/kg	68	0	0.005	0.003	0.002	0	0.005	--	0.005
LEAD CONTENT	g/l	68								

Notes: [1] until the order dated 16 August relating to quality requirements came into effect (i.e. until 18 September 2004) the norm for 98 octane gasoline for the research octane number RON was 95,[2] norm for the winter period

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98  
 National Fuel Grade EuroSuper

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	24	95	97	0.761386988	95	95
MOTOR OCTANE NO.	--	24	85	86	0.282329851	85	85
VAPOUR PRESSURE, DVPE	kPa	9	45.44	59.9	4.529141751	45	60
Summer + Winter period	kPa						60
Summer period	kPa						60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	24	46.1	64.6	4.535270393	46	46.0
evaporated at 150	%(v/v)	24	75.2	90.2	4.515815605	75	75.0
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	14	3	15.4	3.556398042	0	18
aromatics	%(v/v)	14	21.4	42	5.530673707	0	42
benzene	%(v/v)	24	0.3	1	0.174247866	0	1
OXYGEN CONTENT	%(m/m)	7	0.2	2.1	0.688217244	0	2.7
OXYGENATES:							
Methanol	%(v/v)	0	0	0	0	0	3
Ethanol	%(v/v)	0	0	0	0	0	5
iso-propyl alcohol	%(v/v)	0	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	0.9	12	3.895601916	0	15
Other oxygenates	%(v/v)	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	19	15	146	44.87005279	0	150
LEAD CONTENT	g/l	0	0	0	0	0	0.005

Notes: Only ethers with 5 or more carbon atoms per molecule, are used. Unleaded petrol (minimum 95=<RON=98) doesn't have any lead.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Portugal  
 Year: 2004  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade Super plus

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	22	98	99	0.476731295	98	0	95	--
MOTOR OCTANE NO.	--	22	87	88	0.213200716	87	0	85	--
VAPOUR PRESSURE, DVPE	kPa	8	49.16	59.7	3.723991714	45	60	--	60
Summer + Winter period	kPa								60
Summer period	kPa								--
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	22	46.3	60.2	3.637982053	46	71	46.0	--
evaporated at 150	%(v/v)	22	75.3	87.1	4.194956774	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	22	2.8	13.4	2.382675567	0	18	--	18.0
aromatics	%(v/v)	22	28.6	41.4	4.000565436	0	42	--	42.0
benzene	%(v/v)	22	0.3	1	0.176362967	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	14	1.1	2.7	0.50541953	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	14	6	15	2.77506133	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	18	5	139	38.85249464	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0.005	--	0.005

Notes: Only ethers with 5 or more carbon atoms per molecule, are used. Unleaded petrol (minimum RON=>98) doesn't have any lead.

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Slovakia  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Regular unleaded petrol min. RON=91  
**National Fuel Grade:** NORMAL 91

PARAMETER	Unit	Number of Samples	National Specification			EC Limit values		
			Min.	Max.	Mean	Standard deviation	Min.	Max.
RESEARCH OCTANE NO.	--	53	91.3	95.1	92.6	0.7969	95	--
MOTOR OCTANE NO.	--	53	83.4	86	84.5	0.5805	85	--
VAPOUR PRESSURE, DVPE	kPa	53	52.6	60.3	56.7	1.7824	0	60
	kPa	53	48.4	59.2	53.8	3.0144	0	60
	kPa	53	79	86.7	81.7	1.6272	0	--
DISTILLATION:	%(v/v)	53	3.8	15.8	8.5	2.5713	0	18.0
evaporated at 100	%(v/v)	53	22.2	41.3	31.9	3.672	0	42.0
evaporated at 150	%(v/v)	53	0.6	1	0.9	0.0863	0	1.0
HYDROCARBON ANALYSIS:	%(m/m)	53	0.01	0.47	0.1	0.105	0	2.7
olefins	%(v/v)	53	0	0	0	0	0	3
aromatics	%(v/v)	53	0	0	0	0	0	5
benzene	%(v/v)	53	0	0	0	0	0	10
OXYGEN CONTENT	%(v/v)	53	0	0	0	0	0	7
OXYGENATES:	%(v/v)	53	0	2.6	0.5	0.5807	0	10
Methanol	%(v/v)	53	0	0	0	0	0	15
Ethanol	%(v/v)	53	0	0	0	0	0	10
Iso-propyl alcohol	%(v/v)	53	0	0	0	0	0	10
Tetra-butyl alcohol	%(v/v)	53	0	0	0	0	0	15
Iso-butyl alcohol	%(v/v)	53	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	0	0	0	0	0	10
Other oxygenates	%(v/v)	53	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	53	1.8	120	12.6	20.1505	0	150
LEAD CONTENT	g/l	53	0	0	0	0	0	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Slovakia  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Regular unleaded petrol min. RON=91  
**National Fuel Grade:** NORMAL 91

PARAMETER	Unit	Number of Samples	National Specification		Mean	Standard deviation	National Specification		EC Limit values	
			Min.	Max.			Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	61	90.5	95.2	92.4	0.8009	91	0	95	--
MOTOR OCTANE NO.	--	61	83	86.5	84.2	0.5744	81	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	60	--	60
Summer + Winter period	kPa	61	47.9	61	54.2	3.4315	46	0	46.0	--
Summer period	kPa	61	77.8	87.3	82.3	2.0441	75	0	75.0	--
Winter period	kPa	61	6.3	17.8	10.6	2.1804	0	18	--	18.0
DISTILLATION:	%(v/v)	61	24.2	39	30.6	3.1074	0	42	--	42.0
evaporated at 100	%(v/v)	61	0.6	1	0.9	0.0877	0	1	--	1.0
evaporated at 150	%(v/v)	61	0.02	0.37	0.1	0.0895	0	2.7	--	2.7
HYDROCARBON ANALYSIS:	%(v/v)	61	0	0	0	0	0	3	--	3
olefins	%(v/v)	61	0	0.1	0	0.0127	0	5	--	5
aromatics	%(v/v)	61	0	0	0	0	0	10	--	10
benzene	%(v/v)	61	0	0	0	0	0	7	--	7
OXYGEN CONTENT	%(v/v)	61	0.1	2	0.5	0.4906	0	10	--	10
OXYGENATES:	%(v/v)	61	0	0	0	0	0	15	--	15
Methanol	%(v/v)	61	0	0	0	0	0	10	--	10
Ethanol	%(v/v)	61	3	131.1	13.3	23.4584	0	150	--	150
Iso-propyl alcohol	%(v/v)	61	0	0	0	0	0	0.005	--	0.005
Tetro-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	0
Iso-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	0
Ethers with 5 or more C atoms per molecule	%(v/v)	61	0	0	0	0	0	0	--	0
Other oxygenates	%(v/v)	61	0	0	0	0	0	0	--	0
SULPHUR CONTENT	mg/kg	61	3	131.1	13.3	23.4584	0	150	--	150
LEAD CONTENT	g/l	61	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: 2004

Period: Full-year

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values		
			Min.	Max.	Mean		Min.	Max.	Min.
RESEARCH OCTANE NO.	--	114	90.5	95.2	92.5			95	--
MOTOR OCTANE NO.	--	114	83	86.5	84.3			85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	53	0	60.3	56.7			--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	114	47.9	61	54			46.0	--
evaporated at 150	%(v/v)	114	77.8	87.3	82			75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	114	3.8	17.8	9.6			--	18.0
aromatics	%(v/v)	114	22.2	41.3	31.2			--	42.0
benzene	%(v/v)	114	0.6	1	0.9			--	1.0
OXYGEN CONTENT	%(m/m)	114	0.01	0.47	0.1			--	2.7
OXYGENATES:									
Methanol	%(v/v)	114	0	0	0			--	3
Ethanol	%(v/v)	114	0	0.1	0			--	5
iso-propyl alcohol	%(v/v)	114	0	0	0			--	10
Tetra-butyl alcohol	%(v/v)	114	0	0	0			--	7
Iso-butyl alcohol	%(v/v)	114	0	0	0			--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	114	0	2.6	0.5			--	15
Other oxygenates	%(v/v)	114	0	0	0			--	10
SULPHUR CONTENT	mg/kg	114	1.8	131.1	13			--	150
LEAD CONTENT	g/l	114	0	0	0			--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95  
 National Fuel Grade Super 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	56	94.3	97.1	0.4421	95	0	95	--
MOTOR OCTANE NO.	--	56	86	87	0.2719	85	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	56	49.3	62.3	2.3957	0	60	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	56	47	52.8	1.1727	46	0	46.0	--
evaporated at 150	%(v/v)	56	77.2	84.7	1.7484	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	56	6.9	13.7	1.3313	0	18	--	18.0
aromatics	%(v/v)	56	31.8	41.4	2.2315	0	42	--	42.0
benzene	%(v/v)	56	0.5	0.9	0.1048	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	56	0.11	1.72	0.3077	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	56	0	0	0	0	3	--	3
Ethanol	%(v/v)	56	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	56	0	0	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	56	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	56	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	56	0.6	9.7	1.7371	0	15	--	15
Other oxygenates	%(v/v)	56	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	56	3.1	69.3	11.3826	0	150	--	150
LEAD CONTENT	g/l	56	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:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** Super 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	58	94.4	97.5	0.5812	95	0	95	--
MOTOR OCTANE NO.	--	58	85.8	87.2	0.3216	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	60	--	60
Summer + Winter period	kPa	58	47.4	58.9	2.5303	46	0	46.0	--
Summer period	kPa	58	79.6	88.3	2.1292	75	0	75.0	--
Winter period									
DISTILLATION:									
evaporated at 100	%(v/v)	58	4.6	16.3	2.3261	0	18	--	18.0
evaporated at 150	%(v/v)	58	29.7	44.1	2.9317	0	42	--	42.0
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	58	0.6	1	0.0911	0	1	--	1.0
aromatics	%(v/v)	58	0.16	2.31	0.5212	0	2.7	--	2.7
benzene	%(m/m)	58							
OXYGEN CONTENT									
OXYGENATES:									
Methanol	%(v/v)	58	0	0	0	0	3	--	3
Ethanol	%(v/v)	58	0	0.1	0.013	0	5	--	5
Iso-propyl alcohol	%(v/v)	58	0	0	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	58	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	58	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	58	0.8	12.8	2.6504	0	15	--	15
Other oxygenates	%(v/v)	58	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	58	1.7	37.7	6.2391	0	150	--	150
LEAD CONTENT	g/l	58	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:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade** Super 95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	114	94.3	97.5		95	--
MOTOR OCTANE NO.	--	114	85.8	87.2		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	56	0	62.3			60
Winter period	kPa						--
DISTILLATION:							
evaporated at 100	%(v/v)	114	47	58.9		46.0	--
evaporated at 150	%(v/v)	114	77.2	88.3		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	114	4.6	16.3			18.0
aromatics	%(v/v)	114	29.7	44.1			42.0
benzene	%(v/v)	114	0.5	1			1.0
OXYGEN CONTENT	%(m/m)	114	0.11	2.31			2.7
OXYGENATES:							
Methanol	%(v/v)	114	0	0			3
Ethanol	%(v/v)	114	0	0.1			5
Iso-propyl alcohol	%(v/v)	114	0	0			10
Tetra-butyl alcohol	%(v/v)	114	0	0			7
Iso-butyl alcohol	%(v/v)	114	0	0			10
Ethers with 5 or more C atoms per molecule	%(v/v)	114	0.6	12.8			15
Other oxygenates	%(v/v)	114	0	0			10
SULPHUR CONTENT	mg/kg	114	1.7	69.3			150
LEAD CONTENT	g/l	114	0	0			0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovakia  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade Super Plus 98

PARAMETER	Unit	Number of Samples	National Specification			EC Limit values		
			Min.	Max.	Mean	Standard deviation	Min.	Max.
RESEARCH OCTANE NO.	--	3	98.3	100	99.4	0.8014	95	--
MOTOR OCTANE NO.	--	3	89.2	90.2	89.9	0.4714	85	--
VAPOUR PRESSURE, DVPE								
Summer + Winter period	kPa	3	51.6	58.4	55.5	2.8647	0	60
Summer period	kPa	3	48.9	58.7	54.5	4.1215	0	60
Winter period	kPa	3	78.9	87.6	83.3	3.5518	0	--
DISTILLATION:								
evaporated at 100	%(v/v)	3	2.1	8	4.5	2.5171	0	18.0
evaporated at 150	%(v/v)	3	35.1	42	38.7	2.8249	0	42.0
HYDROCARBON ANALYSIS:								
olefins	%(v/v)	3	0.4	0.7	0.5	0.1247	0	1.0
aromatics	%(v/v)	3	2.02	2.34	2.2	0.1347	0	2.7
benzene	%(v/v)	3	0	0	0	0	0	3
OXYGEN CONTENT								
Methanol	%(v/v)	3	0	0	0	0	0	5
Ethanol	%(v/v)	3	0	0	0	0	0	10
Iso-propyl alcohol	%(v/v)	3	0	0	0	0	0	7
Tetra-butyl alcohol	%(v/v)	3	0	0	0	0	0	10
Iso-butyl alcohol	%(v/v)	3	11.4	13.1	12.4	0.7257	0	15
Ethers with 5 or more C atoms per molecule	%(v/v)	3	0	0	0	0	0	10
Other oxygenates	%(v/v)	3	0	0	0	0	0	10
SULPHUR CONTENT	mg/kg	3	2.2	3.8	2.9	0.6332	0	150
LEAD CONTENT	g/l	3	0	0	0	0	0	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Slovakia  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** Super Plus 98

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values			
			Min.	Max.	Mean		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	7	98	99.7	98.6	0.6478	98	0	95	--
MOTOR OCTANE NO.	--	7	89	90	89.4	0.3283	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	60	--	60
Summer + Winter period	kPa	7	48	59.3	53.5	3.6148	46	0	46.0	--
Summer period	kPa	7	77.3	87.9	81.7	3.3611	75	0	75.0	--
Winter period										
DISTILLATION:										
evaporated at 100	%(v/v)	7	2.2	8.5	3.9	2.0284	0	18	--	18.0
evaporated at 150	%(v/v)	7	33	40.9	36.1	2.4575	0	42	--	42.0
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	0.3	0.7	0.4	0.1161	0	1	--	1.0
aromatics	%(v/v)	7	1.66	2.55	2.04	0.277	0	2.7	--	2.7
benzene	%(m/m)	7								
OXYGEN CONTENT										
OXYGENATES:										
Methanol	%(v/v)	7	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	7	0	0.1	0	0.0452	0	5	--	5
Iso-propyl alcohol	%(v/v)	7	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	7	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	7	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	9.3	14	11.3	1.4598	0	15	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	7	0.8	5.6	3.5	1.8288	0	150	--	150
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:** Slovakia  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** Super Plus 98

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	EC Limit values		
			Min.	Max.	Mean		Min.	Max.	Min.
RESEARCH OCTANE NO.	--	10	98	100	98.8			95	--
MOTOR OCTANE NO.	--	10	89	90.2	89.6			85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa	3	0	58.4	55.5			--	60
Summer period	kPa							--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	10	48	59.3	53.8			46.0	--
evaporated at 150	%(v/v)	10	77.3	87.9	82.2			75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	10	2.1	8.5	4.1			--	18.0
aromatics	%(v/v)	10	33	42	36.9			--	42.0
benzene	%(v/v)	10	0.3	0.7	0.4			--	1.0
OXYGEN CONTENT	%(m/m)	10	1.66	2.55	2.1			--	2.7
OXYGENATES:									
Methanol	%(v/v)	10	0	0	0			--	3
Ethanol	%(v/v)	10	0	0.1	0			--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0			--	10
Tetra-butyl alcohol	%(v/v)	10	0	0	0			--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0			--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	9.3	14	11.6			--	15
Other oxygenates	%(v/v)	3	0	0	0			--	10
SULPHUR CONTENT	mg/kg	10	0.8	5.6	3.3			--	150
LEAD CONTENT	g/l	10	0	0	0			--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Slovenia

Year: 2004

Period: Full-year

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	97	95	100	0.9	95	0	95	--
MOTOR OCTANE NO.	--	97	85.2	90.5	1	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	52	53.6	74.5	4.2	0	60	--	60
Summer + Winter period	kPa								
Summer period	kPa								60
Winter period	kPa								--
DISTILLATION:									
evaporated at 100	%(v/v)	97	42.3	65.6	4.7	46	0	46.0	--
evaporated at 150	%(v/v)	97	79.4	93.4	2.9	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	97	0.7	17.4	2.8	0	18	--	18.0
aromatics	%(v/v)	97	24.1	40.2	3.36	0	42	--	42.0
benzene	%(v/v)	97	0.44	1	0.09	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	97	0.03	2.64	0.49	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	97	0.2	0.2	0	0	3	--	3
Ethanol	%(v/v)	97	0.2	0.2	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	97	0.2	0.2	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	97	0.2	0.2	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	97	0.2	0.2	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	97	0.2	14.5	2.61	0	15	--	15
Other oxygenates	%(v/v)	97	0.2	0.2	0	0	10	--	10
SULPHUR CONTENT	mg/kg	97	10	100	20	0	150	--	150
LEAD CONTENT	g/l	97	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: Slovenia

Year: 2004

Period: Full-year

FuelID: Unleaded petrol RON > 98

National Fuel Grade Unleaded petrol NMB 98 SUPER +

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	97.6	100	0.9	95	0	95	--
MOTOR OCTANE NO.	--	12	88	90.7	2.7	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	6	56.5	63.6	3	0	60	--	60
Summer + Winter period	kPa								
Summer period	kPa								
Winter period	kPa								
DISTILLATION:	%(v/v)	12	47.7	56.9	4.2	46	0	46.0	--
evaporated at 100	%(v/v)	12	82.6	88.2	1.7	75	0	75.0	--
evaporated at 150									
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	12	0.5	8.3	3.2	0	18	--	18.0
aromatics	%(v/v)	12	28	39.2	3.4	0	42	--	42.0
benzene	%(v/v)	12	33	1	0.23	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	1.91	2.68	0.21	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	12	0.2	0.2	0	3	0	--	3
Ethanol	%(v/v)	12	0.2	0.2	0	5	0	--	5
Iso-propyl alcohol	%(v/v)	12	0.2	0.2	0	10	0	--	10
Tetra-butyl alcohol	%(v/v)	12	0.2	0.2	0	7	0	--	7
Iso-butyl alcohol	%(v/v)	12	0.2	0.2	0	10	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	10.5	15	1.2	15	0	--	15
Other oxygenates	%(v/v)	12	0.2	0.2	0	10	0	--	10
SULPHUR CONTENT	mg/kg	12	12	10	11	3	150	--	150
LEAD CONTENT	g/l	12	1	1	0	0	0.005	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Spain  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	99	95	96.9	0.6	95	0	95	--
MOTOR OCTANE NO.	--	99	85	86.5	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa	99	45.1	59.9	3.4	45	60	--	60
Summer + Winter period	kPa	99	46	61.3	5.1	46	71	46.0	--
Summer period	kPa	99	77.6	94.3	3.1	75	0	75.0	--
Winter period									
DISTILLATION:									
evaporated at 100	%(v/v)	99	5.6	17.6	3	0	18	--	18.0
evaporated at 150	%(v/v)	99	22.1	41.9	5.2	0	42	--	42.0
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	99	0.5	1	0.1	0	1	--	1.0
aromatics	%(v/v)	99	0	2.6	0.6	0	2.7	--	2.7
benzene	%(v/v)	99	0	0	0	0	0	--	0
OXYGEN CONTENT	%(m/m)	99	0	0	0	0	0	--	0
OXYGENATES:									
Methanol	%(v/v)	99	0	0	0	0	3	--	3
Ethanol	%(v/v)	99	0	0.5	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	99	0	0.1	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	99	0	0.2	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	0
Ethers with 5 or more C atoms per molecule	%(v/v)	99	0	14.7	3.3	0	15	--	15
Other oxygenates	%(v/v)	99	0	0.2	0	0	10	--	10
SULPHUR CONTENT	mg/kg	99	40	149	23	0	150	--	150
LEAD CONTENT	g/l	99	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:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	National Specification			EC Limit values		
			Min.	Max.	Mean	Standard deviation	Min.	Max.
RESEARCH OCTANE NO.	--	158	95	96.9	96	0.6	95	--
MOTOR OCTANE NO.	--	158	85	88	85.3	0.3	85	--
VAPOUR PRESSURE, DVPE								
Summer + Winter period	kPa							60
Summer period	kPa	0	0	0	0	0	0	60
Winter period	kPa							--
DISTILLATION:								
evaporated at 100	%(v/v)	158	46.1	71	55.9	5.2	46.0	--
evaporated at 150	%(v/v)	158	82.2	95.8	91	3	75.0	--
HYDROCARBON ANALYSIS:								
olefins	%(v/v)	158	4.1	17.9	12.1	3.5	0	18.0
aromatics	%(v/v)	158	9.8	41.8	31.9	5.7	0	42.0
benzene	%(v/v)	158	0.2	1	0.7	0.2	0	1.0
OXYGEN CONTENT	%(m/m)	158	0	2.5	0.6	0.5	0	2.7
OXYGENATES:								
Methanol	%(v/v)	158	0	0	0	0	0	3
Ethanol	%(v/v)	158	0	0.3	0	0.1	0	5
Iso-propyl alcohol	%(v/v)	158	0	0.3	0	0	0	10
Tetra-butyl alcohol	%(v/v)	158	0	0.2	0	0	0	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10
Ethers with 5 or more C atoms per molecule	%(v/v)	158	0	13.9	3.6	3.1	0	15
Other oxygenates	%(v/v)	158	0	0.3	0	0.1	0	10
SULPHUR CONTENT	mg/kg	158	10	150	96	41	0	150
LEAD CONTENT	g/l	158	0.001	0.001	0.001	0.001	0	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Spain  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol min. RON=95  
**National Fuel Grade:** GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	257	95	96.9		95	--
MOTOR OCTANE NO.	--	257	85	88		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	99	0	59.9		--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	257	46	71		46.0	--
evaporated at 150	%(v/v)	257	77.6	95.8		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	257	4.1	17.9		--	18.0
aromatics	%(v/v)	257	9.8	41.9		--	42.0
benzene	%(v/v)	257	0.2	1		--	1.0
OXYGEN CONTENT	%(m/m)	257	0	2.6		--	2.7
OXYGENATES:							
Methanol	%(v/v)	257	0	0		--	3
Ethanol	%(v/v)	257	0	0.5		--	5
Iso-propyl alcohol	%(v/v)	257	0	0.3		--	10
Tetra-butyl alcohol	%(v/v)	257	0	0.2		--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	257	0	14.7		--	15
Other oxygenates	%(v/v)	257	0	0.3		--	10
SULPHUR CONTENT	mg/kg	257	10	150		--	150
LEAD CONTENT	g/l	257	0.001	0.001		--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** Spain  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade:** GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation		National Specification		EC Limit values	
							Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	70	97	99.5	97.5	0.4	95	0	95	--	
MOTOR OCTANE NO.	--	70	86	87.9	86.6	0.5	85	0	85	--	
VAPOUR PRESSURE, DVPE	kPa	70	45	60	55.8	4.3	45	60	--	60	
Summer + Winter period	kPa	70	46.3	59.9	52.7	3.3	46	71	--	60	
Summer period	kPa	70	82.8	93.8	88.8	2.9	75	0	46.0	--	
Winter period	kPa	70	6.2	17.5	11.8	3	0	18	75.0	--	
DISTILLATION:	%(v/v)	70	20.6	41.3	34.4	4.6	0	42	--	18.0	
evaporated at 100	%(v/v)	70	0.6	1	0.8	0.1	0	1	--	42.0	
evaporated at 150	%(v/v)	70	0.3	2.5	1.3	0.5	0	2.7	--	1.0	
HYDROCARBON ANALYSIS:	%(m/m)	70	0.3	2.5	1.3	0.5	0	2.7	--	2.7	
olefins	%(v/v)	70	0	0.1	0	0	0	0	--	3	
aromatics	%(v/v)	70	0	0.5	0.1	0.2	0	0	--	5	
benzene	%(v/v)	70	0	0.1	0	0	0	0	--	10	
OXYGEN CONTENT	%(v/v)	70	0	0.3	0.1	0.1	0	0	--	7	
OXYGENATES:	%(v/v)	0	0	0	0	0	0	0	--	10	
Methanol	%(v/v)	70	1.4	14.9	7.9	3.3	0	15	--	15	
Ethanol	%(v/v)	70	0	0.2	0	0	0	0	--	10	
Iso-propyl alcohol	%(v/v)	70	30	142	106	27	0	150	--	150	
Tetra-butyl alcohol	%(v/v)	70	0.001	0.001	0.001	0	0	0.005	--	0.005	
Iso-butyl alcohol	%(v/v)	70	0	0.2	0	0	0	0	--	10	
Ethers with 5 or more C atoms per molecule	%(v/v)	70	0	0.2	0	0	0	0	--	10	
Other oxygenates	%(v/v)	70	0	0.2	0	0	0	0	--	10	
SULPHUR CONTENT	mg/kg	70	30	142	106	27	0	150	--	150	
LEAD CONTENT	g/l	70	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:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade:** GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	Min.		Mean	Standard deviation		National Specification		EC Limit values	
							Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	129	97	99.4	97.6	0.5	95	0	95	--	
MOTOR OCTANE NO.	--	129	85	88	86	0.6	85	0	85	--	
VAPOUR PRESSURE, DVPE	kPa	0	0	0	0	0	0	0	--	60	
Summer + Winter period	kPa								--	60	
Summer period	kPa								--	--	
Winter period	kPa								--	--	
DISTILLATION:											
evaporated at 100	%(v/v)	129	46.4	66.6	55.2	4.2	46	71	46.0	--	
evaporated at 150	%(v/v)	129	82.4	95.4	90.7	2.9	75	0	75.0	--	
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	129	4.1	17.9	12.4	3.5	0	18	--	18.0	
aromatics	%(v/v)	129	18.3	42	34.1	5.6	0	42	--	42.0	
benzene	%(v/v)	129	0.2	1	0.7	0.2	0	1	--	1.0	
OXYGEN CONTENT	%(m/m)	129	0	2.5	1.2	0.6	0	2.7	--	2.7	
OXYGENATES:											
Methanol	%(v/v)	129	0	0	0	0	0	0	--	3	
Ethanol	%(v/v)	129	0	0.5	0.1	0.1	0	0	--	5	
Iso-propyl alcohol	%(v/v)	129	0	0	0	0	0	0	--	10	
Tetro-butyl alcohol	%(v/v)	129	0	0.3	0.1	0.1	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)	129	0.1	14.7	7.1	3.5	0	15	--	15	
Other oxygenates	%(v/v)	129	0	0.4	0	0.1	0	0	--	10	
SULPHUR CONTENT	mg/kg	129	10	150	107	35	0	150	--	150	
LEAD CONTENT	g/l	129	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:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol 95 =< RON < 98  
**National Fuel Grade:** GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	199	97	99.5		95	--
MOTOR OCTANE NO.	--	199	85	88		85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	70	0	60		--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	199	46.3	66.6		46.0	--
evaporated at 150	%(v/v)	199	82.4	95.4		75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	199	4.1	17.9		--	18.0
aromatics	%(v/v)	199	18.3	42		--	42.0
benzene	%(v/v)	199	0.2	1		--	1.0
OXYGEN CONTENT	%(m/m)	199	0	2.5		--	2.7
OXYGENATES:							
Methanol	%(v/v)	199	0	0.1		--	3
Ethanol	%(v/v)	199	0	0.5		--	5
Iso-propyl alcohol	%(v/v)	199	0	0.1		--	10
Tetra-butyl alcohol	%(v/v)	199	0	0.3		--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	199	0.1	14.9		--	15
Other oxygenates	%(v/v)	199	0	0.4		--	10
SULPHUR CONTENT	mg/kg	199	10	150		--	150
LEAD CONTENT	g/l	199	0.001	0.001		--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Spain  
 Year: 2004  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98  
 National Fuel Grade GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	93	98	100	0.5	95	0	95	--
MOTOR OCTANE NO.	--	93	87.1	88.8	0.2	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period	kPa	93	45	60	4.4	45	60	--	60
Summer period	kPa							--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	93	46.3	59.3	3.3	46	71	46.0	--
evaporated at 150	%(v/v)	93	79.1	94.6	3.1	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	93	5	17.9	2.7	0	18	--	18.0
aromatics	%(v/v)	93	13.7	41.9	6.1	0	42	--	42.0
benzene	%(v/v)	93	0.5	1	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	93	0.9	2.6	0.4	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	93	0	0	0	0	3	--	3
Ethanol	%(v/v)	93	0	1	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	93	0	0.4	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	93	0	0.5	0.1	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	93	5.1	15	2.4	0	15	--	15
Other oxygenates	%(v/v)	93	0	0.3	0.1	0	10	--	10
SULPHUR CONTENT	mg/kg	93	10	150	31	0	150	--	150
LEAD CONTENT	g/l	93	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:** 2004  
**Period:** Winter  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	152	98	99.8	0.5	95	0	95	--
MOTOR OCTANE NO.	--	152	86.7	89	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa								60
Summer period	kPa	0	0	0	0	0	0	--	60
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	152	46	63.7	3.5	46	71	46.0	--
evaporated at 150	%(v/v)	152	80.2	96.2	3.3	75	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	152	0.5	17.7	3.9	0	18	--	18.0
aromatics	%(v/v)	152	20.4	41.9	6.1	0	42	--	42.0
benzene	%(v/v)	152	0.2	1	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	152	0.1	2.6	0.5	0	2.7	--	2.7
OXYGENATES:									
Methanol	%(v/v)	152	0	0.2	0	0	3	--	3
Ethanol	%(v/v)	152	0	1	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	152	0	0.2	0	0	10	--	10
Tetra-butyl alcohol	%(v/v)	152	0	0.4	0.1	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	152	0.7	15	3	0	15	--	15
Other oxygenates	%(v/v)	152	0	0.6	0.1	0	10	--	10
SULPHUR CONTENT	mg/kg	152	10	150	40	0	150	--	150
LEAD CONTENT	g/l	152	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:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol RON > 98  
**National Fuel Grade:** GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	EC Limit values	
			Min.	Max.		Min.	Max.
RESEARCH OCTANE NO.	--	245	98	100	98.8	95	--
MOTOR OCTANE NO.	--	245	86.7	89	87.6	85	--
VAPOUR PRESSURE, DVPE							
Summer + Winter period	kPa						60
Summer period	kPa	93	0	60	55.5	--	60
Winter period	kPa					--	--
DISTILLATION:							
evaporated at 100	%(v/v)	245	46	63.7	53.8	46.0	--
evaporated at 150	%(v/v)	245	79.1	96.2	89.6	75.0	--
HYDROCARBON ANALYSIS:							
olefins	%(v/v)	245	0.5	17.9	11.1	--	18.0
aromatics	%(v/v)	245	13.7	41.9	33.5	--	42.0
benzene	%(v/v)	245	0.2	1	0.6	--	1.0
OXYGEN CONTENT	%(m/m)	245	0.1	2.6	1.8	--	2.7
OXYGENATES:							
Methanol	%(v/v)	245	0	0.2	0	--	3
Ethanol	%(v/v)	245	0	1	0.2	--	5
Iso-propyl alcohol	%(v/v)	245	0	0.4	0	--	10
Tetra-butyl alcohol	%(v/v)	245	0	0.5	0.1	--	7
Iso-butyl alcohol	%(v/v)	0	0	0		--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	245	0.7	15	10.7	--	15
Other oxygenates	%(v/v)	245	0	0.6	0	--	10
SULPHUR CONTENT	mg/kg	245	10	150	93.4	--	150
LEAD CONTENT	g/l	245	0.001	0.001	0	--	0.005

Notes:

## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden

Year: 2004

Period: Full-year

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Unleaded 95, class 1

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	720	95	97.3	0	95.4	0	95	--
MOTOR OCTANE NO.	--	720	85	87.5	0	95.3	0	85	--
VAPOUR PRESSURE, DVPE	kPa								
Summer + Winter period	kPa	358	54.5	70	0	62.7	0	--	70
Summer period	kPa							--	70
Winter period	kPa							--	--
DISTILLATION:									
evaporated at 100	%(v/v)	720	47	64	0	54.3	0	46.0	--
evaporated at 150	%(v/v)	720	75	98	0	88.5	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	720	0.3	13	0	6.4	0	--	18.0
aromatics	%(v/v)	720	25.4	42	0	35.4	0	--	42.0
benzene	%(v/v)	720	0.3	1	0	0.73	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	720	0	5	0	4.2	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	720	0	6.7	0	1	0	--	15
Other oxygenates	%(v/v)	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	720	0.1	46	0	10	0	--	150
LEAD CONTENT	g/l	720	0	0.003	0	0.002	0	--	0.005

Notes:

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## Market Fuels used in vehicles with spark ignition engines (Petrol)

Country: Sweden

Year: 2004

Period: Full-year

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade Unleaded gasoline, 98, class 1

PARAMETER	Unit	Number of Samples	National Specification			Standard deviation	National Specification			EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.	
RESEARCH OCTANE NO.	--	150	98	100.2	98.5	0	98	0	95	--	--
MOTOR OCTANE NO.	--	150	87.5	88.9	87.7	0	87	0	85	--	--
VAPOUR PRESSURE, DVPE	kPa										
Summer + Winter period	kPa	91	62	70	67.7	0	0	70	--	70	
Summer period	kPa								--	70	
Winter period	kPa								--	--	
DISTILLATION:											
evaporated at 100	%(v/v)	150	48	66	54.6	0	47	0	46.0	--	--
evaporated at 150	%(v/v)	150	79.2	95.8	88	0	0	0	75.0	--	--
HYDROCARBON ANALYSIS:											
olefins	%(v/v)	150	0.3	13	5.5	0	0	13	--	18.0	
aromatics	%(v/v)	150	26.1	42	36.5	0	0	0	--	42.0	
benzene	%(v/v)	150	0.2	1	0.69	0	0	0	--	1.0	
OXYGEN CONTENT	%(m/m)	150	0	2.7	1.5	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	
Tetra-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)	150	0	14.8	8.5	0	0	0	--	15	
Other oxygenates	%(v/v)	0	0	0	0	0	0	0	--	10	
SULPHUR CONTENT	mg/kg	150	0.1	26	3.7	0	0	0	--	150	
LEAD CONTENT	g/l	150	0	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: UK

Year: 2004

Period: Full-year

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Premium Unleaded

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2493	94.6	98	0.7	0	0	95	--
MOTOR OCTANE NO.	--	2493	84.5	87.5	0.5	0	0	85	--
VAPOUR PRESSURE, DVPE									
Summer + Winter period	kPa	0	0	0	0	0	0	--	70
Summer period	kPa	919	5	71.7	2.1	0	70	--	70
Winter period	kPa	0	0	0	0	0	0	--	--
DISTILLATION:									
evaporated at 100	%(v/v)	2467	46	69	2.9	0	0	46.0	--
evaporated at 150	%(v/v)	2200	76	99	2	0	0	75.0	--
HYDROCARBON ANALYSIS:									
olefins	%(v/v)	2493	1	20.6	2	0	0	--	18.0
aromatics	%(v/v)	2493	14	36.6	2.4	0	0	--	42.0
benzene	%(v/v)	2493	0.1	1.1	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	793	0	1.9	0.1	0	0	--	2.7
OXYGENATES:									
Methanol	%(v/v)	52	0	0	0	0	0	--	3
Ethanol	%(v/v)	52	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	52	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	52	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	52	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	968	0	10	0.8	0	0	--	15
Other oxygenates	%(v/v)	52	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	2493	1.6	55	7.4	0	0	--	150
LEAD CONTENT	g/l	209	0	0	0	0	0	--	0.005

Notes:

0

## Market Fuels used in vehicles with spark ignition engines (Petrol)

**Country:** UK  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphur  
**National Fuel Grade** Super Unleaded and Lead Replacement Petrol

PARAMETER	Unit	Number of Samples	National Specification		Standard deviation	National Specification		EC Limit values	
			Min.	Max.		Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	344	96.6	98.2	0.3	97	0	95	--
MOTOR OCTANE NO.	--	344	85.5	88.3	0.4	86	0	85	--
VAPOUR PRESSURE, DVPE	kPa								70
Summer + Winter period	kPa	119	60	70.9	2.2	0	0	--	70
Summer period	kPa							--	--
Winter period	kPa							--	--
DISTILLATION:	%(v/v)	266	46	68	3.5	0	0	46.0	--
evaporated at 100	%(v/v)	312	81	97	2.5	0	0	75.0	--
evaporated at 150	%(v/v)								
HYDROCARBON ANALYSIS:	%(v/v)	284	2	20	3.2	0	0	--	18.0
olefins	%(v/v)	284	18	36.6	2.8	0	0	--	42.0
aromatics	%(v/v)	282	0.2	1.1	0.2	0	0	--	1.0
benzene	%(m/m)	81	0	1.7	0.3	0	0	--	2.7
OXYGEN CONTENT	%(v/v)	54	0	0	0	0	0	--	3
OXYGENATES:	%(v/v)	54	0	0	0	0	0	--	5
Methanol	%(v/v)	54	0	0	0	0	0	--	10
Ethanol	%(v/v)	54	0	0	0	0	0	--	7
Iso-propyl alcohol	%(v/v)	54	0	0	0	0	0	--	10
Tetra-butyl alcohol	%(v/v)	54	0	0	0	0	0	--	15
Iso-butyl alcohol	%(v/v)	186	0	12	2	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	--	10
Other oxygenates	mg/kg	344	3	52	11.3	0	0	--	150
SULPHUR CONTENT	g/l	25	0	0	0	0	0	--	0.005
LEAD CONTENT									

Notes:

0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Austria  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	14.260097	0	0	0	--	350	

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Austria  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade:

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	14.260097	0	0	0	--	350	

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Austria  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Mean			Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	50.1	59.2	53.656	1.850269978	51	0	51	--
DENSITY AT 15 C	kg/m3	100	820.6	837.4	830.121	3.399533391	820	845	--	845
DISTILLATION - 95 oC POIN	oC	100	327.3	361	345.328	5.512741531	0	360	--	360
PAHs	%(m/m)	100	1.4	5.7	2.767	1.047850614	0	11	--	11
SULPHUR CONTENT	mg/kg	100	3.486648687	266.7097908	14.260097	30.05222389	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Belgium  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: diesel 50 s

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	3445	33.35	68.44	52.69	1.7179	51	0	51	--
DENSITY AT 15 C	kg/m3	5043	820.7	847	832	3.56	0	845	--	845
DISTILLATION - 95 oC POIN	oC	3419	249.6	363.3	346.3	9.5219	0	360	--	360
PAHs	%(m/m)	3442	0	9.6	0	0	0	11	--	11
SULPHUR CONTENT	mg/kg	4937	5	120	39.64	9.7	0	50	--	350

**Notes:** The limit of detection for PAH is 0.1%(m/m), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). Il n'y a pas de valeurs pour la moyenne et l'écart type pour le paramètre aromatique polycycliques car de nombreux échantillons ont une valeur imprécise inférieure à 0.1 % pour le minimum.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Cyprus

Year: 2004

Period: Full-year

FuelID: Diesel fuel

National Fuel Grade: DIESEL 350 ppm SULPHUR (EURODIESEL 0,035%)

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	57.4			55.6	Min.	Max.	Min.
CETANE NUMBER	--	6	52	57.4	55.6	2	51	0	51	--
DENSITY AT 15 C	kg/m3	28	826.5	844	836.8	4.9	820	845	--	845
DISTILLATION - 95 oC POIN	oC	15	347	360	355.5	4.4	0	360	--	360
PAHs	%(m/m)	5	3.9	5.2	4.3	0.6	0	11	--	11
SULPHUR CONTENT	mg/kg	63	20	350	196.5	99.7	0	350	--	350

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Czech Republic

Year: 2004

Period: Full-year

FuelID: Diesel fuel

National Fuel Grade: Motorová nafta

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Mean			Min.	Max.	Min.	Max.
CETANE NUMBER	--	517	46.9	58.6	53.5	1.5	0	0	51	--
DENSITY AT 15 C	kg/m3	700	807	846	836	5	0	0	--	845
DISTILLATION - 95 oC POIN	oC	700	317.8	399.3	349.5	8.4	0	0	--	360
PAHs	%(m/m)	700	1.4	8.6	3.7	1.5	0	0	--	11
SULPHUR CONTENT	mg/kg	700	75	1714	237.7	158.2	0	0	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Denmark  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Low sulphur

PARAMETER	Unit	Number of Samples	Number of		Mean	Standard deviation	National Specifications		EC Limit values	
			Min.	Max.			Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	50.9	55.8	52.7	1.2	0	0	51	--
DENSITY AT 15 C	kg/m3	20	833	844	840	3	0	0	--	845
DISTILLATION - 95 oC POIN	oC	20	338	355	350	4	0	0	--	360
PAHs	%(m/m)	20	0.8	3	1.7	0.7	0	0	--	11
SULPHUR CONTENT	mg/kg	20	21	45	35	7	0	0	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2004  
 Period: Summer  
 FuelID: Diesel fuel  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples	Number of			Mean	Standard deviation	National Specifications		EC Limit values	
			Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	5	51.8	53.4	52.4	0.6	51	0	51	--	
DENSITY AT 15 C	kg/m3	34	820	843	837	4	820	0	--	845	
DISTILLATION - 95 oC POIN	oC	3	344	350	347	3	0	0	--	360	
PAHs	%(m/m)	3	3.4	3.6	3.5	0.1	0	0	--	11	
SULPHUR CONTENT	mg/kg	321	17	789	198	113	0	0	--	350	

Notes: Standard deviation (SD)=SQRT VAR. VAR= 1/(n-1) SUM (x(i)-x(aver))E2

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2004  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples	Number of			Mean	Standard deviation	National Specifications		EC Limit values	
			Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	17	48.2	52.5	50.3	1.2	49	0	51	--	
DENSITY AT 15 C	kg/m3	25	823	840	830	6	820	0	--	845	
DISTILLATION - 95 oC POIN	oC	5	349	356	352	3	0	0	--	360	
PAHs	%(m/m)	3	2.3	3.9	3.1	0.8	0	0	--	11	
SULPHUR CONTENT	mg/kg	264	9	963	175	156	0	0	--	350	

Notes: cetane no for winter diesel must be according to national Standard EVS-EN 590:2004 Class 1 minimum value 49,0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Min.	Max.	Mean		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	22	48.2	53.4	50.8				51	--	--
DENSITY AT 15 C	kg/m3	59	820	843	834				--	--	845
DISTILLATION - 95 oC POIN	oC	8	344	356	350.1				--	--	360
PAHs	%(m/m)	6	2.3	3.9	3.3				--	--	11
SULPHUR CONTENT	mg/kg	585	9	963	187.6				--	--	350

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland

Year: 2004

Period: Summer

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel fuel (max. 50 mg/kg) summer period from 1st Jun

PARAMETER	Unit	Number of Samples	Standard deviation			National Specifications			EC Limit values		
			Min.	Max.	Mean	Min.	Max.	Min.	Max.	Min.	Max.
CETANE NUMBER	--	23	51.8	58.1	56.9	1.8	0	0	51	--	--
DENSITY AT 15 C	kg/m3	53	830	840	838	4	0	0	--	--	845
DISTILLATION - 95 oC POIN	oC	53	343.9	359.1	353	3.5	0	0	--	--	360
PAHs	%(m/m)	53	0.8	2.4	1.4	0.3	0	0	--	--	11
SULPHUR CONTENT	mg/kg	53	1.9	30.2	6.5	6.2	0	50	--	--	350

### Notes:

FN 9: The distillation points have been calculated according to the standard EN ISO 3405. In the 2003 report R value of 95-%-point was 8,0.FN 10: The R value used by the Customs Laboratory is 6,7 and the maximum tolerance limit is 54,0. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2004  
 Period: Winter

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel fuel (max. 50 mg/kg) winter period from 1st Septe

PARAMETER	Unit	Number of Samples	Standard deviation			National Specifications			EC Limit values		
			Min.	Max.	Mean	Min.	Max.	Min.	Max.	Min.	Max.
CETANE NUMBER	--	33	50.8	57.8	53.7	1.9	0	0	51	--	--
DENSITY AT 15 C	kg/m3	50	810	840	827	8	0	0	--	--	845
DISTILLATION - 95 oC POIN	oC	46	291.6	352.6	324.3	21	0	0	--	--	360
PAHs	%(m/m)	46	0.5	3.1	1.2	0.5	0	0	--	--	11
SULPHUR CONTENT	mg/kg	50	1.6	35.2	6.8	6.8	0	50	--	--	350

### Notes:

FN 9: The distillation points have been calculated according the standard EN ISO 3405. In the 2003 report R value of 95-%-point was 8,0.FN 10: The R value used by the Customs Laboratory is 6,7 and the maximum tolerance limit is 54,0. The values have been calculated according to EN ISO 20846, which is the method to be used by the Laboratory as from year 2004. The old standard EN ISO 8754 gives irrational R values. FN 11: The lowest cetane number 50,8 is below the limit value 51,0 but within the allowed tolerance limit 48,4.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland

Year: 2004

Period: Full-year

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel fuel (max. 50 mg/kg) winter period from 1st Septe

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Min.	Max.	Mean		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	56	50.8	58.1	55				51	--	--
DENSITY AT 15 C	kg/m3	103	810	840	832.7				--	--	845
DISTILLATION - 95 oC POIN	oC	99	291.6	359.1	339.7				--	--	360
PAHs	%(m/m)	99	0.5	3.1	1.3				--	--	11
SULPHUR CONTENT	mg/kg	103	1.6	35.2	6.6				--	--	350

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Germany  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Dieselkraftstoff schwefelfrei 10ppm

PARAMETER	Unit	Number of Samples			Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
		Unit	Number of Samples	Min.					Max.	Min.	Max.	Min.
CETANE NUMBER	--		211	49.1	65.3	53.56739336	1.926679848	0	0	51	--	
DENSITY AT 15 C	kg/m3		212	824.2	843.4	834.8245283	5.15	0	0	--	845	
DISTILLATION - 95 oC POIN	oC		212	318.6	362.5	345.5038679	9.6	0	0	--	360	
PAHs	%(m/m)		178	1	5.3	2.856853933	1.1	0	0	--	11	
SULPHUR CONTENT	mg/kg		212	1	48	7.379811321	11.8	0	50	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Greece  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	283.07246	0	0	0	--	350	

**Notes:**

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Greece  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	283.07246	0	0	0	--	350	

**Notes:**

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Automotive Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	138	51	61	55.18695652	1.938500666	51	0	51	--
DENSITY AT 15 C	kg/m3	138	822	844.7	836.242029	5.063290116	0	845	--	845
DISTILLATION - 95 oC POIN	oC	127	302.1	365	356.4669291	7.325136708	0	360	--	360
PAHs	%(m/m)	103	1	5.8	4.12038835	1.282564773	0	11	--	11
SULPHUR CONTENT	mg/kg	138	140	350	283.0724638	46.84555112	0	350	--	350

### Notes:

The deviations that were noticed in sulphur content are due to the fact that 5 samples, taken from the gas stations were found adulterated, as was confirmed by the mark found, with heating gas oil or marine diesel. To the culprits were applied, from the responsible authorities, the penalties foreseen by the relevant national legislation.

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Hungary  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel fuel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	18	51	54.5	52.32	1.09	51	0	51	--
DENSITY AT 15 C	kg/m3	18	830.4	843.7	836.31	3.27	820	845	--	845
DISTILLATION - 95 oC POIN	oC	18	339	356	349.5	4.3	0	360	--	360
PAHs	%(m/m)	18	2	6.6	4.18	1.25	0	11	--	11
SULPHUR CONTENT	mg/kg	18	8.1	50	30.76	9.79	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	18	51	54.5	52.32	1.09	51	0	51	--
DENSITY AT 15 C	kg/m3	18	830.4	843.7	836.31	3.27	820	845	--	845
DISTILLATION - 95 oC POIN	oC	18	339	356	349.5	4.3	0	360	--	360
PAHs	%(m/m)	18	2	6.6	4.18	1.25	0	11	--	11
SULPHUR CONTENT	mg/kg	18	8.1	50	30.76	9.79	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: DERV

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	35	51.9	56.7	53.6	1.3	0	0	51	--
DENSITY AT 15 C	kg/m3	73	827.3	844.7	839.4	4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	72	329.6	367	353.7	7.2	0	0	--	360
PAHs	%(m/m)	73	1.52	9	3.8	1.4	0	0	--	11
SULPHUR CONTENT	mg/kg	73	10	156	32.2	20.2	0	0	--	350

**Notes:** Distillation at 95% Point: 1 sample not sufficient to carry out analyses - hence only 48 samples were analysed. When ISO 4259 criteria of 0.59R is applied the samples are within limits.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2004  
 Period: Summer  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	152	48.6	60	52.7	1.4	51	0	51	--
DENSITY AT 15 C	kg/m3	175	819.7	845.2	835.2	5.2	0	845	--	845
DISTILLATION - 95 oC POIN	oC	175	332	369.6	356.3	5.8	0	360	--	360
PAHs	%(m/m)	43	1.9	6.9	4.3	1.2	0	11	--	11
SULPHUR CONTENT	mg/kg	172	3.2	356	226.3	92.9	0	350	--	350

### 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).

distillation curve. 95% (v/v) recovered point: R=10,0 °C

Mean value for reproducibility was obtained for



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2004  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	73	49	55.6	52.1	1.4	51	0	51	--
DENSITY AT 15 C	kg/m3	94	821.4	844.8	835	5.5	0	845	--	845
DISTILLATION - 95 oC POIN	oC	94	336.9	368	355.3	5.9	0	360	--	360
PAHs	%(m/m)	48	2.2	9.2	5.5	1.7	0	11	--	11
SULPHUR CONTENT	mg/kg	94	3.2	348	198.2	102.1	0	350	--	350

**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).  
 Mean value for reproducibility was obtained for distillation curve. 95% (v/v) recovered point: R=10,0 °C

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Min.	Max.	Mean		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	225	48.6	60	52.5					51	--
DENSITY AT 15 C	kg/m3	269	819.7	845.2	835.1					--	845
DISTILLATION - 95 oC POIN	oC	269	332	369.6	356					--	360
PAHs	%(m/m)	91	1.9	9.2	4.9					--	11
SULPHUR CONTENT	mg/kg	266	3.2	356	216.4					--	350

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	53.3			51.11	Min.	Max.	Min.
CETANE NUMBER	--	239	49	53.3	51.11	0	51	0	51	--
DENSITY AT 15 C	kg/m3	239	828.5	845.9	837.2	0	0	845	--	845
DISTILLATION - 95 oC POIN	oC	239	296	359.2	327.6	0	0	360	--	360
PAHs	%(m/m)	239	2.02	6	4.01	0	0	11	--	11
SULPHUR CONTENT	mg/kg	239	8	650	329	0	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Lithuania  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	160.8732	0	0	0	--	350	

**Notes:**

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Lithuania  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	160.8732	0	0	0	--	350	

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Lithuania  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	51	51	--	--
DENSITY AT 15 C	kg/m3	129	830.8	846.7	842.0806	2.216525	0	0	--	845
DISTILLATION - 95 oC POIN	oC	126	344	360	352.4365	3.416422	0	360	--	360
PAHs	%(m/m)	0	0	0	0	0	0	11	--	11
SULPHUR CONTENT	mg/kg	71	20	340	160.8732	66.6436	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Lithuania  
**Year:** 2004  
**Period:** Winter  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	48	0	51	--	
DENSITY AT 15 C	kg/m3	262	820.9	844.2	833.558	0	7.254313	--	845	
DISTILLATION - 95 oC POIN	oC	233	300	360	333.6438	0	20.96872	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	238	2	350	87.52521	0	85.93957	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Min.	Max.	0		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	0	0	0					51	--	--
DENSITY AT 15 C	kg/m3	391	820.9	846.7	836.4				--	--	845
DISTILLATION - 95 oC POIN	oC	359	300	360	340.2				--	--	360
PAHs	%(m/m)	0	0	0					--	--	11
SULPHUR CONTENT	mg/kg	309	2	350	104.4				--	--	350

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Luxembourg

Year: 2004

Period: Full-year

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Carburant Diesel (teneur en soufre inférieure à 50 mg/kg)

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Mean			Min.	Max.	Min.	Max.
CETANE NUMBER	--	8	51	52.9	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	8	831.4	836.9	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	4	331	333.3	0	0	0	--	360	
PAHs	%(m/m)	4	2.2	3.8	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	8	28	61	0	0	0	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel

National Fuel Grade:

PARAMETER	Unit	Number of Samples	National Specifications			EC Limit values			
			Min.	Max.	Mean	Standard deviation	Min.	Max.	
CETANE NUMBER	--	14	50.1	53.3	51.6			51	--
DENSITY AT 15 C	kg/m3	14	831	839	833.6			--	845
DISTILLATION - 95 oC POIN	oC	7	352.7	362	357.7			--	360
PAHs	%(m/m)	14	3.8	7.3	4.8			--	11
SULPHUR CONTENT	mg/kg	14	220	380	322.1			--	350

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2004  
 Period: Summer  
 FuelID: Diesel fuel  
 National Fuel Grade: N/A

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	5	53.3	50.11	51.592	1.278	46	0	51	--
DENSITY AT 15 C	kg/m3	5	839	831.5	834.92	3.507	0	845	--	845
DISTILLATION - 95 oC POIN	oC	5	362	352.7	357.8	3.601	0	360	--	360
PAHs	%(m/m)	5	6.7	4.8	6	0.822	0	11	--	11
SULPHUR CONTENT	mg/kg	5	330	220	264	43.932	0	350	--	350

**Notes:** \*\*\*Cetane index (ASTM D976) is reported here instead of cetane number. Density at 15degrees Celsius tested using ASTM D4052. Sulphur content tested using ASTM D4294-02.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2004  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: N/A

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	9	50.1	53.16	51.642	0.927	46	0	51	--
DENSITY AT 15 C	kg/m3	9	831	838.1	832.822	2.038	0	845	--	845
DISTILLATION - 95 oC POIN	oC	2	356.6	358	357.3	0.99	0	360	--	360
PAHs	%(m/m)	9	3.8	7.3	4.2	5.4	0	11	--	11
SULPHUR CONTENT	mg/kg	9	320	380	354.444	21.858	0	350	--	350

**Notes:** \*\*\*Cetane index (ASTM D976) is reported here instead of cetane number. Density at 15 degrees Celsius tested using ASTM D4052. Sulphur content tested using ASTM D4294-02.

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Netherlands  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Number of			Mean	Standard deviation	National Specifications		EC Limit values	
			Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	100	48.7	59.1	52.42	1.52	0	0	51	--	
DENSITY AT 15 C	kg/m3	100	820.8	839.7	830.39	0.42	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	100	330	365.8	350.64	3.38	0	0	--	360	
PAHs	%(m/m)	100	2	8	4.08	1.34	0	0	--	11	
SULPHUR CONTENT	mg/kg	100	7.4	75	34.19	13.84	0	0	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Poland  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	157	49.8	56.9	52.401	1.668	51	0	51	--
DENSITY AT 15 C	kg/m3	157	825	844.9	835.514	4.078	0	845	--	845
DISTILLATION - 95 oC POIN	oC	157	336.3	400	350.073	9.65	0	360	--	360
PAHs	%(m/m)	157	0	7	2.46	0.991	0	11	--	11
SULPHUR CONTENT	mg/kg	157	0	2268	124.297	299.706	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Portugal  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Gasóleo

PARAMETER	Unit	Number of Samples			Max.	Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Mean				Min.	Max.	Min.	Max.
CETANE NUMBER	--	24	51	59.3	52.825	2.096840273	51	0	51	--	
DENSITY AT 15 C	kg/m3	24	823	844.1	834.2458333	6.4444679583	820	845	--	845	
DISTILLATION - 95 oC POIN	oC	24	353	360	358.9583333	2.156469874	0	360	--	360	
PAHs	%(m/m)	3	3	6	4.1	1.49	0	11	--	11	
SULPHUR CONTENT	mg/kg	22	36	340	240.5	100.8	0	350	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel

National Fuel Grade:

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Unit	Min.	Max.		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	107	51	55.2	52.9				51	--	--
DENSITY AT 15 C	kg/m3	107	828.3	843.8	836.9				--	--	845
DISTILLATION - 95 oC POIN	oC	107	335.9	359.1	346.3				--	--	360
PAHs	%(m/m)	107	0	5.9	3.8				--	--	11
SULPHUR CONTENT	mg/kg	107	2.9	1167	116.9				--	--	350

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Slovakia  
**Year:** 2004  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:**

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	116.9	0	0	0	--	350	

**Notes:**

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade:

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	116.9	0	0	0	--	350	

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Slovakia  
**Year:** 2004  
**Period:** Summer  
**FuelID:** Diesel fuel  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	51			0.9822	Min.	Max.	Min.
CETANE NUMBER	--	57	55.1	51	52.8	0.9822	51	0	51	--
DENSITY AT 15 C	kg/m3	57	843.8	828.3	839	3.9449	0	845	--	845
DISTILLATION - 95 oC POIN	oC	57	359.1	343.1	348.7	3.7773	0	360	--	360
PAHs	%(m/m)	57	5.9	1.9	4.5	0.8989	0	11	--	11
SULPHUR CONTENT	mg/kg	57	1167	4.5	189.2	160.5787	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2004  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	51			0	Min.	Max.	
CETANE NUMBER	--	50	51.5	55.2	53.1	0.9233	51	0	51	--
DENSITY AT 15 C	kg/m3	50	829.4	842.1	834.4	3.1916	0	845	--	845
DISTILLATION - 95 oC POIN	oC	50	335.9	356.7	343.6	4.8032	0	360	--	360
PAHs	%(m/m)	50	0	4.9	3	0.9813	0	11	--	11
SULPHUR CONTENT	mg/kg	50	2.9	201.6	34.5	49.1024	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovenia  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: EURO DIESEL

PARAMETER	Unit	Number of Samples			Max.	Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	54.1				Min.	Max.	Min.	Max.
CETANE NUMBER	--	113	48.1	54.1	52.3	1	51	0	51	--	
DENSITY AT 15 C	kg/m3	113	824.3	842.6	833.7	3.7	0	845	--	845	
DISTILLATION - 95 oC POIN	oC	113	343.3	364.4	355.1	3.4	0	360	--	360	
PAHs	%(m/m)	113	2.5	7.3	5.3	1.2	0	11	--	11	
SULPHUR CONTENT	mg/kg	113	10	350	236	99	0	350	--	350	

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade:

PARAMETER	Unit	Number of Samples			Mean	Standard deviation		National Specifications		EC Limit values	
		Min.	Max.	Mean		Min.	Max.	Min.	Max.		
CETANE NUMBER	--	276	51	60	52.9					51	--
DENSITY AT 15 C	kg/m3	276	821.6	845	837.1					--	845
DISTILLATION - 95 oC POIN	oC	276	330.3	360	355.1					--	360
PAHs	%(m/m)	276	2.4	7.3	4.4					--	11
SULPHUR CONTENT	mg/kg	276	15	350	252.5					--	350

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2004  
 Period: Summer  
 FuelID: Diesel fuel

National Fuel Grade: GASÓLEO DE AUTOMOCIÓN

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	103	51	60	53.3	1.9	51	0	51	--
DENSITY AT 15 C	kg/m3	103	824.1	844.8	837.7	5.3	820	845	--	845
DISTILLATION - 95 oC POIN	oC	103	341.9	360	356	3.6	0	360	--	360
PAHs	%(m/m)	103	2.8	7.3	4.5	1.1	0	11	--	11
SULPHUR CONTENT	mg/kg	103	100	345	282	57	0	350	--	350

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2004  
 Period: Winter  
 FuelID: Diesel fuel

National Fuel Grade: GASÓLEO DE AUTOMOCIÓN

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	51			51	Min.	Max.	
CETANE NUMBER	--	173	51	59.7	52.7	1.6	51	0	51	--
DENSITY AT 15 C	kg/m3	173	821.6	845	836.8	5.4	820	845	--	845
DISTILLATION - 95 oC POIN	oC	173	330.3	360	354.5	4.4	0	360	--	360
PAHs	%(m/m)	173	2.4	7.1	4.4	1.1	0	11	--	11
SULPHUR CONTENT	mg/kg	173	15	350	235	100	0	350	--	350

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Sweden  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade:

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Min.			Max.	Min.	Max.	
CETANE NUMBER	--	0	0	0	0	0	0	51	--	
DENSITY AT 15 C	kg/m3	0	0	0	0	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	0	0	0	0	0	0	--	360	
PAHs	%(m/m)	0	0	0	0	0	0	--	11	
SULPHUR CONTENT	mg/kg	0	0	2	0	0	0	--	350	

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Sweden  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel, class 1

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Mean			Min.	Max.	Min.	Max.
CETANE NUMBER	--	630	50.2	56.4	53	0	50	0	51	--
DENSITY AT 15 C	kg/m3	630	807.9	819.9	815.1	0	800	820	--	845
DISTILLATION - 95 oC POIN	oC	630	240.3	285	281.4	0	0	285	--	360
PAHs	%(m/m)	630	0	0	0	0	0	0.02	--	11
SULPHUR CONTENT	mg/kg	630	0	6	2	0	0	10	--	350

**Notes:** Cetane index was measured instead of Cetane number. The limit of detection for PAH is 0.02%(v/v), and therefore values reported as 0 will fall into the range 0-0.02 %(v/v).

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: UK  
 Year: 2004  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples			Mean	Standard deviation	National Specifications		EC Limit values	
		Min.	Max.	Max.			Min.	Min.	Max.	
CETANE NUMBER	--	915	62	53.5	1.4	0	0	51	--	
DENSITY AT 15 C	kg/m3	2031	835	832	2.2	0	0	--	845	
DISTILLATION - 95 oC POIN	oC	1352	347	337	5.7	0	0	--	360	
PAHs	%(m/m)	854	7	2	0.8	0	0	--	11	
SULPHUR CONTENT	mg/kg	2031	56	35	8.9	0	0	--	350	

Notes: 0

AEAT in Confidence

*EU FQM - 2004 Summary Report*

AEAT/ED51182/R2 Final

# **Appendix 4: Fuel Quality Monitoring Reporting Format from 2004**

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AEAT in Confidence

*EU FQM - 2004 Summary Report*  
AEAT/ED51182/R2 Final

# 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>22</sup>, as last amended by Directive 2003/17/EC<sup>23</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>24</sup>.

From 2004 Member States are required to report according to the requirements of the European Standard EN 14274: 2003<sup>25</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>	

<sup>22</sup> OJ L 350, 28.12.1998, p. 58.

<sup>23</sup> OJ L76/10, 22.3.2003, p. 10

<sup>24</sup> O.J. L 53 of 23.2.2002, p.30

<sup>25</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

### 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 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>	
<b>33</b>	<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.

	(Litres/Tonnes)	% Total Petrol/Diesel Sales
<b>Total National sales &lt;10 ppm sulphur petrol</b>		
<b>Total National sales &lt;10 ppm sulphur diesel</b>		

**Details of petrol RON grades available with <10 ppm sulphur:**

<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>26</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>26</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	All	With <10 ppm grades available			All
	Number	Number	Min.	Max.	Mean	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: Name/ID:	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
<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>**

Country:	
Fuel type (petrol or diesel):	
Period and Year	

NUTS Region Description <sup>(2)</sup>	Regional Parameters		No. of refuelling stations	Regional availability (NUTS Level 3) of sulphur free fuel at refuelling stations <sup>(2)</sup>		
	NUTS Code <sup>(2)</sup>	--		Minimum %	Maximum %	Mean %
<b>LEVEL 2 Regions</b>	--	--	--	--	--	--
Region 1	E.g. XX11					
Region 2	E.g. XX12					
Region 3	E.g. XX13					
Etc.	E.g. XX21					
	E.g. XX22					
	E.g. XX31					
<i>&lt;insert extra rows as needed&gt;</i>						
<b>LEVEL 1 Regions</b>	--	--	--	--	--	--
Region 1	E.g. XX1					
Region 2	E.g. XX2					
Etc.	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)

**Additional Comments:**

### 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
Research Octane Number	--						--	95 <sup>(2)</sup>	EN 25164	1993
Motor Octane Number	--						--	85 <sup>(3)</sup>	EN 25163	1993
Vapour pressure, DYPE	kPa							--	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)									
- aromatics	%(V/V)									
- benzene	%(V/V)									
Oxygen content	% (m/m)							--	EN 1601 PrEN 13132	1997 1998
Oxygenates:										
- Methanol	%(V/V)							--		
- Ethanol	%(V/V)							--		
- Iso-propyl alcohol	%(V/V)							--		
- Tert-butyl alcohol	%(V/V)							--	EN 1601	1997
- Iso-butyl alcohol	%(V/V)							--	Or PrEN 13132	1998
- Ethers containing 5 or more carbon atoms per molecule	%(V/V)							--		
- other oxygenates	%(V/V)							--		
Sulphur content	mg/kg							--	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l							--	EN 237	1996

Sample Numbers in Month	Total:		
	April	July	October
January			
February		August	November
March		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

Country	
Fuel grade:	
National specification:	
Period and Year:	

Parameter	Unit	Analytical and statistical results					National Specification, if any		Limiting value <sup>(1)</sup> According to 98/70/EC		Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	Min.	Max.	Min.	Max.	Method	Date
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	PhEN 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
<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

**Comments**



**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
Research Octane Number	--						--	95 <sup>(2)</sup>	EN 25164	1993
Motor Octane Number	--						--	85 <sup>(3)</sup>	EN 25163	1993
Vapour pressure, DYPE	kPa							60.0 <sup>(4)</sup>	PrEN 13016-1	1997
Distillation:										
- evaporated at 100 °C	%(V/V)							46.0		
- evaporated at 150 °C	%(V/V)							75.0		
Hydrocarbon Analysis:										
- olefins	%(V/V)									
- aromatics	%(V/V)									
- benzene	%(V/V)									
Oxygen content	% (m/m)							--	EN 1601 PrEN 13132	1997 1998
Oxygenates:										
- Methanol	%(V/V)							--		
- Ethanol	%(V/V)							--		
- Iso-propyl alcohol	%(V/V)							--		
- Tert-butyl alcohol	%(V/V)							--	EN 1601	1997
- Iso-butyl alcohol	%(V/V)							--	Or PrEN 13132	1998
- Ethers containing 5 or more carbon atoms per molecule	%(V/V)							--		
- other oxygenates	%(V/V)							--		
Sulphur content	mg/kg							--	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l							--	EN 237	1996

Sample Numbers in Month	Total:		
	April	July	October
January			
February		August	November
March		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)		
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any	According to 98/70/EC	Method	Date
							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	PtEN 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
<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

**Comments**

# **Appendix 5: Commission Recommendation 2005/27/EC**

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AEAT in Confidence

*EU FQM - 2004 Summary Report*  
AEAT/ED51182/R2 Final

# 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*

<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: Proposed 2005 Excel Reporting Template**

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AEAT in Confidence

*EU FQM - 2004 Summary Report*  
AEAT/ED51182/R2 Final

## EU Fuel Quality Monitoring Submissions – 2005 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 and 2002 have been summarised in the EU Fuel Quality Monitoring 2001 and 2002 Summary Reports. 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 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 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 2005 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 2004; 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	% (v/v)		18.0	ASTM D1319	95a	4.6		20.7
				ASTM D1319*	95a	6.5		21.8
				EN 14517	2004	2.6		19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	95a	5.1		24.0
				EN 14517	2004	3.0		22.8
-- Aromatics (up to 2004)	% (v/v)		42.0	ASTM D1319	95a	3.7		44.2
				EN 14517	2004	2.0		43.2
-- Aromatics (from 2005)	% (v/v)		35.0	ASTM D1319	95a	3.7		37.2
				EN 14517	2004	1.7		36.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.17		1.10
				EN 14517	2004	0.05		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			
				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 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
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.

**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:	
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:

<b>Summer Period</b>	
<b>Start</b>	
<b>End</b>	
<b>Winter Period</b>	
<b>Start</b>	
<b>End</b>	

\* 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)	
		Small Country	Large Country
<b>Fuel Quality Monitoring System model used:</b>	<b>Yes / No</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 & 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:

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
<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[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.

<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.

**Option (B): Average distance between refuelling stations with sulphur free grades available**

	No. Refuelling Stations		Distance between refuelling stations			
	<10 ppm	All	With <10 ppm grades			All
	Number	Number	Min.	Max.	Mean	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		



**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>	
<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>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>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:**

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**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	
Period (Summer or 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	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	According to 98/70 EC		Method	Date	
							Minimum	Maximum			
Research Octane Number	-						95 <sup>(2)</sup>		EN 25164	2005	
Motor Octane Number	-						85 <sup>(3)</sup>		EN 25163	2005	
Vapour Pressure, DYPE -summer period only	kPa							(4)	EN 13016-1	2000	
Distillation								60.0		2000	
- evaporated at 100 °C	% (w/w)						46.0		EN ISO 3405	2000	
- evaporated at 150 °C	% (w/w)						75.0				
Hydrocarbon analysis											
- Olefins	% (w/w)							18.0 <sup>(6)</sup>	ASTM D 1319 or EN 14517	1995, 2004	
- Aromatics	% (w/w)							42.0	ASTM D 1319 or EN 14517	1995, 2004	
- Benzene	% (w/w)							1.0	EN 12177, EN 235 or EN 14517	1996, 1996, 2004	
Oxygen content	% (m/m)							2.7	EN 1601 or P/EN 13132	1997 1996	
Oxygenates											
- Methanol	% (w/w)							3			
- Ethanol	% (w/w)							5			
- Iso-propyl alcohol	% (w/w)							10	EN 1601	1997	
- Tert-butyl alcohol	% (w/w)							7	Or		
- Iso-butyl alcohol	% (w/w)							10	EN 13132	2000	
- Ethers with ≥5 carbon atoms / molecule	% (w/w)							15			
- other oxygenates	% (w/w)							10			
Sulphur content (regular grades)	mg/kg							50	EN ISO 14596, EN 24280, EN ISO 20846, EN ISO 20847, EN ISO 20864	1996, 1994, 2004, 2004, 2004	
Sulphur content (fuels sold as sulphur-free)	mg/kg							10	EN ISO 14596, EN 24280, EN ISO 20846, EN ISO 20864	1996, 1994, 2004, 2004	
Lead content	g/l							0.005	EN 237	1996, 2004	

**Sampling frequency**

	Number of samples in month					
	January	February	March	April	May	June
July						
August						
September						
October						
November						
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	No. samples	Values	Details/action taken
					Minimum	Maximum	Exceeded?	
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	
Mobor 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) -summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3		61.8		
Distillation *	kPa	EN 13016-1	2000	3.2		71.9		
-evaporated at 100 oC	% (w/w)	EN-ISO 3405	2000	4.0	43.6		Yes	
-evaporated at 150 oC	% (w/w)	EN-ISO 3405	2000	4.0	72.6		Yes	
Hydrocarbon analysis								
- Olefins	% (w/v)	ASTM D1319	95a	4.63		20.7		
	% (w/v)	ASTM D1319*	95a	6.5		21.8		
	% (w/v)	EN 14517	2004	2.6		19.5		
- Olefins (RON 91 fuel only)	% (w/v)	ASTM D1319	95a	5.1		24.0		
	% (w/v)	EN 14517	2004	3		22.8		
- Aromatics (from 2005)	% (w/v)	ASTM D1319	95a	3.7		37.2		
	% (w/v)	EN 14517	2004	1.7		36.0		
- Benzene	% (w/v)	EN 12177	1998	0.1		1.1		
	% (w/v)	EN 238	1996	0.2		1.1		
	% (w/v)	EN 14517	2004	0.1		1.0		
	% (w/v)	EN 1601	1997	0.3		2.9		
Oxygen content	% (m/m)							
Oxygenates								
- Methanol	% (w/v)	EN 1601	1997	0.4		3.2		
- Ethanol	% (w/v)	EN 1601	1997	0.3		5.2		
- Iso-propyl alcohol	% (w/v)	EN 1601	1997	0.9		10.5		
- Tert-butyl alcohol	% (w/v)	EN 1601	1997	0.6		7.4		
- Iso-butyl alcohol	% (w/v)	EN 1601	1997	0.8		10.5		
- Ethers with 5 or more carbon atoms per molecule	% (w/v)	EN 1601	1997	1		15.6		
- other oxygenates	% (w/v)	EN 1601	1997	0.8		10.5		
Oxygen content	% (m/m)	EN 13132	2000	0.3		2.9		
Oxygenates								
- Methanol	% (w/v)	EN 13132	2000	0.3		3.2		
- Ethanol	% (w/v)	EN 13132	2000	0.4		5.2		
- Iso-propyl alcohol	% (w/v)	EN 13132	2000	0.8		10.5		
- Tert-butyl alcohol	% (w/v)	EN 13132	2000	0.5		7.3		
- Iso-butyl alcohol	% (w/v)	EN 13132	2000	0.8		10.5		
- Ethers with 5 or more carbon atoms per molecule	% (w/v)	EN 13132	2000	1.0		15.6		
- other oxygenates	% (w/v)	EN 13132	2000	0.8		10.5		
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8		
	mg/kg	EN 24260	1994	6.8		54.0		
	mg/kg	EN ISO 20846	2004	9.7		55.7		
	mg/kg	EN ISO 20847	2004	16.6		59.8		
	mg/kg	EN ISO 20884	2004	7.9		54.7		
	mg/kg	EN ISO 14596	1998	5.0		13.0		
	mg/kg	EN 24260	1994	3.4		12.0		
	mg/kg	EN ISO 20846	2004	2.7		11.6		
	mg/kg	EN ISO 20884	2004	3.1		11.8		
Lead content	g/l	EN 237	1996	0.002		0.0062		
	g/l	EN 237	2004	0.00062		0.0054		

**Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005**

Country
Reporting year
Period (Summer or 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	According to 98/70/EC		Method	Date
							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 3675, 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	
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 limits 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)		Tolerance limits		Notes on exceedences				
		Method	Date	Reproducibility, R	Minimum	Maximum	Exceeded?	No. samples	Values	Details/action taken
Cetane number	--	EN-ISO 5165	1998	4.3	48.5	845.7	Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2		845.3				
		EN ISO 12185	1996	0.51		365.9				
Distillation – 95% Point	oC	EN-ISO 3405	2000	10.0		13.2				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		61.8				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		54.0				
		EN 24260	1994	6.8		57.6				
		EN ISO 20846	2004	6.7		54.7				
		EN ISO 20847	2004	12.8		13.0				
		EN ISO 20884	2004	7.9		12.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0						
		EN 24260	1994	3.4						