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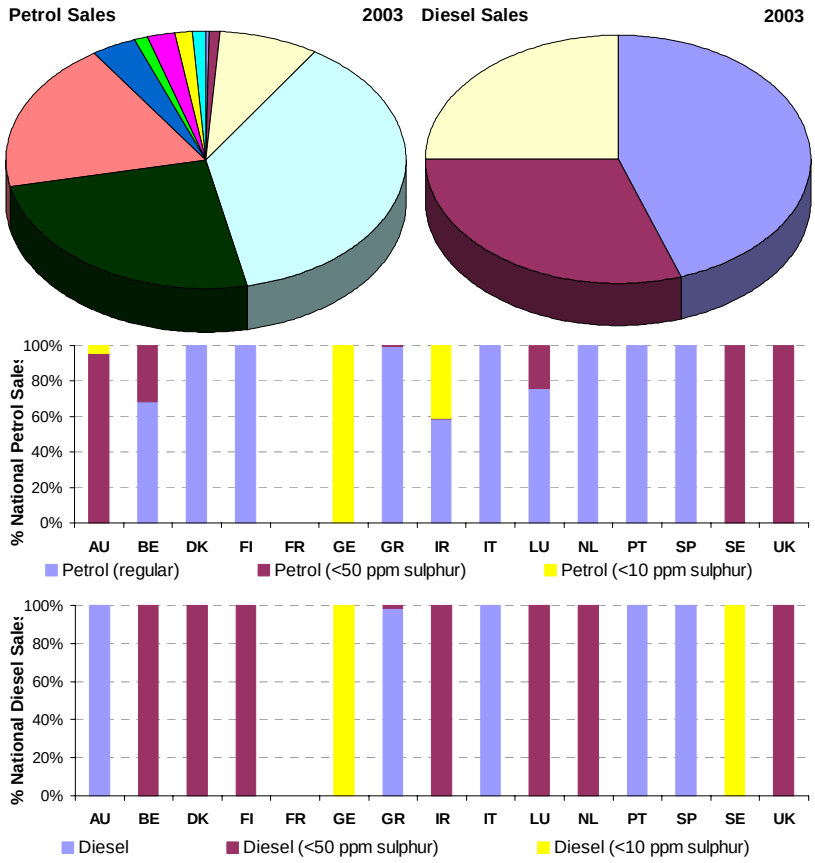
EU Fuel Quality Monitoring – 2003 Summary Report

Final report produced for the European Commission, DG Environment

Nikolas Hill, AEA Technology Environment



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Appendices

Glossary

<10 ppm fuels	See *sulphur free fuels*
Commission Decision 2002/159/EC	Commission Decision of 18 February 2002 on a common format for the submission of summaries of national fuel quality data
Directive 98/70/EC	of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC
Directive 2003/17/EC	of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels
EN 14274: 2003	Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS)
Euro standards	European Union emission regulations for new vehicles, e.g. Euro 3
Fuel Dispensing Sites	See *refuelling stations.*
FQMS	Fuel Quality Monitoring System
National fuel grade	Member States may, define 'national' fuel grades that 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.
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.
Refuelling Stations	Sites, retail or commercial, where fuel is dispensed into road vehicles for propulsion (as defined in EN 14274: 2003)
RON	Research Octane Number (petrol vehicles)
Sulphur free fuels	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)
The Sulphur Review	'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: http://europa.eu.int/comm/environment/sulphur/summary.pdf
Zero sulphur fuels	See *sulphur free fuels*.

1 Introduction

This report produced for DG Environment represents a consolidation of the third year of Member States' submissions under Directive 98/70/EC[1], summarising the quality of petrol and diesel in the community for the year 2003. 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 will enter 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 reporting format for this was laid out in Commission Decision 2002/159/EC of 18 February 2002[2] (Appendix 1). 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 and 2002 were presented in the *EU Fuel Quality Monitoring - 2001 Summary Report* (AEA Technology Environment, June 2003) and *EU Fuel Quality Monitoring - 2002 Summary Report* (AEA Technology Environment, March 2004). The 10 new Member States will first have to submit reports to cover the 2004 monitoring year and are therefore not covered in this report.

1.1 REPORT STRUCTURE

This report follows the same format developed for the preceding two 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.

The report begins by setting out the background and context for the control of fuel quality and its relation to harmful tailpipe emissions from vehicles. Subsequent sections (2 to 16) summarise the information reported by individual Member States under Commission Decision 2002/159/EC, as part of their submissions of summaries of national fuel quality data. The final sections (17 and 18) provide an EU summary, discussion of the 2003 reporting and recommendations for future reporting.

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. At present, transport is a significant contributor to CO_2 as well as other emissions and the demand for transport 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_2 emissions in the European Union. Fuel quality has strong links to both CO_2 and air quality related emissions; the following

[1] O.J. L 350 of 28.12.1998, p. 58
[2] O.J. L 53 of 23.2.2002, p.30

sections briefly outline the main policy drivers relating to fuel consumption, carbon dioxide emissions, air quality and their influence on fuel quality legislation.

1.2.1 Fuel Consumption & Carbon Dioxide Emissions

The Community's strategy to reduce carbon dioxide emissions from passenger cars and improve fuel economy was endorsed by the Council in 1996 (COM(95) 689 final). This strategy presented an action plan to reduce CO_2 emissions over a fifteen-year period and thereby help the European Union meet the commitment it was expecting to make under the Kyoto Convention. The strategy aims to deliver an average CO_2 emission value for new passenger cars equal to 120 g CO_2/km by 2005 or 2010 at the latest.

The automobile industry has committed itself to improving the fuel economy of vehicles produced such that it aims to deliver an average CO_2 emission figure for new passenger cars sold in the EU of 140 g CO_2/km by 2008/2009. In addition, this is currently being reviewed in consideration of the potential for additional CO_2 reduction, with a view to moving further towards the Community's objective of 120g CO_2 /km by 2012.

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_2 emissions. Sulphur-free fuels enable the use of improved catalytic technology and reduce particle emissions, facilitating compliance with existing (and future) emissions standards and help 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 and the limit values for the air pollutants nitrogen dioxide, sulphur dioxide, lead and particulate matter are set out in the first daughter Directive 99/30/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 aims to develop a thematic strategy on air pollution in order to devise and assess the cost effectiveness of proposals for legislation to improve air quality and to meet environmental objectives in Europe.

Releases of carbon monoxide, hydrocarbons, nitrogen oxides and particulates from vehicles are covered under the 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 mean emissions. There are four stages for cars and LCVs (Light Commercial Vehicles) and five (plus EEV) for HDVs (Heavy Duty Vehicles), which have progressively tighter emissions limits. Progress is also being made on an Environmentally Enhanced Vehicle (EEV) classification for light duty vehicles and also plans for a future Euro 5 standard.

1.2.3 Fuel Quality

The parameters covered in the fuel quality standards outlined in Directive 98/70/EC fall loosely into two categories. Firstly, physical properties (such as RON for petrol; Cetane number & density for diesel) need to be within certain limits in order for internal combustion engines to function efficiently (which itself has an impact on emissions of both air quality pollutants and CO_2). Secondly, 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_X Storage Traps (NSTs) and particulate traps. The current mandatory limit for sulphur is set at 150 ppm, however some EU states are already providing fuel at <50 ppm ahead of the future date of its mandatory requirement of 2005. Debate as to whether the 2005 limit should be reduced further prompted the EC to launch a consultation with stakeholders in 2000[3]. The final decision to amend Directive 98/70/EC (made in December 2002) is that the 2005 limit of 50 ppm will stand, but that zero sulphur fuel should be made available "on an appropriately balanced geographical basis" from January 2005 and made mandatory from 2009 (and implemented under the amending Directive 2003/17/EC[4]).

The reasoning behind this amendment is that by 2009 the composition of vehicle fleets able to take full advantage of the lower sulphur content will be sufficient to more than offset any disadvantages due to additional refining of the fuel. The availability of zero sulphur 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 zero sulphur diesel. The fuel economy of other diesel vehicle types and technologies would also improve by using zero sulphur fuels and its use by the existing fleet could also lead to lower emissions of pollutants such as particulate matter.

The date for mandatory introduction of zero sulphur diesel is to be confirmed by 31 December 2005 at the latest, in order to ensure that there is no overall increase in greenhouse gas emissions caused by mandatory introduction from 2009. This is outlined in Directive 2003/17/EC, in Article 9(1)(a), which states that "*This analysis and 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*."

[3] 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.
[4] O.J. L76 of 22.3.2003, p. 10

2 Austria

2.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	Petrol min. RON = 91	Normal	ON EN 228 "Normal"	Yes	1
8	Petrol min. RON = 95	< 50 ppm	ON EN 228 "Super"	Yes	5
12	Petrol RON > = 98	< 10 ppm	ON EN 228 "Super Plus"	Yes	12
13	Diesel Fuel	Regular	Diesel	Yes	13

2.1.1 Sales

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

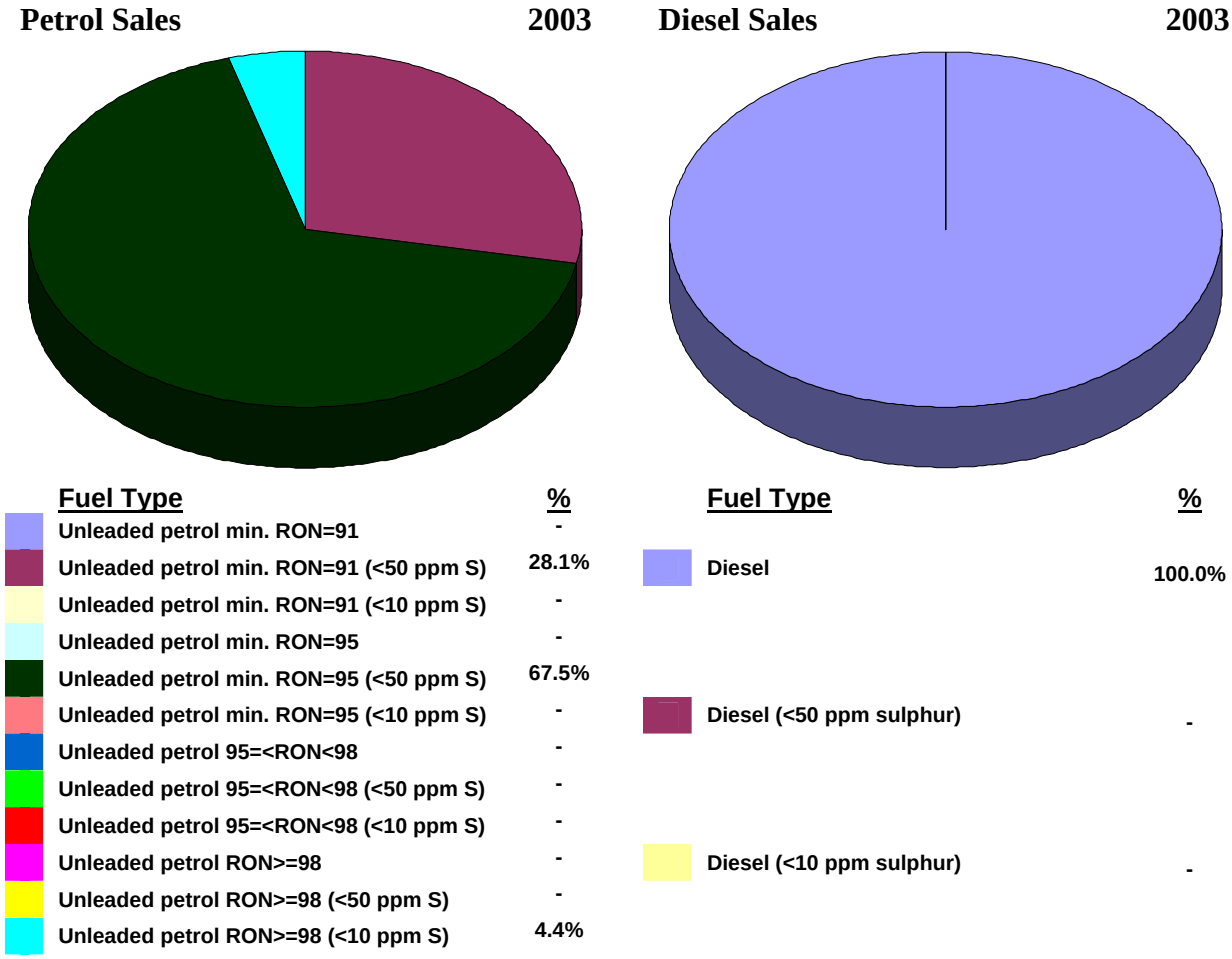


Figure 2.1 clearly shows that RON91 petrol was still sold widely in Austria in 2003, accounting for 28% sales (30% in 2001, 27% in 2002), sales of low sulphur (<50 ppm)

RON95-98 petrol were 68% compared to 65% in 2001 and 69% in 2002. Sales of sulphur free (<10 ppm) petrol (available at RON>98 grade throughout Austria), were essentially unchanged at just over 4% of sales. No low sulphur diesel grades were available in Austria in 2003.

2.1.2 Sulphur content

Geographic availability of sulphur-free fuels: sulphur free unleaded petrol at RON 98 quality was available all over Austria, sulphur free Diesel was not available in 2003. However, in 2003 an agreement was made between the Federal Minister for Land, Forest, Environment and Water Management and the General Director of OMV AG (Austrian mineral oil administration) that from the 1st January 2004 a countrywide availability of sulphur free petrol and diesel will be guaranteed. From February 2004 it can be assumed that sulphur free fuel will be available from at least 79% of all public refuelling stations.

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: Although not required by national legislation, analysis of samples of RON 91 petrol in 2002 have found it generally meets the low sulphur (<50 ppm) quality standard.

[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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	21	17	14		
Diesel	277	236	213		

2.2 FUEL QUALITY MONITORING 2003

2.2.1 Description of system

Responsible organisation(s): Umweltbundesamt GmbH (Environmental Protection Agency), conducted the fuel monitoring for the first time in 2003.

Location(s) of sampling: samples were taken from petrol stations all over Austria.

Time/frequency of sampling: samples were taken in several months in each of the winter and summer periods.

Number of samples taken: 340, with 170 samples in each of 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 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	Summer: 120 (50 each for Normal and Super and 20 for SuperPlus); Winter: 120 (as for summer)
Frequency of sampling:	March, May, August, September, November and December

Reporting

Fuel grades:	The results of sample analysis of the 3 petrol grades are reported in separate tables
Parameters:	All specified parameters are measured except: lead content. Leaded petrol has been forbidden in Austria since 1993. Random testing of lead content was carried out until 1998, whereupon it was ceased as samples always complied with the regulations.

Other:

Exceedances of Directive 98/70/EC limit values

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

1. Normal Petrol

Detail:	RON (minimum 91), MON (minimum 81) and summer vapour pressure (maximum 60) limit values were exceeded by some samples, with the greatest exceedances being 89.8, 80.6 and 89 respectively.
Statistical significance:	The tolerance limit for statistical significance for RON is 90.6, MON is 80.5 and for the vapour pressure test method is 61.7 kPa. One sample was non-compliant with the Directive with respect to RON and two for summer vapour pressure.

Member State's notes:

2. Super Petrol

Detail: RON (minimum 95), MON (minimum 85), summer vapour pressure (maximum 60) and aromatics (maximum 42.0%(v/v)) limit values were exceeded by some samples, with the greatest exceedances being 89.8, 80.6, 89 kPa and 42.1%(v/v) respectively.

Statistical significance: The tolerance limit for statistical significance for RON is 94.6, for MON is 84.5, for the vapour pressure test method is 61.7 kPa and for aromatics is 44.1%(v/v). One sample was in non-compliance with the Directive with respect to MON and one sample was non-compliant with respect to summer vapour pressure.

Member State's notes:

3. Super Plus Petrol

Detail: Summer vapour pressure (maximum 60) and aromatics (maximum 42.0%(v/v)) limit values were exceeded by some samples, with the greatest exceedances being 87 kPa and 43.2%(v/v) respectively.

Statistical significance: The tolerance limit for statistical significance for the vapour pressure test method is 61.7 kPa and for aromatics is 44.1%(v/v). One of the samples was in non-compliance with the Directive with respect to summer vapour pressure.

Member State's notes:

2.2.3 Diesel reporting

Sampling

Number of samples: Summer: 50; Winter: 50

Frequency of sampling: March, May, August, September, November and December

Reporting

Fuel grades: Sampling analysis data has been provided for the single grade available.

Parameters: All parameters specified in the Directive are measured.

Other: No further comments.

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: Limits for Cetane number (min. 51) and sulphur content (max. 350 ppm) have been exceeded by some samples (up to values of 47.7 and 485.0 ppm respectively).

Statistical significance: The tolerance limits for statistical significance for Cetane number is 48.5, therefore this sample cannot be said to be noncompliant. The tolerance limit for sulphur is 380 Ppm and one sample exceeded this limit, with 485 ppm and was noncompliant with the Directive.

Member State's notes:

2.3 TEMPORAL TRENDS

The following Figure 2.2 to Figure 2.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol and diesel have both the increased, by 4% and 26% respectively since 2001. However, of the petrol sales, regular grade sales have all converted to low sulphur (<50 ppm) grade sales (increased by 53% since 2001), but sulphur-free (< 10 ppm) grade sales have only increased by just over 4% since 2001.

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

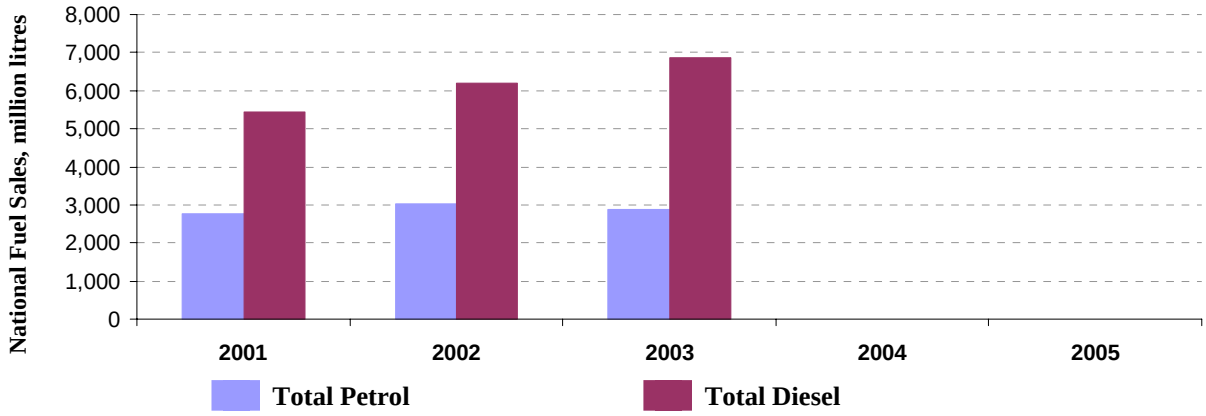


Figure 2.3: Temporal trends in national sales of low sulphur petrol (%)

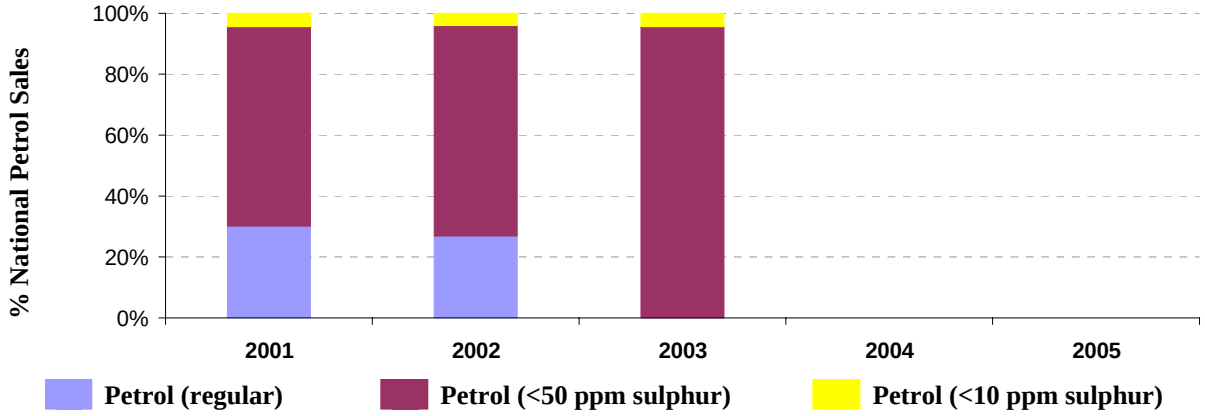
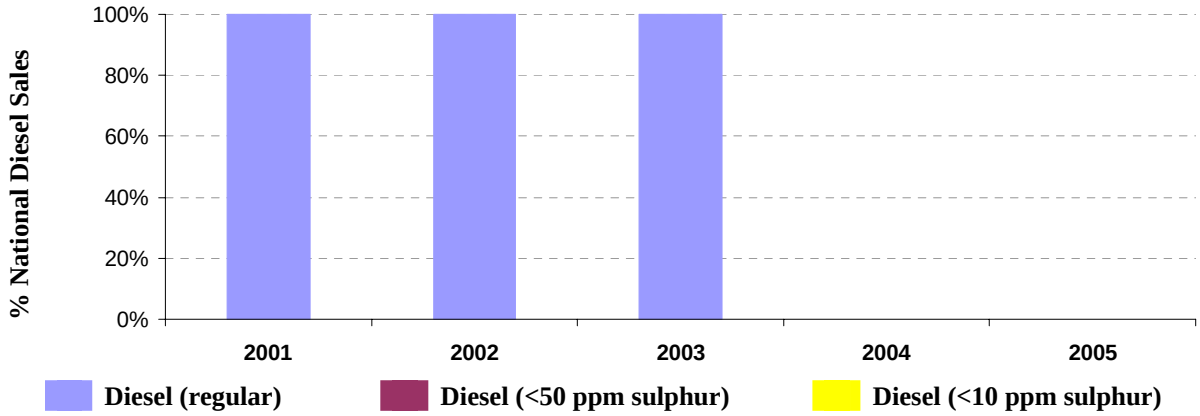


Figure 2.4: Temporal trends in national sales of low sulphur diesel (%)



3 Belgium

3.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	Eurosuper	Yes	4
7	Petrol RON > = 98	< 50 ppm	Super Plus	Yes	11
13	Diesel Fuel	< 50 ppm	Diesel 50S	Yes	14

3.1.1 Sales

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

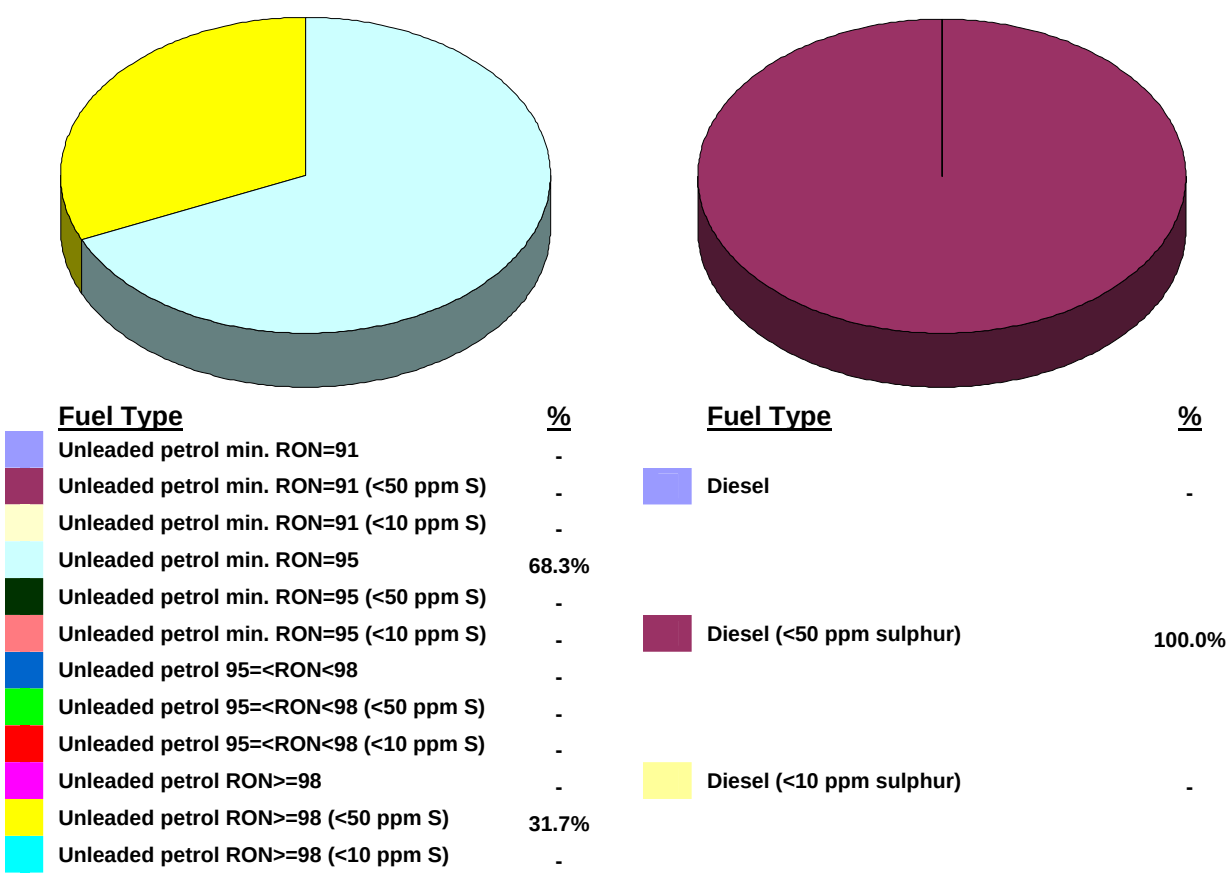


Figure 3.1 above shows that the majority (68%) of petrol sold in Belgium in 2003 was still RON95 (up from 66% in 2001, 69% and 2002), with the remainder being sales of RON <98 fuel. Between 2002 and 2003 Belgium has switched completely from regular RON <98 to low sulphur (< 50 ppm) RON <98. Low sulphur diesel (< 50 ppm) has comprised 100% of sales since beginning of 2002.

3.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available in 2003.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	68	44	42		
Diesel	269	47	40		

3.2 FUEL QUALITY MONITORING 2003

3.2.1 Description of system

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

Location(s) of sampling: public and private refuelling stations spread in the Belgium territory.

Time/frequency of sampling: 7983 samples from 3897 stations throughout the year.

Number of samples taken: 4539 on all petrol fuels, and 5045 on diesel fuel.

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: an electronic version of these reports is available via Internet on the site:
http://mineco.fgov.be/energy/index_fr.htm

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. Besides charges of the analysis of the non-compliant samples are transferred to the concerned pump attendant, it is a kind of fine, which varies between 125 to 250 euros.

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 still exist winter quality during summer months). [Full details of 2003 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; 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 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	4539
Frequency of sampling:	Weekly, evenly spread throughout the year

Reporting

Fuel grades:	Two Petrol grades were presented in separate reporting tables.
Parameters:	Parameters not analysed included: oxygen content.
Other:	

Exceedances of Directive 98/70/EC limit values
(Details on the limit values, test methods and tolerance limits can be found in Appendix 2.)

1. Petrol RON 95

Detail:	Some samples exceeded the limit values for RON, MON, summer vapour pressure, distillation-evaporation at 100 C, olefins and aromatics. 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

2. Petrol RON 98

Detail: Some samples exceeded the limit values for MON, summer vapour pressure (189 samples), distillation-evaporation at 100 C & 150 C, olefins, 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

3.2.3 Diesel reporting

Sampling

Number of samples: 5045

Frequency of sampling: Weekly, spread fairly evenly throughout the year.

Reporting

Fuel grades: Only one available.

Parameters: All measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: Some samples exceeded the limit values for Cetane no., Density at 15 C and Distillation 95% point, 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 Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol have increased by 1% since 2001, whilst those of diesel have increased by 8%. However, of the petrol sales, regular grade (RON 95) sales have increased by 4%, whilst RON >98 grade sales have decreased by 6%. A low sulphur petrol grade (RON <98) became available for the first time in 2003.

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 (%)

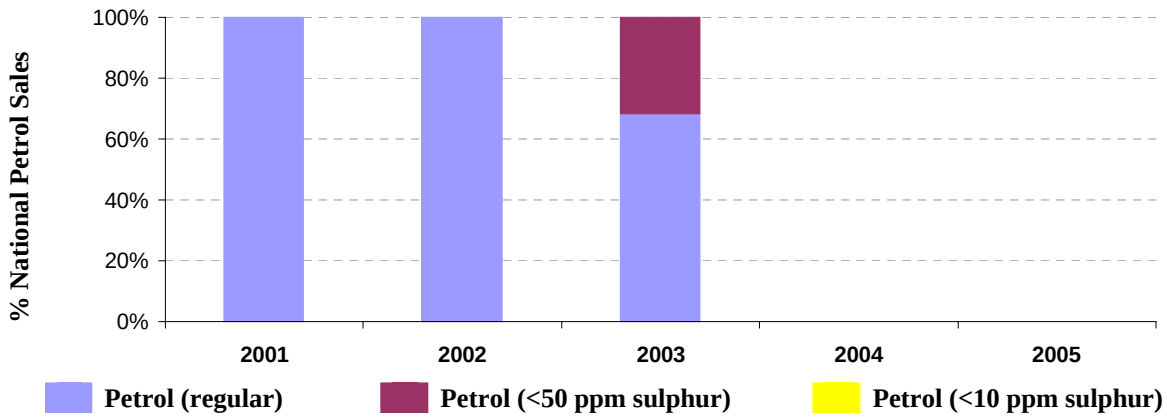
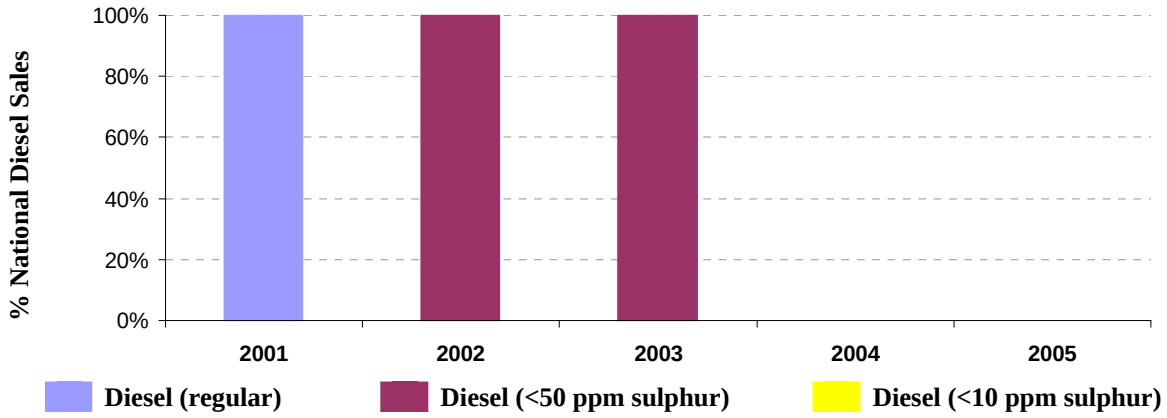


Figure 3.4: Temporal trends in national sales of low sulphur diesel (%)



4 Denmark

4.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

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

4.1.1 Sales

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

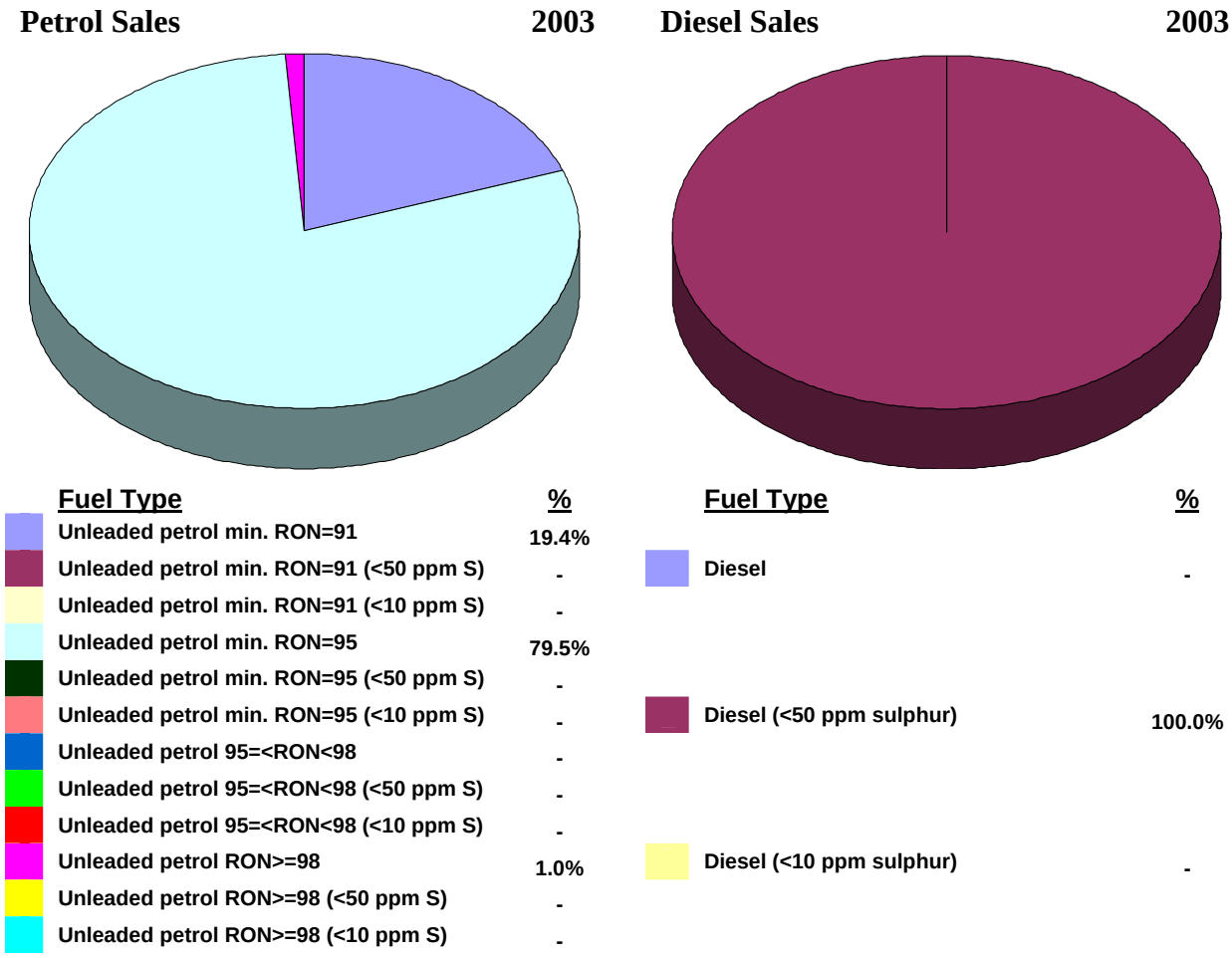


Figure 4.1 above shows that 19% of fuel sales in 2003 were at the lowest RON91 petrol fuel grade - the same as for 2001 and 2002. The majority of sales (80%) were RON95 grades, up from 76% in 2001 and 79% in 2002, and the remainder of sales were RON>98. Whilst there were no low sulphur (<50 ppm) petrol grades available in Denmark in 2003, all diesel fuel sold was of low sulphur content.

4.1.2 Sulphur content

Geographic availability of sulphur-free fuels: none available in 2003.

Average sulphur content of all petrol and diesel sold: the average sulphur content of both petrol and diesel has decreased since 2001, see Table 4.1. 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 2003 have found it meets the low sulphur (<50 ppm) quality standard. Most of the samples of 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 4.1: Annual trend in average sulphur content in petrol and diesel fuels

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	47	40	19		
Diesel	51	48	28		

4.2 FUEL QUALITY MONITORING 2003

4.2.1 Description of system

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

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 (July), half in wintertime (December).

Number of samples taken: petrol - 52; diesel - 25

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

Collection of sales data: Official Danish statistics.

Other details: none.

4.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 52

Frequency of sampling: July and December only

Reporting

Fuel grades: The analysis results for the 3 fuel grades were reported separately.

Parameters: Only parameters expected to have significant impact on the environment were measured. RON, MON, oxygen content and all oxygenates (except ethers/MTBE) were not measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

1. Petrol-RON 92

Detail: The vapour pressure summer limit value (60 kPa) was exceeded by one sample (62.1 kPa) and the benzene limit (1.0%(v/v)) was exceeded by one sample (1.1%(v/v)).

Statistical significance: The statistical significance tolerance limit for vapour pressure is 61.7 kPa and the tolerance limit for benzene is 1.2%(v/v). Therefore only the sample for vapour pressure was in breach of the Directive.

Member State's notes: No exact explanation could be found through dialogue with the refinery.

2. Petrol-RON 95

Detail: The vapour pressure summer limit value (60 kPa) was exceeded by two samples (60.1 and 61.7 kPa). The aromatic limit (42%(v/v)) was exceeded by one sample (43.7%(v/v)) and the benzene limit (1.0%(v/v)) was exceeded by one sample (1.2%(v/v)).

Statistical significance: The statistical significance tolerance limit for vapour pressure is 61.7 kPa and for aromatics 44.0%(v/v) and for benzene 1.2%(v/v). Therefore the samples cannot be judged non-compliant with the Directive.

Member State's notes:

3. Petrol-RON 98

None.

4.2.3 Diesel reporting

Sampling

Number of samples: 25

Frequency of sampling: July and December only

Reporting

Fuel grades: Only one grade.

Parameters: All parameters reported.

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: The cetane number limit value (min. 51.0) was not met by two samples (50.8 and 49.4 ppm).

Statistical significance: The statistical significance tolerance limit for cetane number is min. 48.5. Therefore the samples cannot be judged non-compliant with the Directive.

Member State's notes:

4.3 TEMPORAL TRENDS

The following Figure 4.2 to Figure 4.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. There was little change in the sales of petrol, but a 9% increase in the sales of diesel since 2001. The sales of RON91 and RON95 petrol only increased by 5% each since 2001, but there was a 79% decrease in the sales of RON98 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 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 (%)

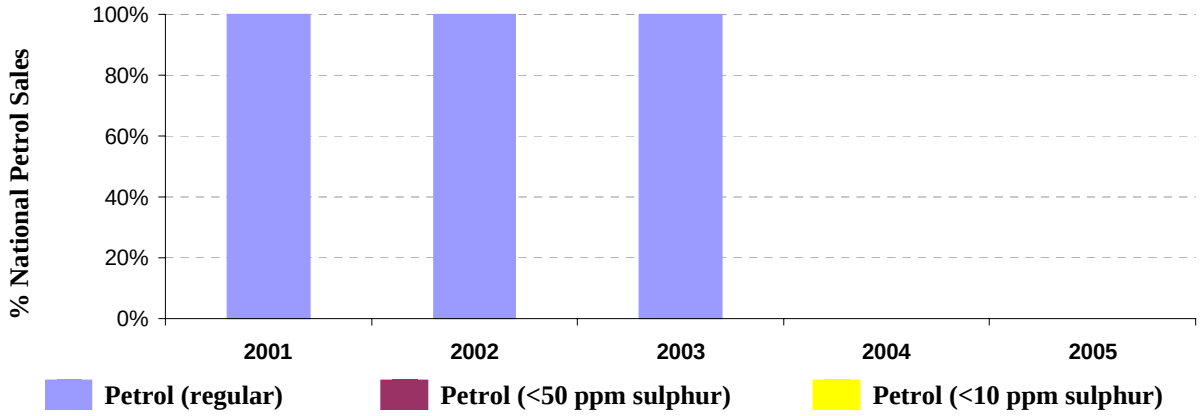
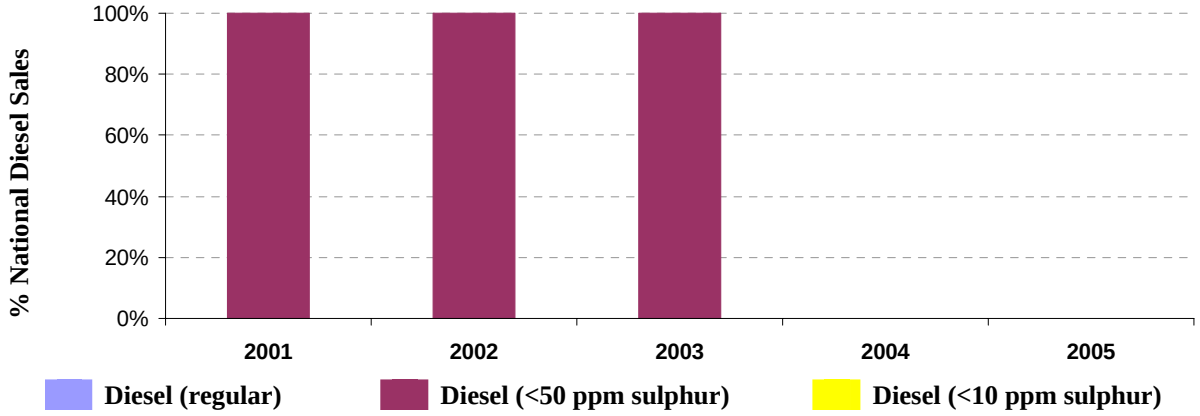


Figure 4.4: Temporal trends in national sales of low sulphur diesel (%)



5 Finland

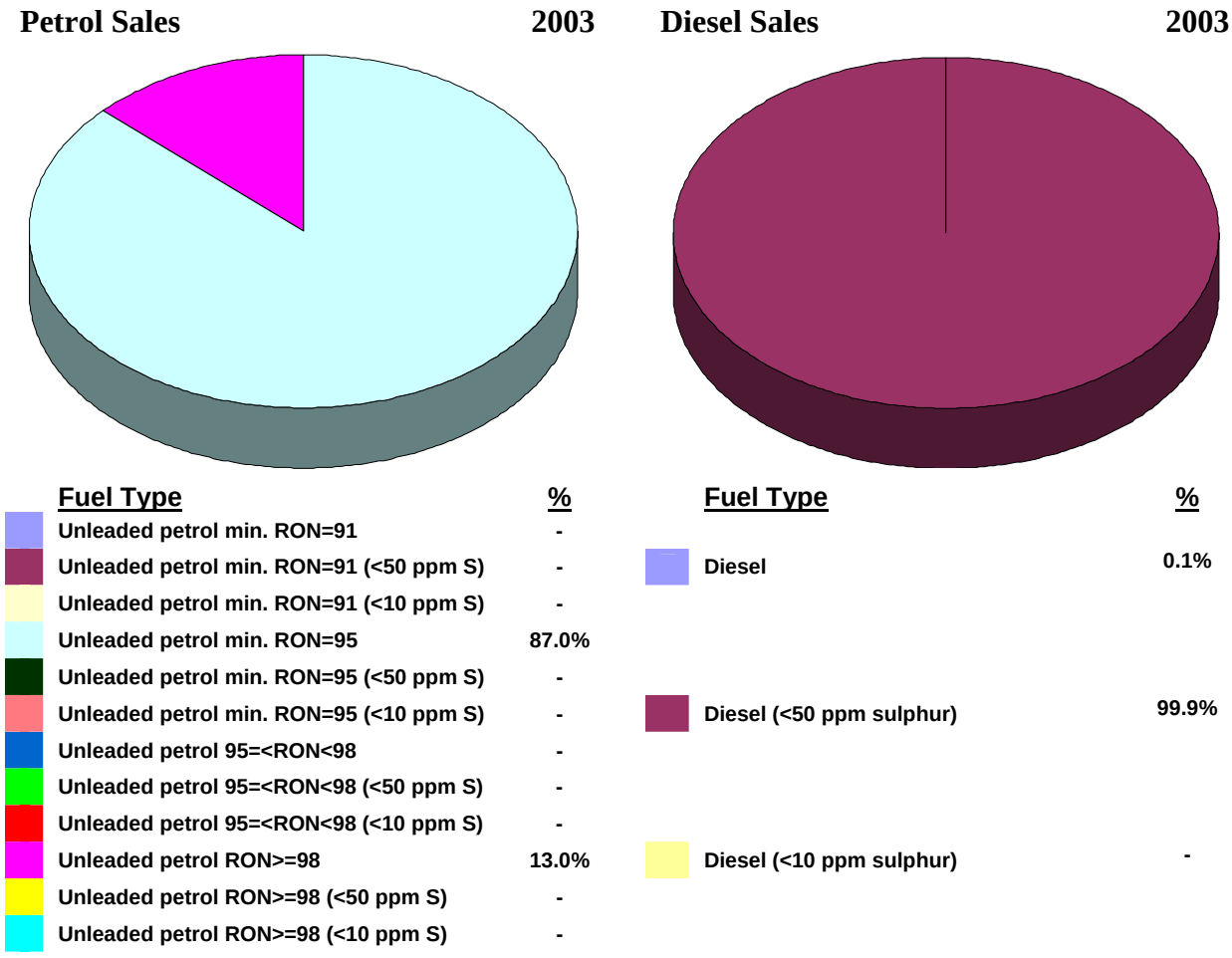
5.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	95 Okt.	Yes	4
10	Petrol RON > = 98	Regular	98 Okt.	Yes	10
13	Diesel Fuel	Regular	-	Yes	14
14	Diesel Fuel	< 50 ppm	-	Yes	14

5.1.1 Sales

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



Of petrol sales, 87% were of RON95 (95 octane) classification (up from 85% in 2001 and 86% in 2002), with the remainder being of RON>98. Almost all of diesel fuel sold was low

sulphur diesel (< 50 ppm), although 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.

5.1.2 Sulphur content

Geographic availability of sulphur-free fuels: In Finland, sulphur-free (less than 10 ppm) grades are not marketed separately by displaying the sulphur content at the point of sale. So far, there are no official statistics available concerning the volume and/or geographical extent to which sulphur free petrol or diesel fuels are marketed. As from the 1st of September 2004 fiscal incentives will be introduced for sulphur free petrol and diesel oil (Law on the Excise Duty on Liquid Fuels 394/2004 amending the provisions of 1472/1994). 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 5.1.

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 9.4 mg/kg (average 24.1 mg/kg), while for RON 98 grade petrol it was 3.0 mg/kg (average 13.8 mg/kg) and for diesel fuel 3.8 mg/kg (average 14.1 mg/kg). The Finnish tax legislation in force during 2003 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 2003 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 5.1: Annual trend in average sulphur content in petrol and diesel fuels

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	84	53	23		
Diesel	34	24	14		

5.2 FUEL QUALITY MONITORING 2003

5.2.1 Description of system

Responsible organisation(s): the Customs Authority draws up annually a sample taking schedule which 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.

Location(s) of sampling: all the various distribution chains across the entire country.

Time/frequency of sampling: each month throughout the year.

Number of samples taken: 207 petrol; 101 diesel.

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: none.

5.2.2 Petrol reporting

Sampling

Summer Period:	Arctic: 1st June to 31st August
Number of samples:	207
Frequency of sampling:	Monthly

Reporting

Fuel grades:	Two grades reported separately, with separate tables for summer and winter sampling.
Parameters:	All parameters are measured regularly.
Other:	

Exceedances of Directive 98/70/EC limit values

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

1. Petrol-RON 95

Detail:	One sample exceeded the minimum limit value and tolerance limits for RON (95 and 94.6 respectively), with value of 94.5. One sample also exceeded the minimum MON limit value and tolerance limit (85 and 84.5 respectively) with a value of 84.3.
Statistical significance:	The statistical significance tolerance limits (95% confidence) indicate that these two samples were noncompliant with the Directive.
Member State's notes:	The observed exceedances of the limit value and the tolerance limits were insignificant and non systematic, thus giving no reason for further legal action.

2. Petrol-RON 98

Detail:	Samples exceeded the minimum limit value for RON (95) and the minimum MON limit value (85), with minimum values of 94.8 and 84.9 respectively. One sample also exceeded the distillation at 100 ^{o}C limit (46.0 % v/v min.) with a value of 42.7 % v/v.

Statistical significance: The statistical significance tolerance limits (95% confidence) for RON and MON are 94.6 and 84.5, therefore the samples were not in breach of the Directive. The distillation at 100 ^{o}C minimum limit of statistical tolerance was 43.7, and the sample was therefore noncompliant with the Directive.

Member State's notes: The observed exceedances of the limit value and the tolerance limits were insignificant and non systematic, thus giving no reason for further legal action.

5.2.3 Diesel reporting

Sampling

Number of samples: 101

Frequency of sampling: Monthly

Reporting

Fuel grades: One grade reported with separate tables for summer and winter sampling.

Parameters: All parameters were measured.

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

5.3 TEMPORAL TRENDS

The following Figure 5.2 to Figure 5.4 show the trend in Fuel Quality Monitoring reporting in terms of 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 2003 – of 2% for petrol and for 5% for diesel. There was no separate data collection on the availability of low sulphur petrol, and subsequently no separate data reporting. low sulphur (<50 ppm) and sulphur free (<10 ppm) qualities were, however, on sale since the minimum and mean values for RON 95 petrol were 9.4 and 24.1 ppm and for >= RON 98 petrol 3.0 and 13.8 ppm respectively, lower than the year before for both qualities. Sales of regular sulphur diesel fuel have decreased since 2001, with essentially 100% of diesel fuel now being of low sulphur (<50 ppm) quality.

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 (%)

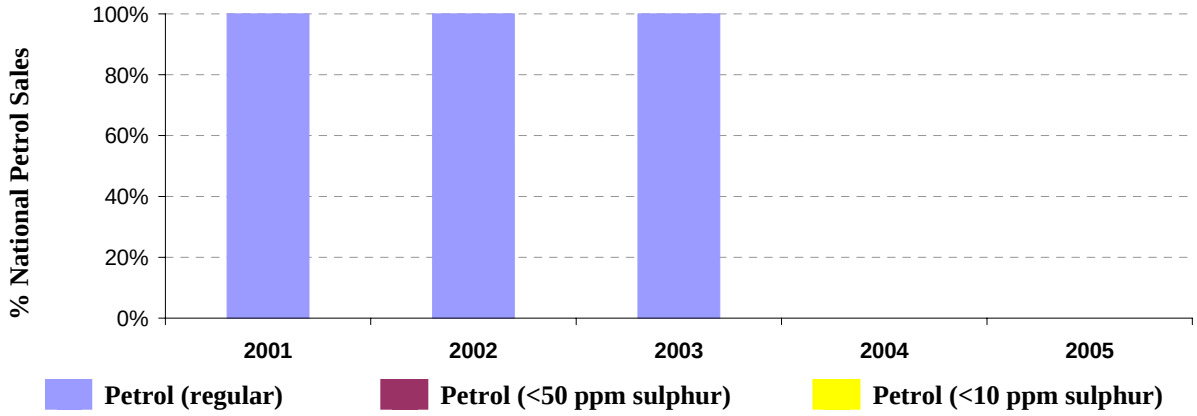
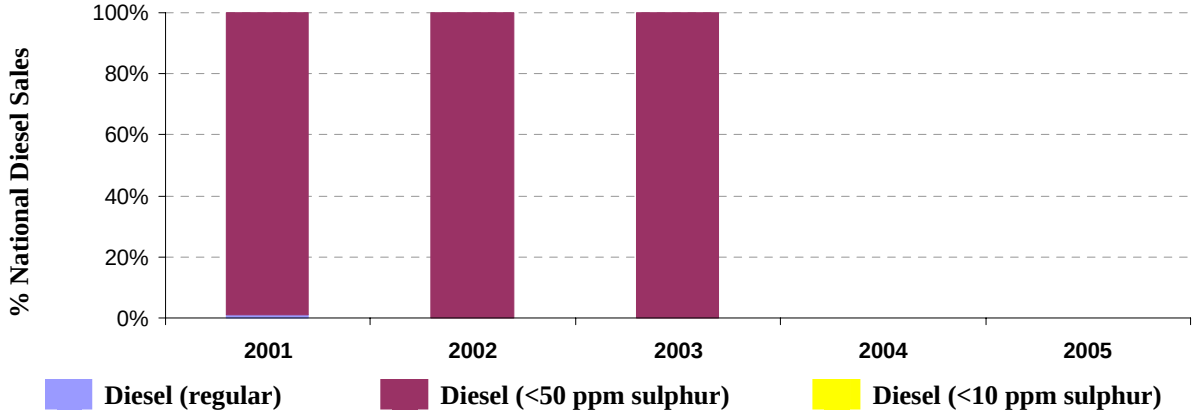


Figure 5.4: Temporal trends in national sales of low sulphur diesel (%)



6 France

No submission was provided by France for 2003 fuel quality monitoring.

7 Germany

7.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
3	Petrol min. RON = 91	< 10 ppm	Benzin Normal	Yes	1
6	Petrol min. RON = 95	< 10 ppm	Eurosuper	Yes	5
12	Petrol RON > = 98	< 10 ppm	Super Plus	Yes	12
14	Diesel Fuel	< 10 ppm	Dieselkraftstoff, schwefelfrei	Yes	15

7.1.1 Sales

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

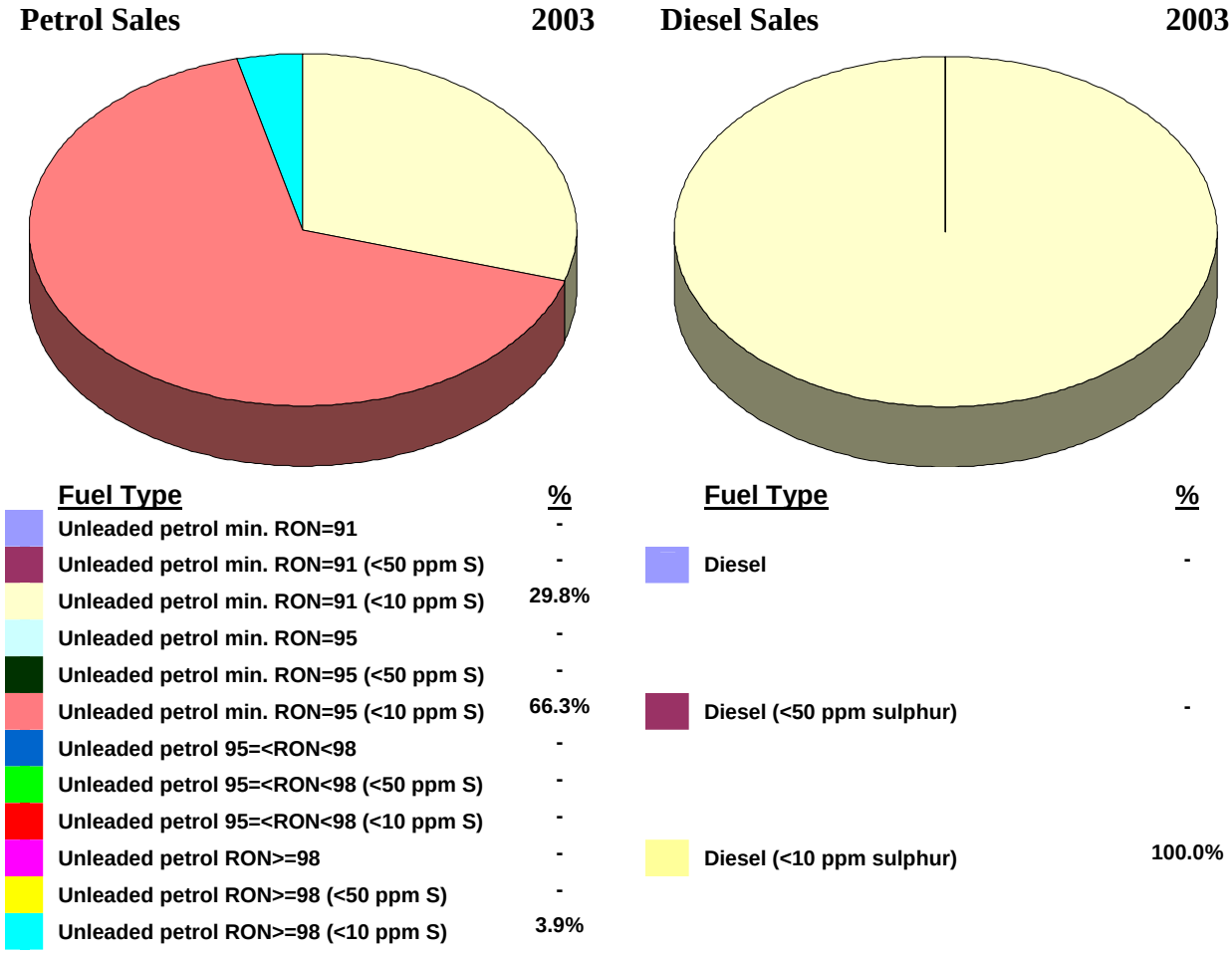


Figure 7.1 shows that in 2003 the German market had switched entirely to sulphur free fuels since 2002. Whilst most of the fuel sold was RON95 quality (66% compared to 65% in 2002), 30% of fuel sold was still RON91. All diesel sold was zero sulphur (<10 ppm) grade.

7.1.2 Sulphur content

Geographic availability of sulphur-free fuels: The German market has converted entirely to sulphur free fuels with the beginning of 2003.

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 7.1.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	54	23	7		
Diesel	249	31	8		

7.2 FUEL QUALITY MONITORING 2003

7.2.1 Description of system

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

Location(s) of sampling: at refuelling stations across the country.

Time/frequency of sampling: monthly across the year.

Number of samples taken: 399 petrol and 222 diesel.

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, who the person responsible is. 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.

7.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 399 (139 for normal, 169 for super, 99 for super plus)

Frequency of sampling: Monthly across the year

Reporting

Fuel grades: 3 grades reported separately

Parameters: All parameters measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

1. Petrol RON91

Detail: Some samples exceeded the vapour pressure limit for summer (60 kPa), the aromatics (42.0%v/v) and benzene (1.0%v/v) limits with the highest being 61.6 kPa, 42.6%v/v and 1.02%v/v respectively.

Statistical significance: The tolerance limit for statistical significance for vapour pressure test method is 61.7 kPa, for aromatics is 44.1%(v/v) and for benzene is 1.2%(v/v). Therefore samples cannot be said to be in non-compliance with the Directive.

Member State's notes:

2. Petrol RON95

Detail: One sample exceeded the vapour pressure limit for summer (60 kPa) with 62.6 kPa. Some samples also exceeded the limit values for distillation at 100°C (min 46.0%v/v), olefins content (max 18.0%v/v) and aromatics content (max 42.0%v/v) with values of 44.2, 20.2 and 46.3 respectively.

Statistical significance: The tolerance limit for vapour pressure is 61.7 kPa, for distillation 100°C is 41.9%, for olefins content is 22.0%v/v and for aromatics content is 44.1%v/v. Therefore some samples were noncompliant with the Directive with respect to summer vapour pressure and aromatics content.

Member State's notes: On repeat analysis of the sample with high vapour pressure, no threshold exceedance was observed. A single sample exceeded the tolerance limit for aromatics content (46.3%) at a petrol station in Sachsen. No legal measures were taken, but the owner was warned of the result.

3. Petrol RON98

Detail: One sample exceeded the limit values for distillation at 100°C (min 46.0%v/v) with value of 45.2%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:

7.2.3 Diesel reporting

Sampling

Number of samples: 222

Frequency of sampling: Monthly throughout the year

Reporting

Fuel grades: 1 grade

Parameters: All parameters were measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel <50 ppm S

Detail: Some samples were below the limit for Cetane no. (51) with the lowest being 49.8, and above the limit value for distillation 95% point (360°C) and PAH content (11%m/m), with values of 365.0°C and 19.4%m/m respectively.

Statistical significance: Samples were within the tolerance limits for cetane number (min 48.5), distillation (366°C) and therefore compliant with the Directive. The tolerance limit for PAH content is 11.2%m/m, and therefore at least one sample was noncompliant with the Directive.

Member State's notes: One exceedance occurred for PAH in North Rhine Westphalia (19.4%m/m). The court fine proceeding (a hearing for the affected person) is now being conducted.

7.3 TEMPORAL TRENDS

The following Figure 7.2 to Figure 7.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2003, sales of petrol decreased by 7%, while sales of diesel decreased by 16%. Since end of 2002, all petrol and diesel grades have switched to sulphur free fuel.

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

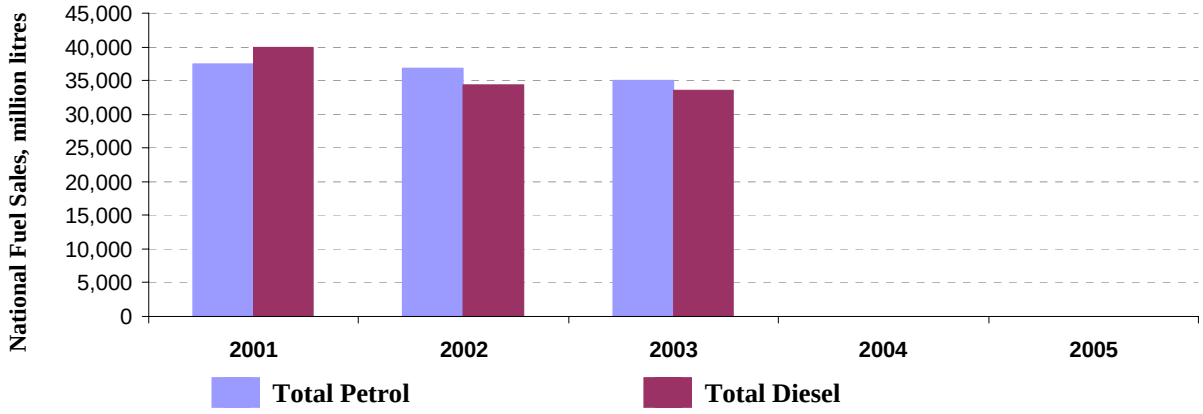


Figure 7.3: Temporal trends in national sales of low sulphur petrol (%)

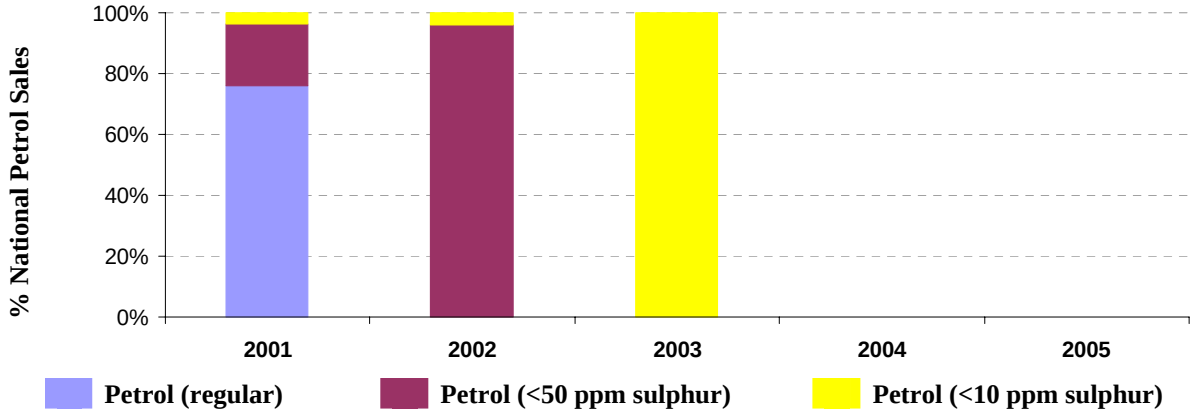
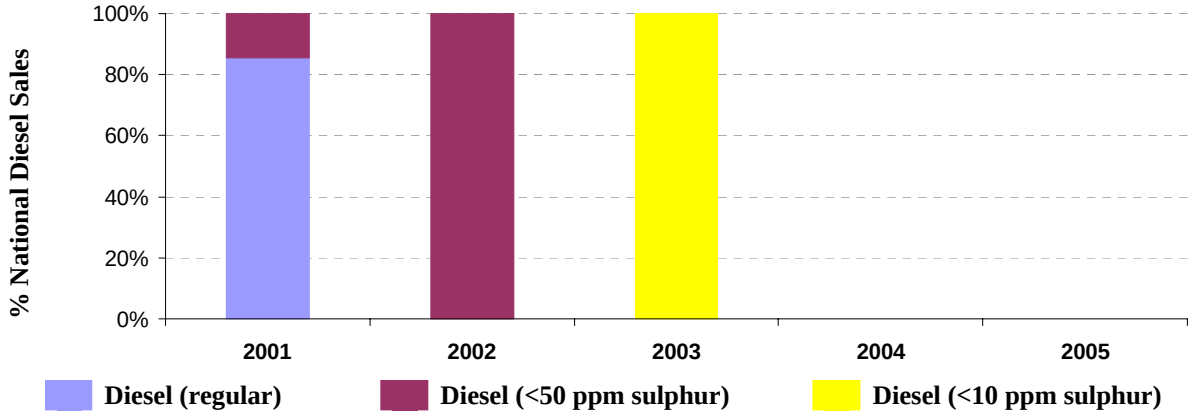


Figure 7.4: Temporal trends in national sales of low sulphur diesel (%)



8 Greece

8.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

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

8.1.1 Sales

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

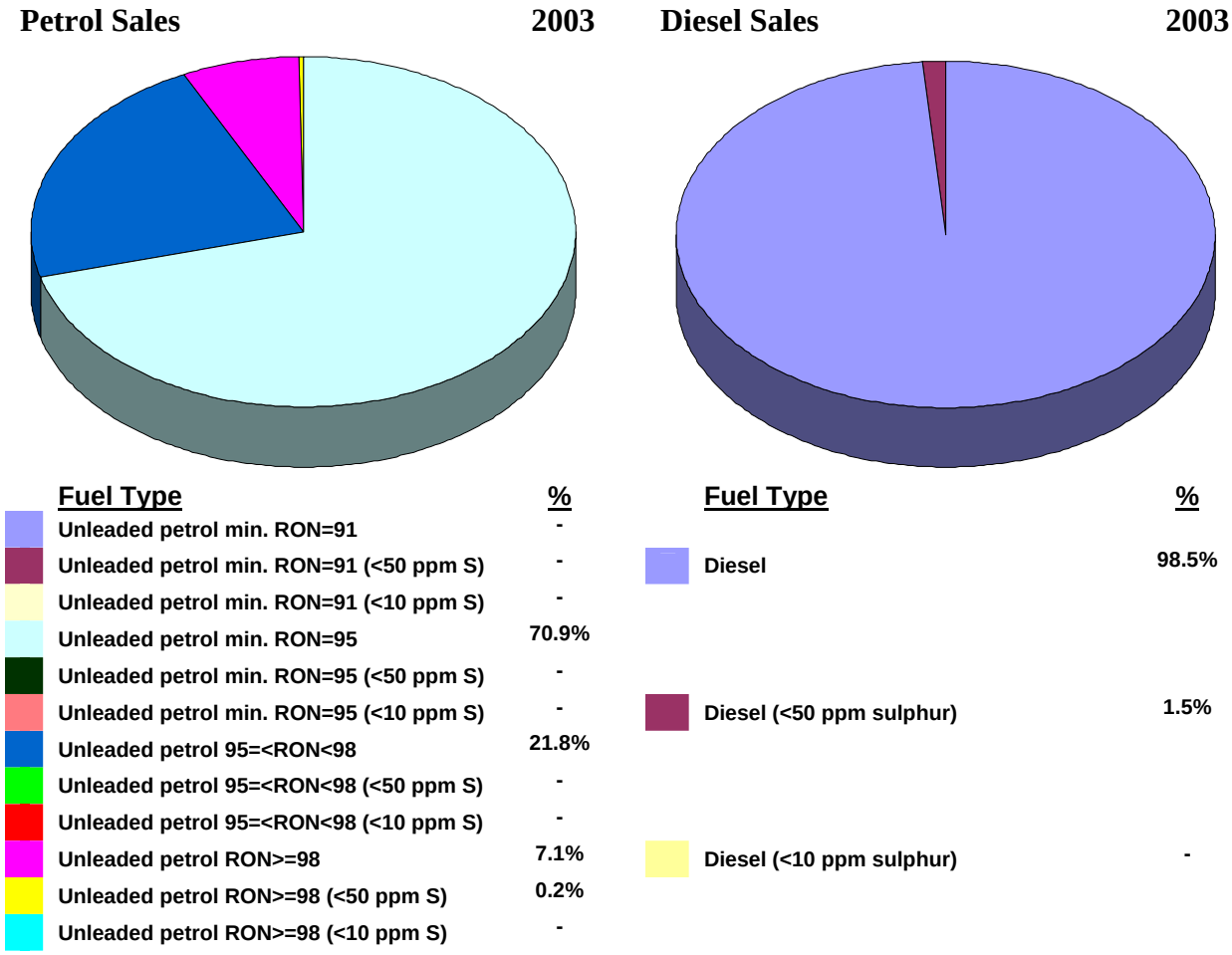


Figure 8.1 above shows that the number of grades of petrol available in Greece in 2003 has increased to four, with the majority of petrol sold, 71% (93% in 2001 and 92% in 2002), being RON95 level. For the first time low sulphur fuel grade sales were available for petrol and diesel, though total sales were low (0.2% and 1.5% respectively). Sales of Lead Replacement Petrol (LRP – reported under Unleaded petrol 95=<RON<98) were provided for the first time for 2003.

8.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available

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 8.1.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	108	72	92		
Diesel	281	500	290		

8.2 FUEL QUALITY MONITORING 2003

8.2.1 Description of system

Responsible organisation(s): General State Chemical Laboratory

Location(s) of sampling: at refineries, storage tanks of the marketing companies, at fuel transportation trucks, at vessels and ships, at petrol stations, cars etc.

Time/frequency of sampling: monthly throughout the year

Number of samples taken: 242 petrol and 91 diesel

Specification of test methods: not specified.

Collection of sales data: not specified.

Other details: Sampling is done at refineries and customs points as well as retailing stations but this may not have been included in the report. Sampling at refineries and customs points was not originally set up to measure all parameters as it is aimed at combating fraud.

8.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 242

Frequency of sampling: Monthly throughout the year

Reporting

Fuel grades: 4 fuel grades, reported separately only by RON category (i.e. 3 tables).

Parameters: All parameters were measured

Other:

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.

8.2.3 Diesel reporting

Sampling

Number of samples: 91

Frequency of sampling: Monthly throughout the year

Reporting

Fuel grades: 2 grades reported together

Parameters: All parameters are measured

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: One sample exceeded the limit value for distillation 95% point (360°C) with 367°C. Two samples exceeded the limit value for sulphur (350 ppm), with 570 and 500 ppm.

Statistical significance: The tolerance limits for distillation was calculated as 367.2, and therefore the sample was not in breach of the Directive. The tolerance limit for sulphur is 380 ppm and therefore the two samples were noncompliant with the Directive with respect to sulphur content.

Member State's notes: The noncompliant diesel samples were found to contain the euromarker for heating oil, indicating contamination; the results were sent to the authority responsible for sampling for further actions.

8.3 TEMPORAL TRENDS

The following Figure 8.2 to Figure 8.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol increased by 57% between 2001 and 2003 (up 40% between 2002 and 2003), with sales of diesel increasing by 14%. 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 22% of total sales in 2003 and would explain the large increase in total sales since 2001 & 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 0.2% and 1.5% respectively.

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 (%)

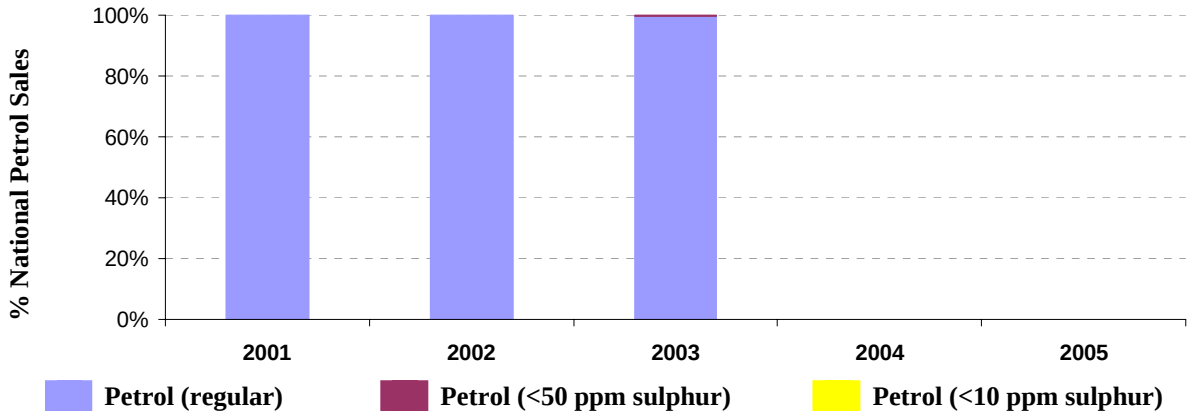
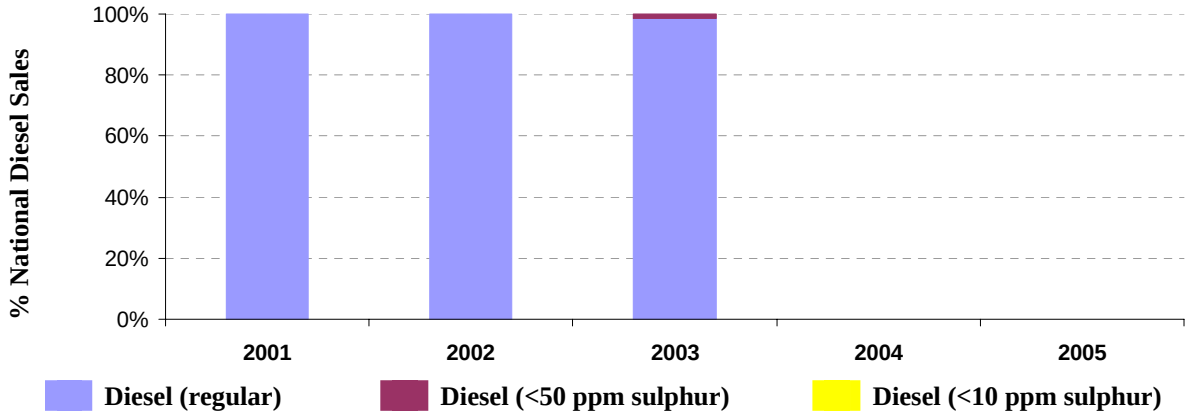


Figure 8.4: Temporal trends in national sales of low sulphur diesel (%)



9 Ireland

9.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	Unleaded petrol (max < 96 RON)	Yes	4
5		< 50 ppm	Unleaded petrol (max < 96 RON, < 50 ppm S)	Yes	4
6		< 10 ppm	Unleaded petrol (max < 96 RON, < 10 ppm S)	Yes	4
7	Petrol 95 = < RON < 98	Regular	Unleaded petrol (>= 96 RON)	Yes	4
14	Diesel Fuel	< 50 ppm	Diesel fuel	Yes	14

9.1.1 Sales

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

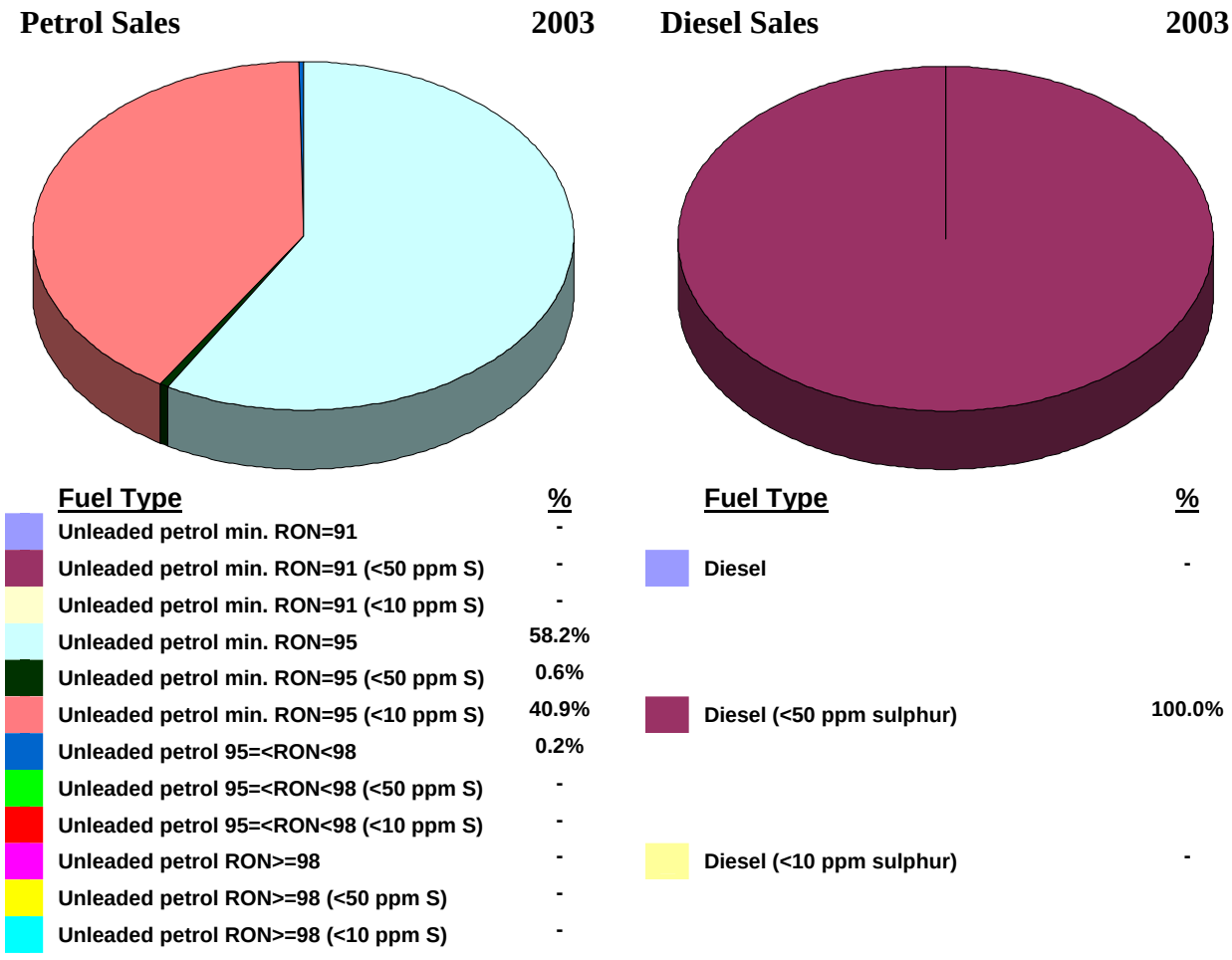


Figure 9.1 shows that 2003 diesel was only available as low sulphur grade, with petrol being available mostly at RON 95 grade (RON<96 national grade) but at various levels of sulphur. The majority of sales being of RON95 grade at regular sulphur content (58% sales, down from 63% in 2001 and 66% in 2002) and also sulphur free (40% sales, compared to 35% in 2001 and 33% in 2002).

9.1.2 Sulphur content

Geographic availability of sulphur-free fuels: Petrol produced by the refinery at Whitegate was sulphur free and was distributed to cover the Munster area, Limerick, Galway and New Ross. In total this accounted for some 40% of national sales of petrol in 2003 and geographically 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.

Average sulphur content of all petrol and diesel sold: the average sulphur content of both petrol and diesel has decreased since 2001, see Table 9.1.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	83	57	52		
Diesel	231	49	42		

9.2 FUEL QUALITY MONITORING 2003

9.2.1 Description of system

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

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, 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 home refinery and on receipt at terminals, a certificate of quality is available for inspection fore each cargo/batch. Further quality spot checks are carried out at selected retail sites to give quality traceability from refinery to end user.

Time/frequency of sampling: monthly throughout the year.

Number of samples taken: 80 petrol and 48 diesel

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.

9.2.2 Petrol reporting

Sampling

Summer Period: Arctic: 1st June to 31st August

Number of samples: 80

Frequency of sampling: Quarterly throughout the year, together with spot checks at selected retail sites.

Reporting

Fuel grades: Four grades with measurements reported together in a single table

Parameters: All parameters were measured

Other:

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: 8 samples exceeded some of the parameter limit values for RON (min 95) with the lowest being 94.0. 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) and 1.2%v/v (benzene). The sample was within the tolerance limit for benzene and therefore complied with the Directive. Member State's notes relating to the samples outside of the tolerance limits are below.

Member State's notes: Of the 80 petrol samples taken in 2003, 8 samples (10%) indicated relatively minor exceedances of the RON parameter. All such cases were raised with the relevant fuel supplier, who in 7 cases produced certificates of conformity indicating that the fuel was on specification ex-refinery (one response outstanding). Industry has indicated that "light hydrocarbons" material can be lost through evaporation if inadequately stored and held over a relatively long period of time prior to testing, which for operational reasons has been a feature.

The Department of the Environment, Heritage and Local Government is in ongoing discussions with the industry's representative body (Irish Petroleum Industry Association) to further understand and mitigate any discrepancy between refinery certification and downstream analysis, and with a view to strengthening procedures, as appropriate, to resolve this matter. All other parameters were within the relevant Directive limits.

9.2.3 Diesel reporting

Sampling

Number of samples: 48

Frequency of sampling: Monthly throughout the year

Reporting

Fuel grades: 1

Parameters: All parameters measured

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

9.3 TEMPORAL TRENDS

The following Figure 9.2 to Figure 9.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2003, petrol sales increased by 3% and diesel sales increased by 4%. There was a 26 % decrease in the sales of low sulphur petrol, and a 6% decrease in standard petrol sales, but a 20% increase of sulphur free petrol. Diesel sales switched completely from regular grade to low sulphur (<50 ppm) diesel in 2002.

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

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

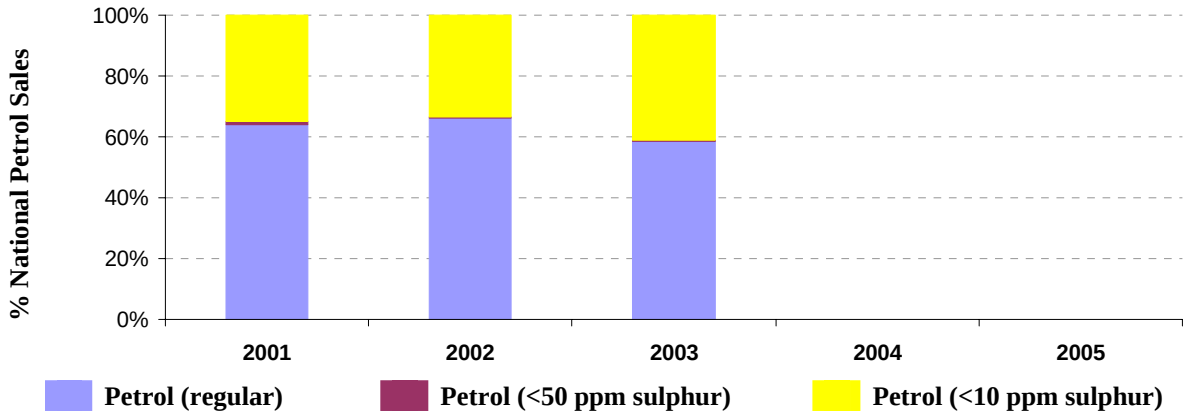
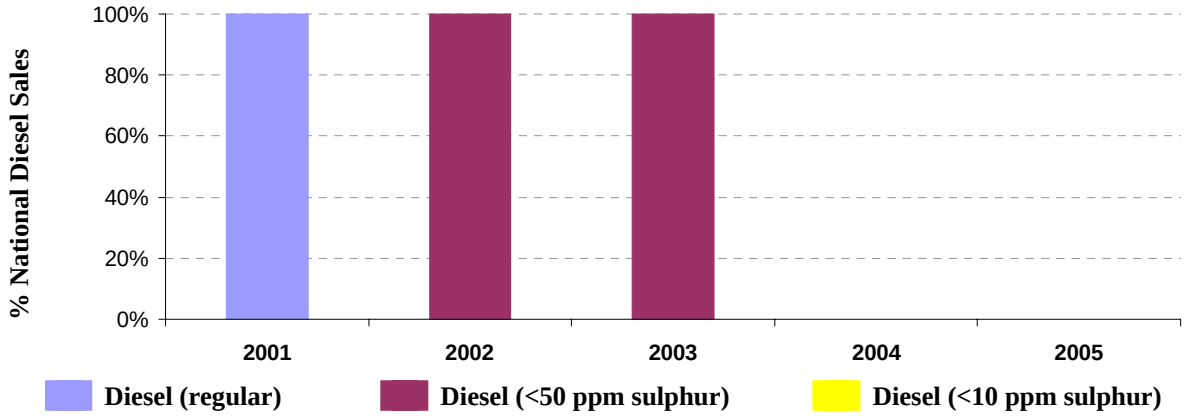


Figure 9.4: Temporal trends in national sales of low sulphur diesel (%)



10 Italy

10.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade ID	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	-	Yes	4
13	Diesel Fuel	Regular	-	Yes	13

10.1.1 Sales

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

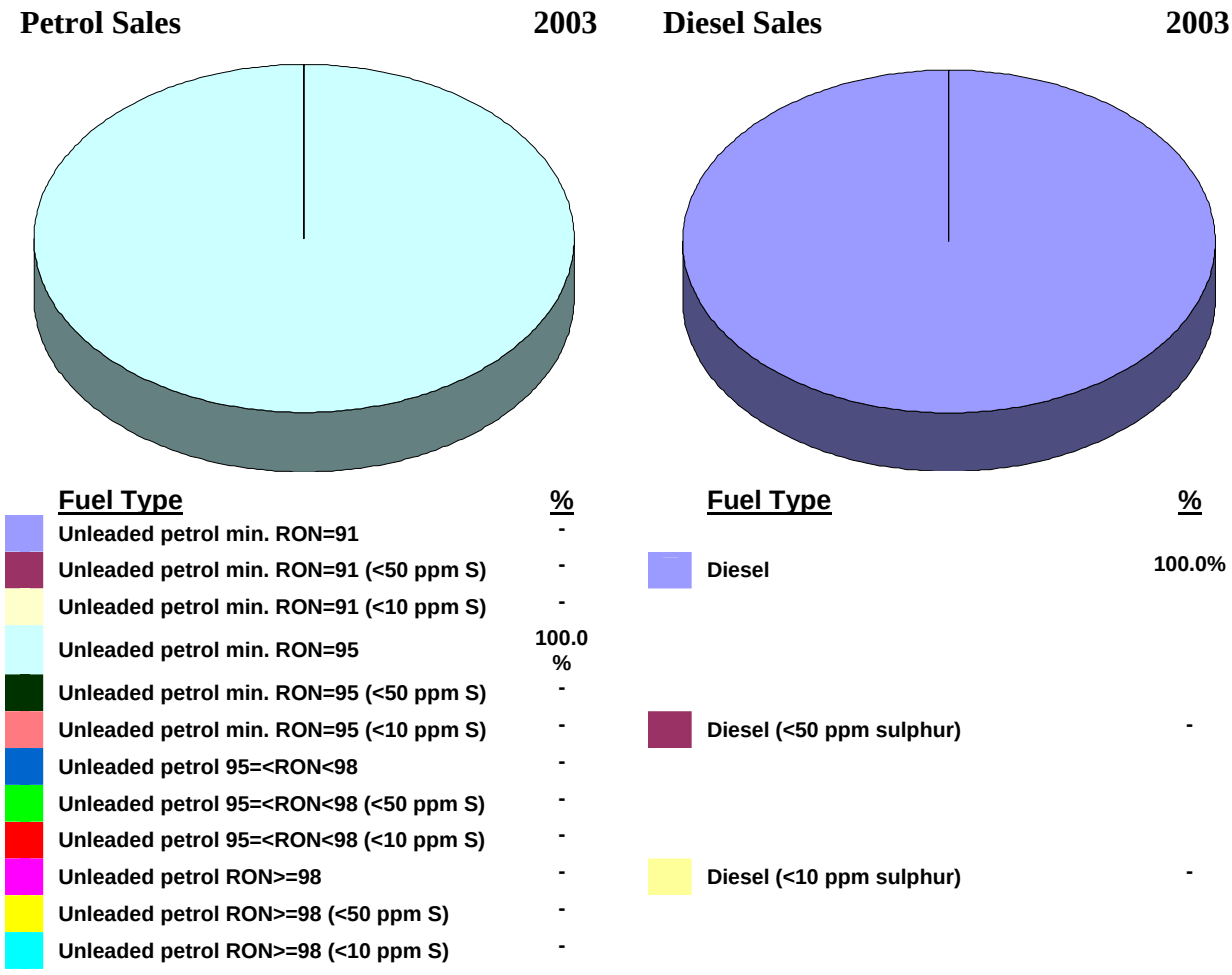


Figure 10.1 shows that all of petrol sales accounted for were of RON95 grade and all diesel fuel sold was of the regular grade.

10.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available as a separate grade in 2003.

Average sulphur content of all petrol and diesel sold: the average sulphur content of both petrol and diesel has decreased since 2001, see Table 10.1. Although no low sulphur (<50 ppm) 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 10.1: Annual trend in average sulphur content in petrol and diesel fuels

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	61	51	53		
Diesel	273	246	238		

10.2 FUEL QUALITY MONITORING 2003

10.2.1 Description of system

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

Location(s) of sampling: sales outlets throughout the Italian territory.

Time/frequency of sampling: on a monthly basis of throughout the year.

Number of samples taken: 192 petrol and 276 diesel.

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 executed by 1st January 2005.

The 2003 report from Italy had been drawn up 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: 31% in North-West, 15% in North-East, 17% in Centre, 16% in South, 21% 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.

10.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 192

Frequency of sampling: Monthly

Reporting

Fuel grades: 1

Parameters: All parameters were measured.

Other:

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: Individual samples exceeded the variety of different parameter limit values: RON (min. 95), MON (min. 85), summer vapour pressure (max. 60 kPa) and evaporation at 100°C.

Statistical significance: Some of these samples were outside of the zone of tolerance for the test methods and were therefore noncompliant with the Directive: 1 sample for summer vapour pressure (67.7) and 3 samples for distillation at 100°C (42.0, 42.0, 43.0).

Member State's notes: In order to ensure the compliance with the Directive 98/70/EC, laboratories and organisations qualified to carry out the sampling and the analysis, have been asked to strictly follow the sampling and rules set up by EN ISO 4259 for testing limits. A further improvement is expected from the decision taken by the national standardisation body (UNICHIM) to monitor performance of the involved laboratories through the proficiency testing schemes foreseen for laboratories' accreditation purposes. Besides, in Italy there is a monitoring system carried out by competent national authority in the production and importing sites.

Italy carried out successfully these actions last year. Compared to 2002, in fact, the number of petrol and diesel fuel samples which do not comply with the specification limits decreased.

Further, Italy elaborated a draft of decree necessary to comply with the Directive 2003/17/EC. The draft updated the rules for monitoring system both for marked, produced and imported fuel.

10.2.3 Diesel reporting

Sampling

Number of samples: 276

Frequency of sampling: Monthly

Reporting

Fuel grades: 1

Parameters: All parameters were measured

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: Some samples exceeded the limits for Cetane number (51.0 min.), and distillation 95% point (360°C), and sulphur content (350 ppm) with the greatest exceedances being 49.0, 368°C and 390 ppm respectively.

Statistical significance: Some of these samples were outside of the zone of tolerance for the test methods and were therefore noncompliant with the Directive: One for distillation 95% point (368.0°C) and sulphur content (390 ppm).

Member State's notes: See section on Petrol reporting, section 10.2.2.

10.3 TEMPORAL TRENDS

The following Figure 10.2 to Figure 10.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol increased by 13% between 2001 and 2003, while sales of diesel increased by 9%. No low or zero sulphur fuels were reported to be on sale.

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

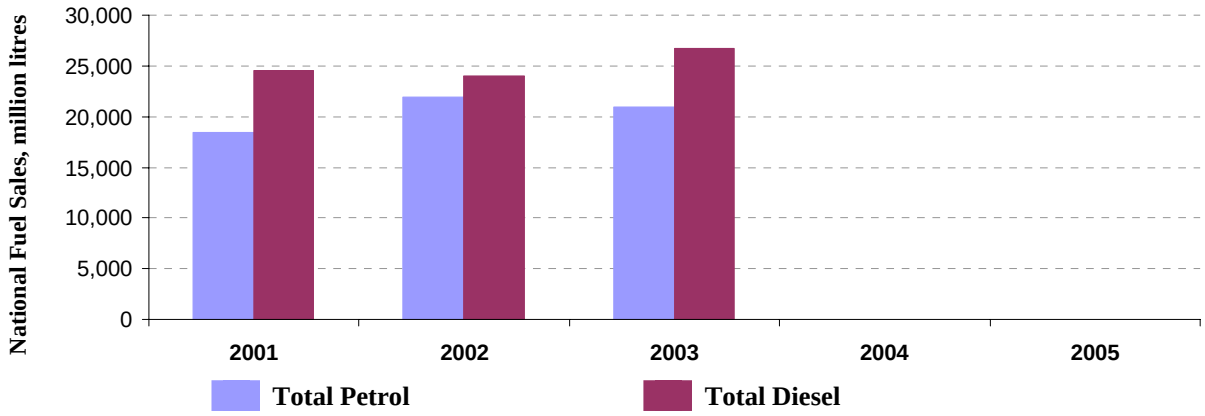


Figure 10.3: Temporal trends in national sales of low sulphur petrol (%)

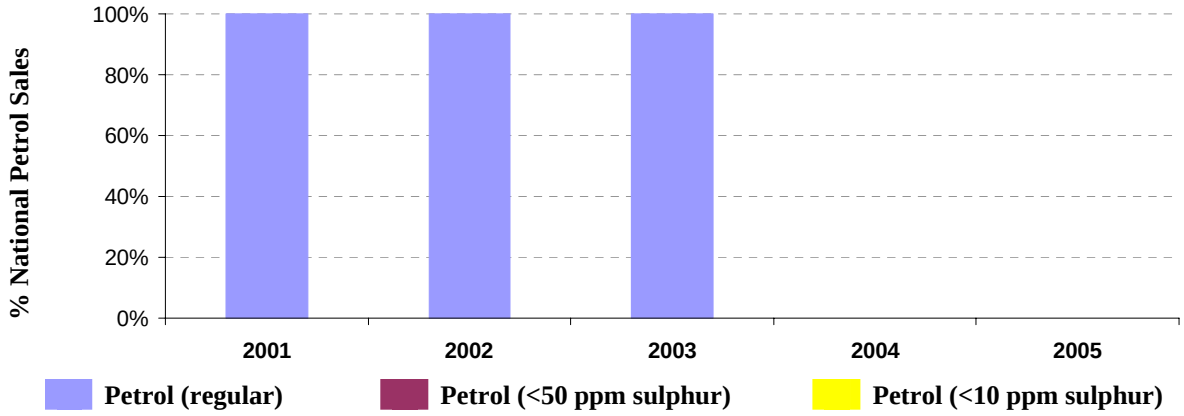
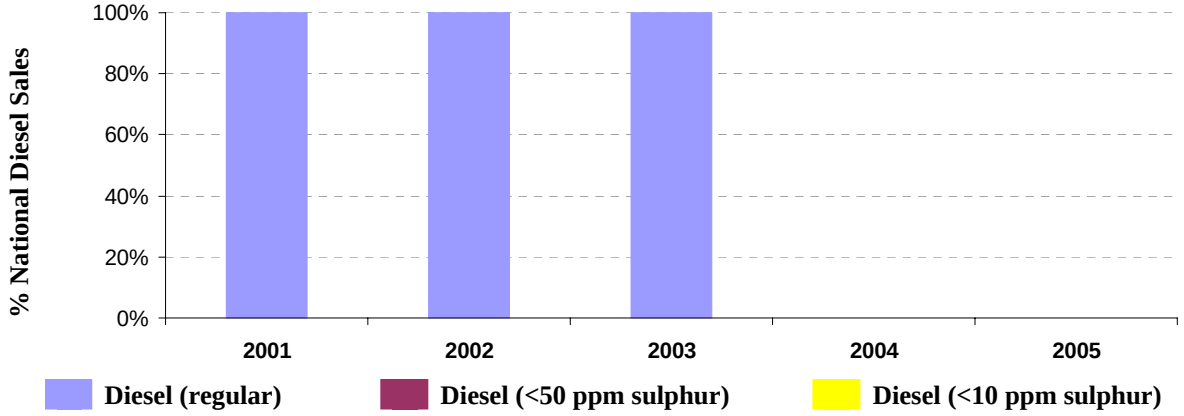


Figure 10.4: Temporal trends in national sales of low sulphur diesel (%)



11 Luxembourg

11.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
1	Petrol min. RON = 91	Regular	Essence normale RON 91	Yes	Data not supplied
4	Petrol min. RON = 95	Regular	Essence Eurosuper RON 95	Yes	4
11	Petrol RON > = 98	< 50 ppm	Essence super plus RON 98 (< 50 ppm)	Yes	11
14	Diesel Fuel	< 50 ppm	Carburant Diesel (< 50 ppm)	Yes	14

11.1.1 Sales

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

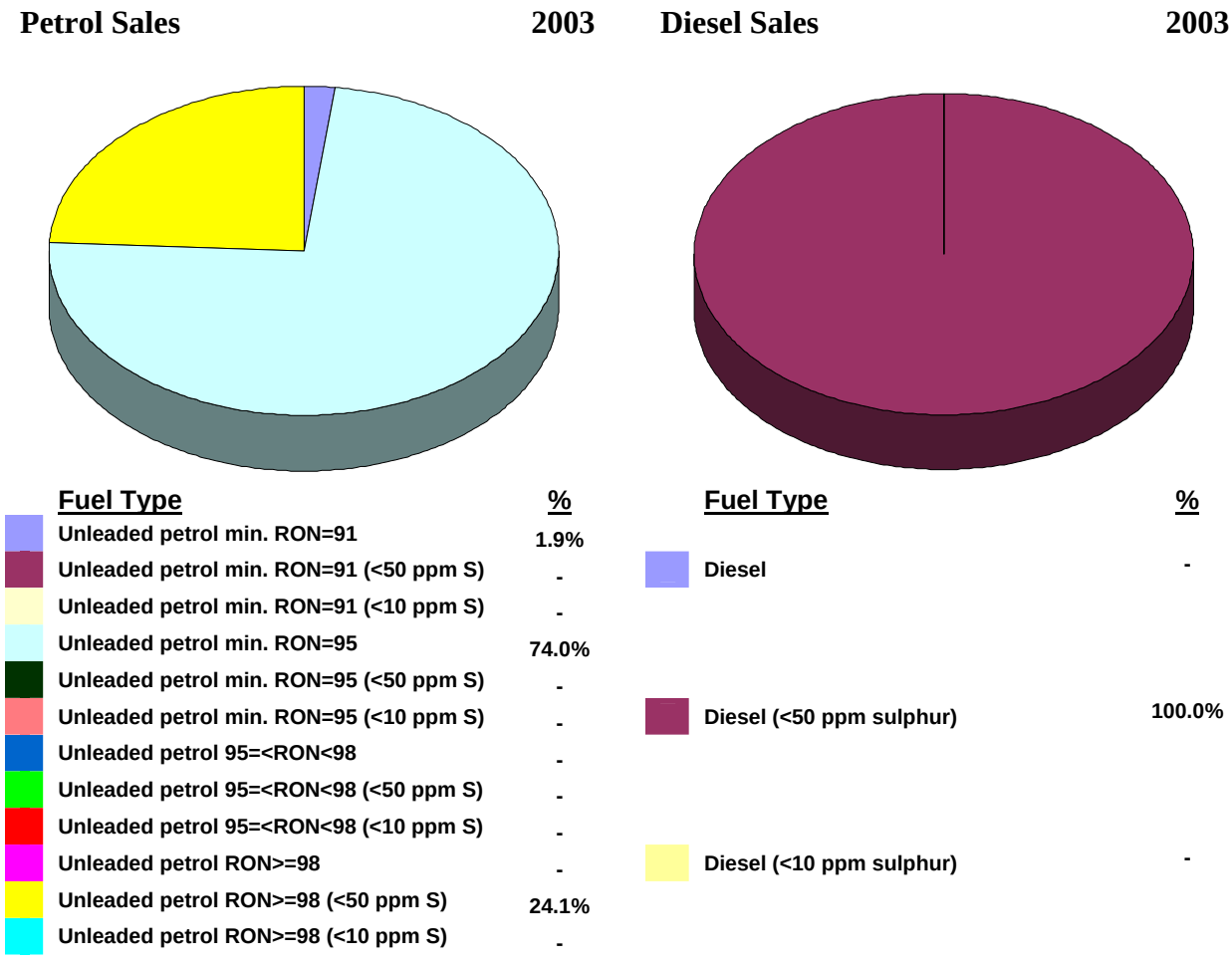


Figure 11.1 shows that the majority (74%) of Luxembourg's petrol sales in 2003 were of RON95 grade (compared to 67% in 2001 and 70% in 2002), with the remainder comprising of RON91 (2%, compared to 4% in 2001 and 3% in 2002) and RON>98, <50 ppm sulphur (24%, compared to 27% in 2002 and 2% in 2001 with 27% regular sulphur grade). Luxembourg completely switched to low sulphur diesel grades from 2002.

11.1.2 Sulphur content

Geographic availability of sulphur-free fuels: none on sale in 2003

Average sulphur content of all petrol and diesel sold: the average sulphur content of petrol and diesel has fluctuated since 2001, see Table 11.1, however this may be as a result of the low number of samples taken (see 11.2.1).

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	18	38	44		
Diesel	252	33	42		

11.2 FUEL QUALITY MONITORING 2003

11.2.1 Description of system

Responsible organisation(s): Luxembourg Environment Agency

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

Number of samples taken: 10 Petrol and 4 Diesel

Specification of test methods: as required by the Directive.

Collection of sales data: from the fuel importers

Other details: only some of the fuel importers answered by sending analysis data in 2003, RON 91 data was again absent.

11.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 10

Frequency of sampling: Periodically covering both summer and winter periods

Reporting

Fuel grades: Three Fuel grades were on sale, however analysis data was only presented for two grades in separate tables (RON91 is omitted).

Parameters: All parameters were measured.

Other:

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.

11.2.3 Diesel reporting

Sampling

Number of samples: 4

Frequency of sampling: Quarterly

Reporting

Fuel grades: 1 fuel grade available

Parameters: All parameters were measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

11.3 TEMPORAL TRENDS

The following Figure 11.2 to Figure 11.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2003, total petrol sales increased 1% and diesel sales rose by 28%. There was significant transfer of sales regular sulphur petrol (down 21%) to low-sulphur petrol (<50 ppm) and complete transfer to low-sulphur diesel in the same time period.

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

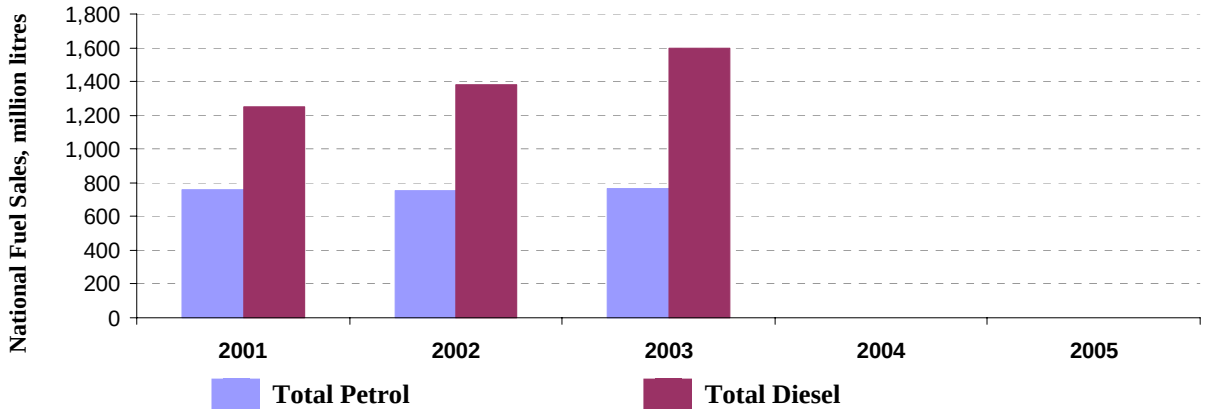


Figure 11.3: Temporal trends in national sales of low sulphur petrol (%)

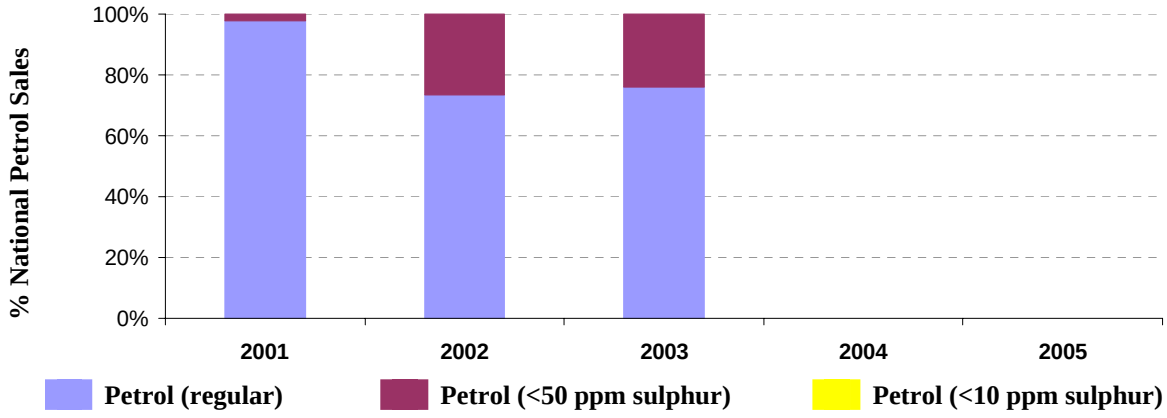
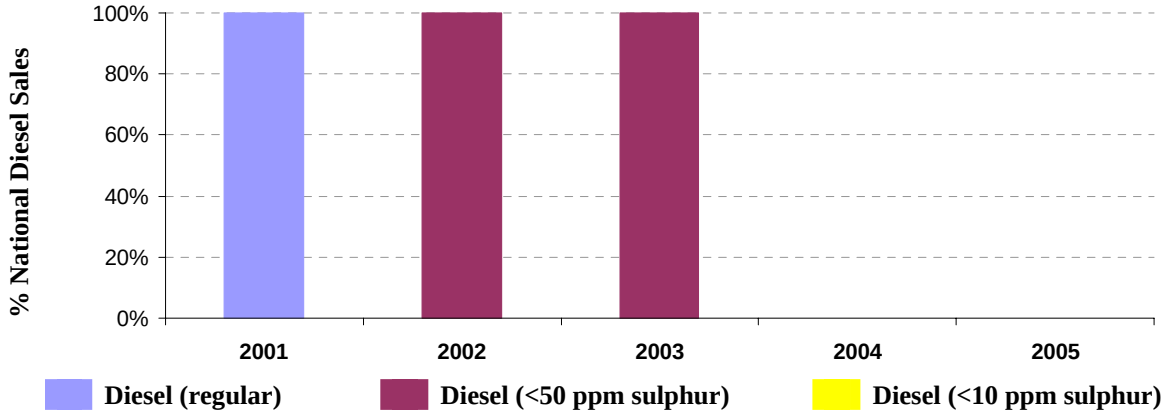


Figure 11.4: Temporal trends in national sales of low sulphur diesel (%)



12 Netherlands

12.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	-	Yes	4
10	Petrol RON > = 98	Regular	-	Yes	10
14	Diesel Fuel	< 50 ppm	-	Yes	14

12.1.1 Sales

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

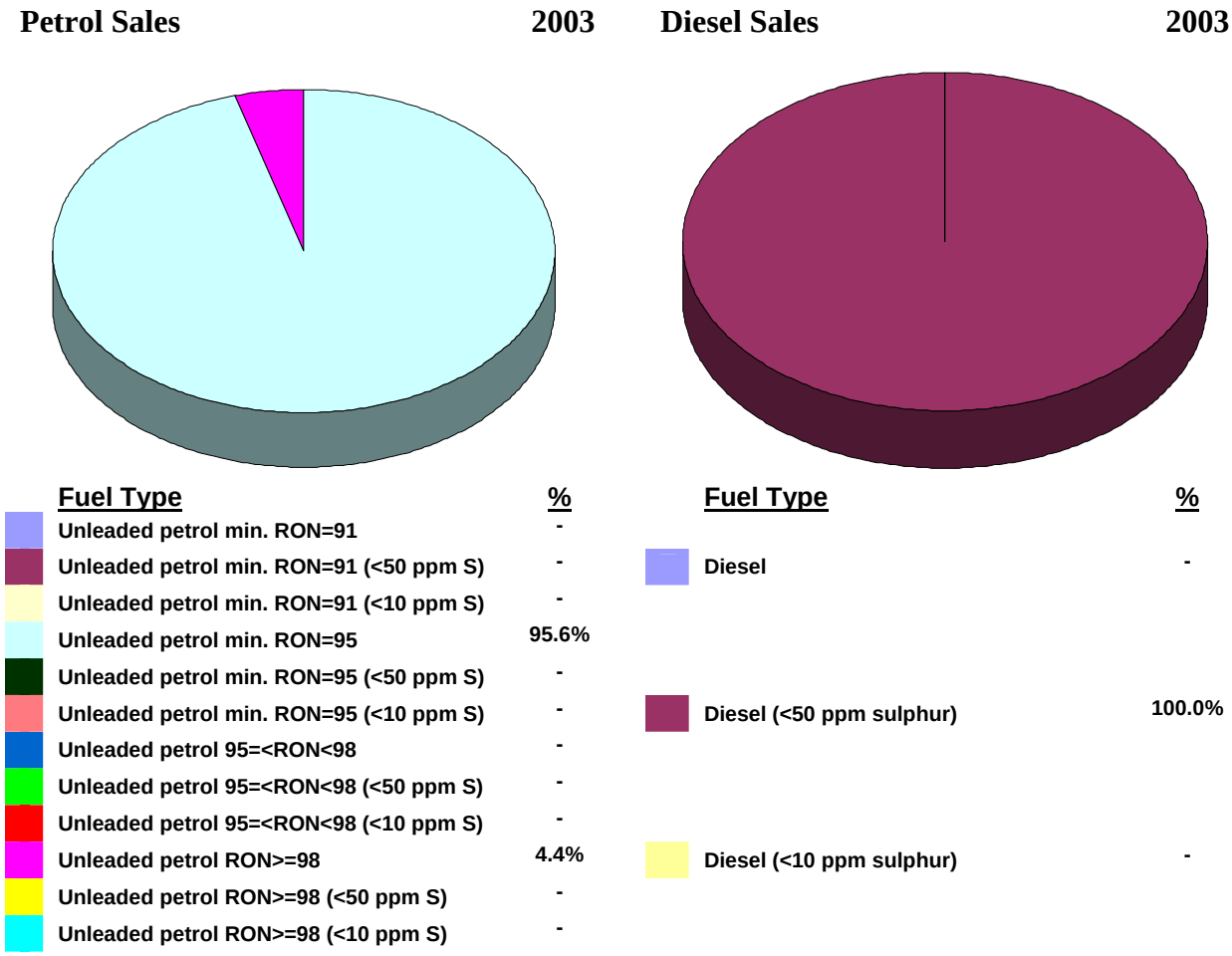


Figure 12.1 shows that 96% of petrol sold in The Netherlands in 2003 (up from 91% in 2001 and 92% in 2002) was of regular RON95 grade, with the remainder being RON>98.

Although no low sulphur (<50 ppm) petrol was marketed in 2003, 100% of diesel sales were of low sulphur grades (81% in 2002).

12.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available in 2003.

Average sulphur content of all petrol and diesel sold: the average sulphur content of both petrol and diesel has decreased since 2001, see Table 12.1. 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 12.1: Annual trend in average sulphur content in petrol and diesel fuels

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	51	60	26		
Diesel	42	34	31		

12.2 FUEL QUALITY MONITORING 2003

12.2.1 Description of system

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

Location(s) of sampling: a variety of refuelling stations across the Netherlands.

Time/frequency of sampling: sampling was carried out monthly from June to August and October to November 2003.

Number of samples taken: 100 petrol and 102 diesel.

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 to take samples 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 distribution was done of petrol stations to visit, 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 and for each grade of petrol/diesel available at >10% sales.

12.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 100

Frequency of sampling: Monthly between June to August and October to November 2003

Reporting

Fuel grades: Two petrol grades reported in the combined table

Parameters: All parameters measured.

Other:

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: In some samples the MON limit (min 85) and summer vapour pressure limit (max 60.0 kPa) were exceeded, with 84.6 and 65.1 kPa being the extremes.

Statistical significance: The MON sample was within the zone of tolerance (84.5) and therefore compliant with the Directive. Summer vapour pressure samples were the outside zone of tolerance for this parameter test method (61.8 kPa) and were therefore noncompliant with the Directive (see Member State comments below).

Member State's notes: In the summer period it appeared that in 17 samples the vapour pressure (DVPE) fell outside the specifications. In view of the deviation of the manipulated analysis method no further action was undertaken in 16 cases. The VROM inspectorate is currently researching the other case.

In the winter period 11 samples appeared not to fulfil the motor octane number specification. In view of the deviation of the manipulated analysis method no further action was undertaken here.

12.2.3 Diesel reporting

Sampling

Number of samples: 102

Frequency of sampling: Monthly between June to August and October to November 2003

Reporting

Fuel grades: 2 grades with measurements reported in a single table

Parameters: All parameters were measured.

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail: 12 samples exceeded the minimum limit for cetane number (51.0), with the minimum being 49.7.

Statistical significance: No samples were outside of the zone of tolerance for this parameter test method (min. 48.5) and were therefore compliant with the Directive (see Member State comments below).

Member State's notes: In the summer period 5 samples and in the winter period 7 samples appeared not to satisfy the cetane number specifications. In view of the deviation of the manipulated analysis method no further action was undertaken here. Furthermore, samples were also taken in the summer period from a transport business and a bus company. These samples conformed to the specifications.

12.3 TEMPORAL TRENDS

The following Figure 12.2 to Figure 12.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2003 petrol sales increased by 9% and diesel sales decreased by 11%. The only low sulphur (<50 ppm) fuel on sale was low-sulphur diesel, which comprised 100% of diesel sales from 2003.

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 (%)

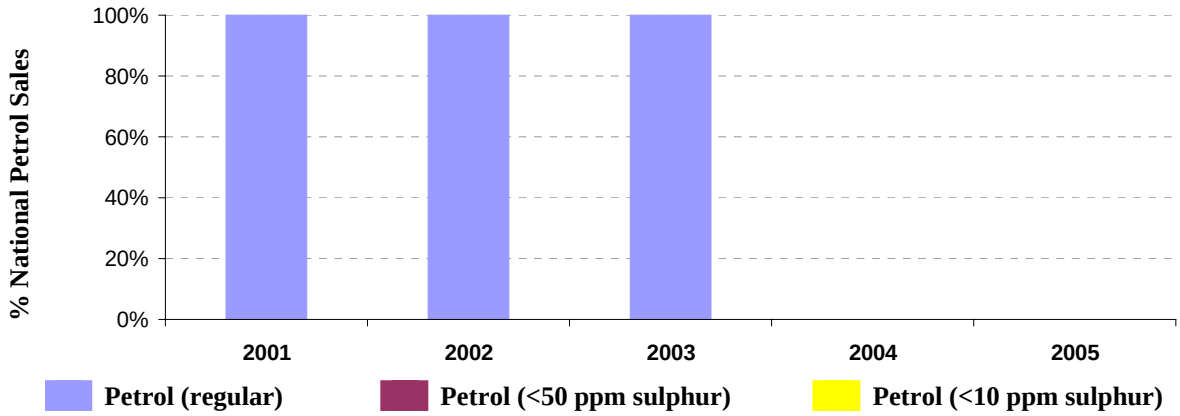
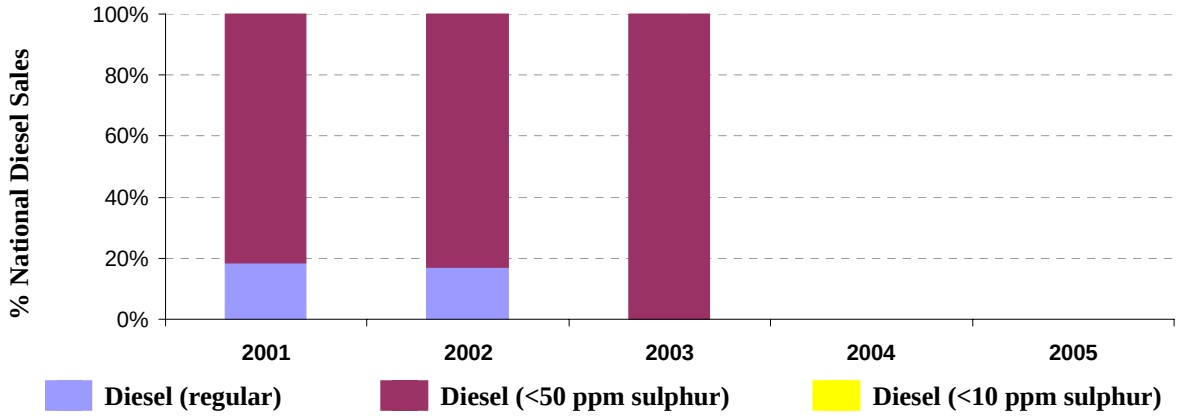


Figure 12.4: Temporal trends in national sales of low sulphur diesel (%)



13 Portugal

13.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
7	Petrol 95 = < RON < 98	Regular	-	Yes	7
10	Petrol RON > = 98	Regular	-	Yes	10
13	Diesel Fuel	Regular	-	Yes	13

13.1.1 Sales

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

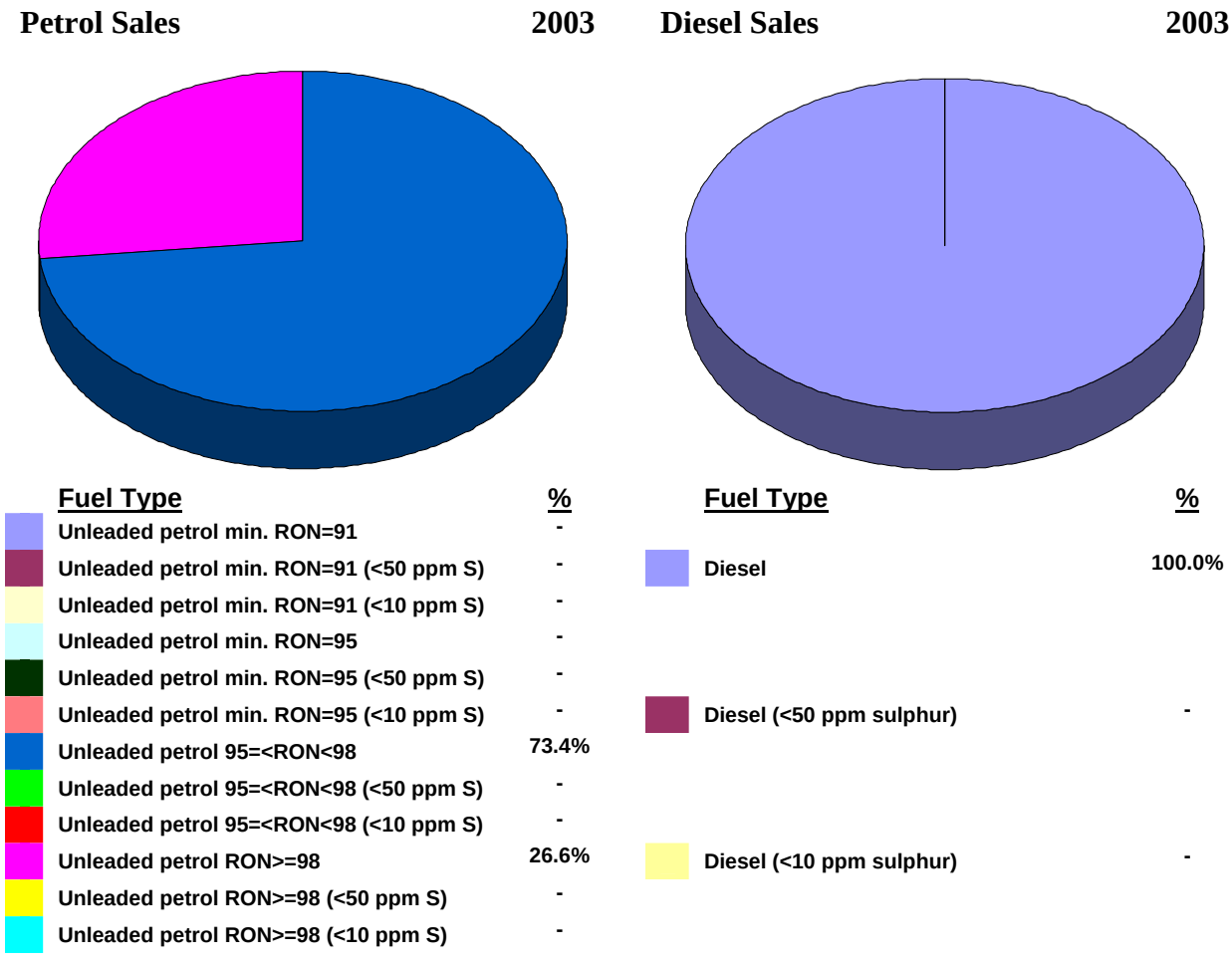


Figure 13.1 shows that of the fuel marketed in 2003 in Portugal, none was of low sulphur (<50 ppm) grade. The majority (73%) of petrol grades were RON95-98 (as for 2002, and up from 65% in 2001), with the remainder being at RON>98.

13.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available in 2002.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	447	57	61		
Diesel	272	296	261		

13.2 FUEL QUALITY MONITORING 2003

13.2.1 Description of system

Responsible organisation(s): DGE (Directorate General Energy), Institute for the Environment and Oil companies.

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: Roughly monthly throughout the year.

Number of samples taken: 35 petrol and 23 diesel

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.

13.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 35

Frequency of sampling: Roughly monthly

Reporting

Fuel grades:	2 grades were available, measurements were reported separately and separate measurements were reported for summer and winter sampling.
Parameters:	All parameters were measured, except oxygenates other than ethers containing five or more carbon atoms per molecule.
Other:	Portugal had a derogation for the sulphur content in Petrol until the 31st December 2002, given by the European Commission. No other oxygenates other than ethers were added.

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.

13.2.3 Diesel reporting

Sampling

Number of samples:	23
Frequency of sampling:	Monthly

Reporting

Fuel grades:	1
Parameters:	All parameters were measured.
Other:	

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

13.3 TEMPORAL TRENDS

The following Figure 13.2 to Figure 13.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2003, the sales of petrol increased by 12 %, while sales of diesel decreased by 6%. No low sulphur fuels were available.

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 (%)

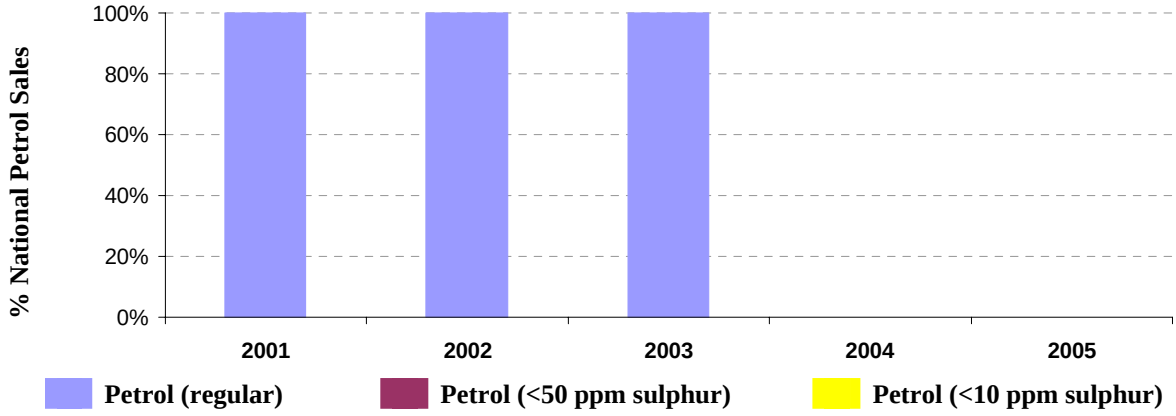
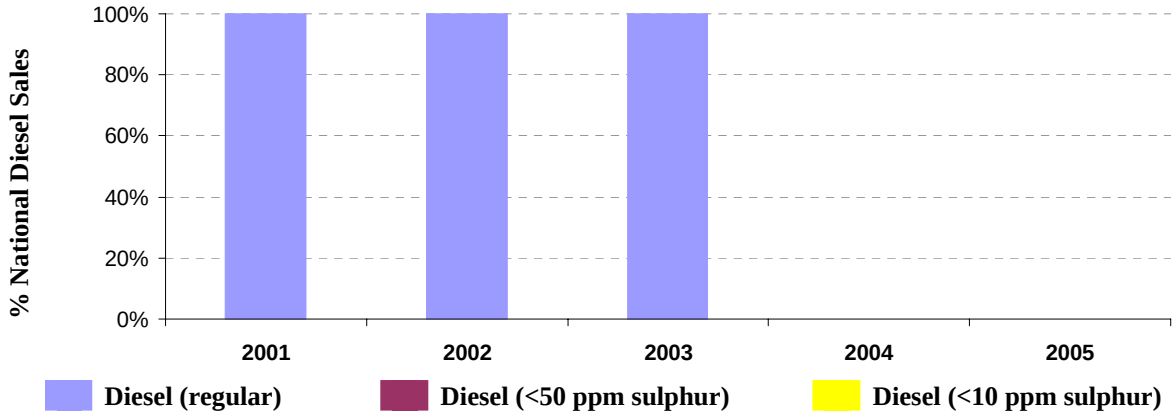


Figure 13.4: Temporal trends in national sales of low sulphur diesel (%)



14 Spain

14.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
4	Petrol min. RON = 95	Regular	Gasolina IO 95	Yes	4
7	Petrol 95 = < RON < 98	Regular	Gasolina 97 IO	Yes	7
10	Petrol RON > = 98	Regular	Gasolina 97 IO	Yes	10
13	Diesel Fuel	Regular	Gasoleo de automocion	Yes	13

14.1.1 Sales

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

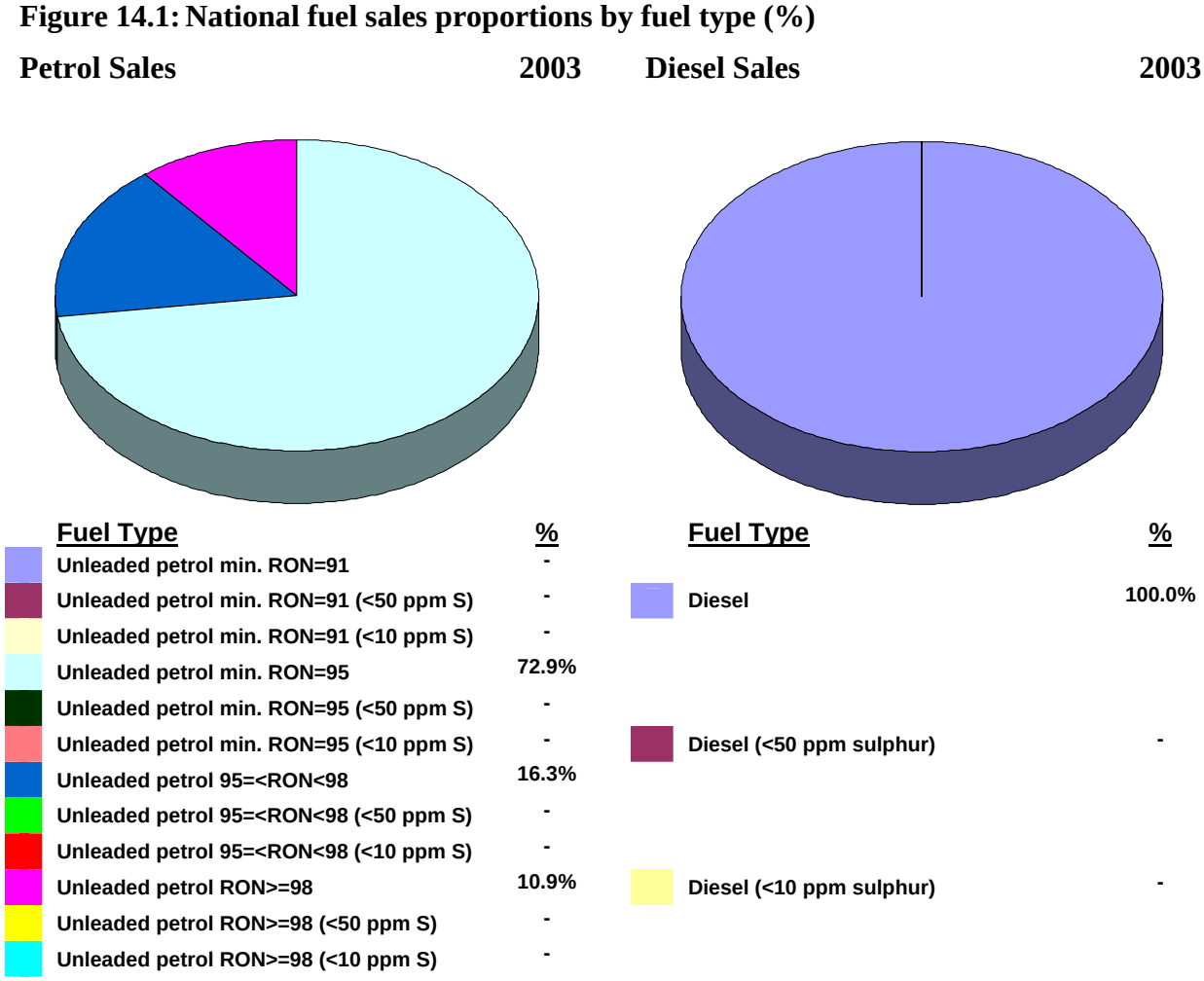


Figure 14.1 shows that the majority of fuel sold in Spain in 2003 was RON95 grade (73%, compared to 64% in 2001 and 69% in 2002), with the rest comprising of RON95-98 (16%,

down from 26% in 2001 and 20% in 2002) and RON>98 (11%, up from 9% in 2001 and 10% in 2002). No low sulphur (<50 ppm) grades of fuel were available in Spain in 2003.

14.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available in 2003.

Average sulphur content of all petrol and diesel sold: average sulphur content of petrol and diesel in Spain has varied little between 2001 and 2003, see Table 14.1.

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	96	103	103		
Diesel	278	276	267		

14.2 FUEL QUALITY MONITORING 2002

14.2.1 Description of system

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

Location(s) of sampling: fuel storage centres

Time/frequency of sampling: Monthly throughout the year

Number of samples taken: 763 petrol and 288 diesel

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 MTm/year. Imports of petrol and diesel for 2003 were 982 and 6,094 KTm respectively. Exports of petrol and diesel in 2003 were 1888 and 422 KTm respectively.

14.2.2 Petrol reporting

Sampling

Summer Period: Normal: 1st May to 30th September

Number of samples: 763

Frequency of sampling: Roughly monthly throughout the year

Reporting

Fuel grades: 3 reported separately with separate reporting for summer and

winter.

Parameters: All parameters were measured

Other:

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.

14.2.3 Diesel reporting

Sampling

Number of samples: 288

Frequency of sampling: Roughly monthly throughout the year

Reporting

Fuel grades: 1

Parameters: All parameters are measured

Other:

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

14.3 TEMPORAL TRENDS

The following Figure 14.2 to Figure 14.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales at decreased by 5% between 2001 and 2003, with diesel sales increasing by 15%. There were no low sulphur fuels on sale in Spain in 2003.

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

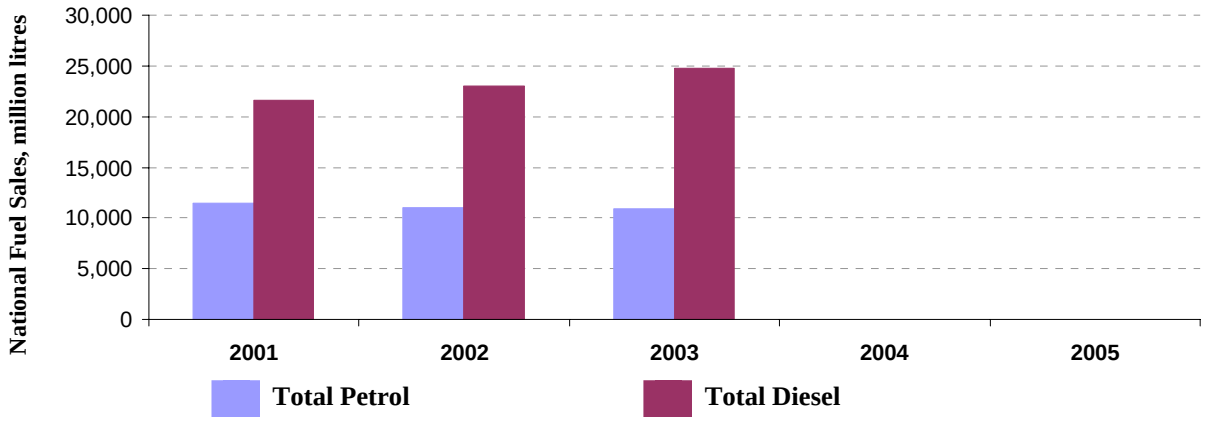


Figure 14.3: Temporal trends in national sales of low sulphur petrol (%)

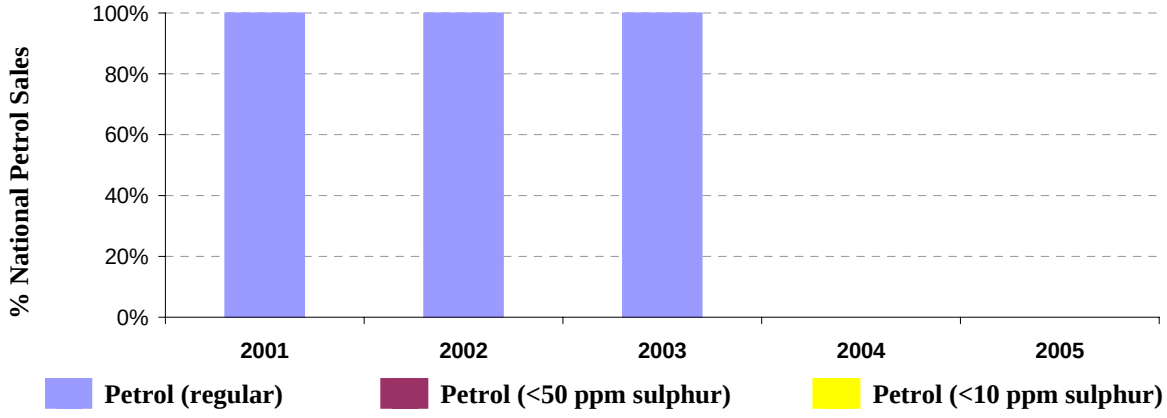
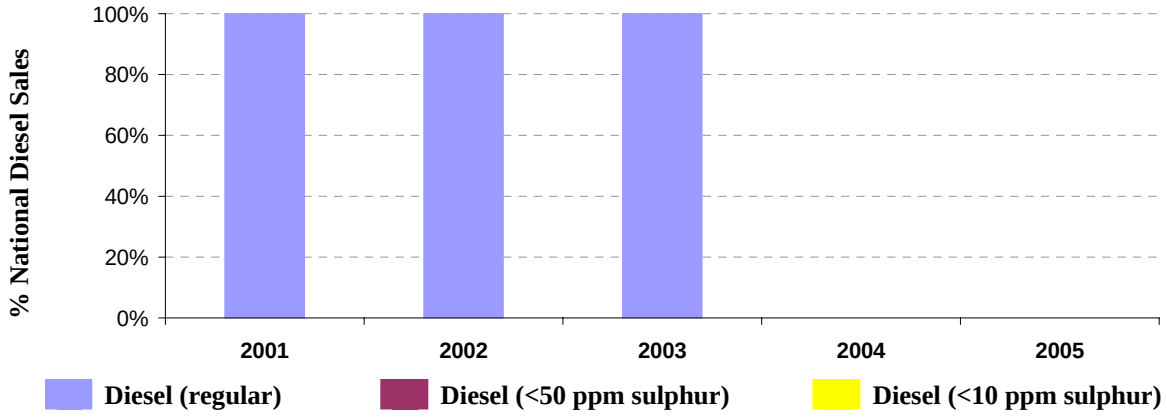


Figure 14.4: Temporal trends in national sales of low sulphur diesel (%)



15 Sweden

15.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

Ref. No.	Fuel grade	Sulphur Content	National fuel grade	Sales Data Availability	Reporting Category
5	Petrol min. RON = 95	< 50 ppm	95 Oktan	Yes	5
11	Petrol RON > = 98	< 50 ppm	98 Oktan	Yes	11
15	Diesel Fuel	< 10 ppm	Diesel	Yes	15

15.1.1 Sales

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

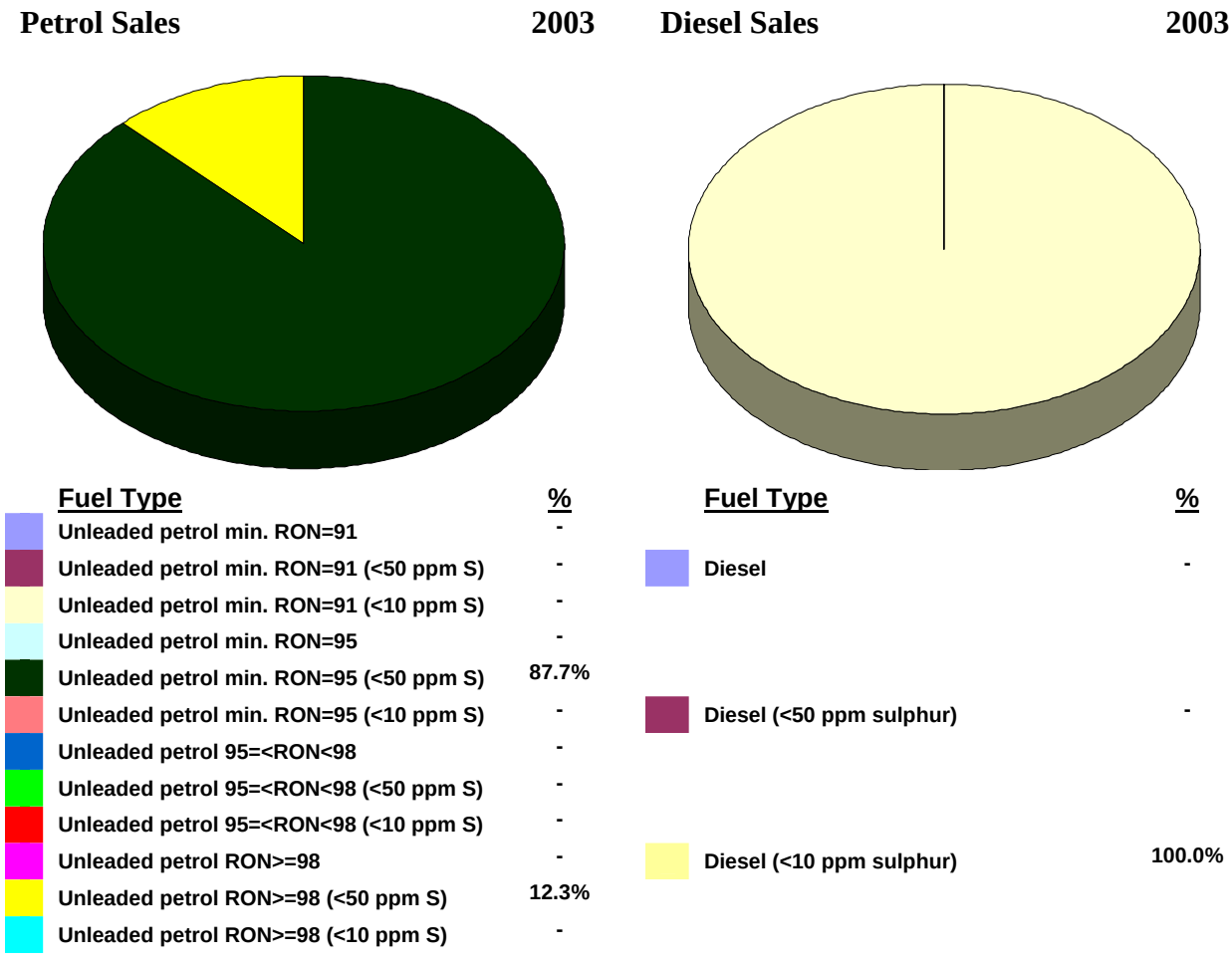


Figure 15.1 shows that the all petrol sold in Sweden in 2003 (as in 2001) was low sulphur (<50 ppm), with 88% being RON95 (87% in 2002) and 13% being RON98. All diesel sold was zero sulphur grade (<10 ppm) as in 2001.

15.1.2 Sulphur content

Geographic availability of sulphur-free fuels: Sulphur-free diesel fuel was available throughout the country. As early as 1996, 85% of all diesel fuel sold was sulphur-free and for the last three years virtually all diesel sold was sulphur-free. The average sulphur content of petrol is <14 ppm. Sulphur free petrol availability will be monitored when the updated fuels Directive is implemented in national legislation.

Average sulphur content of all petrol and diesel sold: the average sulphur content of both petrol and diesel has decreased since 2001, see Table 15.1. Whilst the required sulphur level for petrol is <50 ppm, much of fuel on sale in 2003 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 15.1: Annual trend in average sulphur content in petrol and diesel fuels

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	21	17	13		
Diesel	1	2	2		

15.2 FUEL QUALITY MONITORING 2003

15.2.1 Description of system

Responsible organisation(s): Swedish Environmental Protection Agency

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.

Number of samples taken: 929 petrol and 640 diesel

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.

15.2.2 Petrol reporting

Sampling

Summer Period:	Arctic: 1st June to 31st August
	(National period: Gotaland and Sveland (<61 degrees N): 1 May-15 September, Norrland (>61 degrees N): 16 May-31 August)
Number of samples:	929
Frequency of sampling:	Throughout the year

Reporting

Fuel grades:	2 reported in separate tables
Parameters:	All parameters except all oxygenates other than ethanol and ethers with 5 or more carbon atoms per molecule.
Other:	

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.

15.2.3 Diesel reporting

Sampling

Number of samples:	640
Frequency of sampling:	Throughout the year

Reporting

Fuel grades:	1
Parameters:	All parameters were measured.
Other:	

Exceedances of Directive 98/70/EC limit values

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

Diesel

None.

15.3 TEMPORAL TRENDS

The following Figure 15.2 to Figure 15.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales increased by 2% between 2001 and 2003, with diesel sales increasing by 7%. All petrol sold in 2001 - 2003 was low sulphur (<50 ppm), and all diesel was sulphur free (<10 ppm).

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

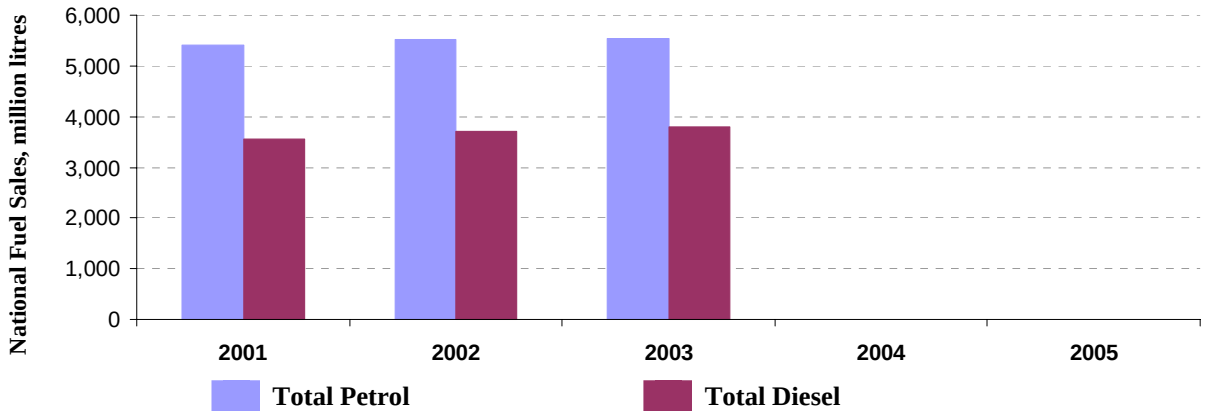


Figure 15.3: Temporal trends in national sales of low sulphur petrol (%)

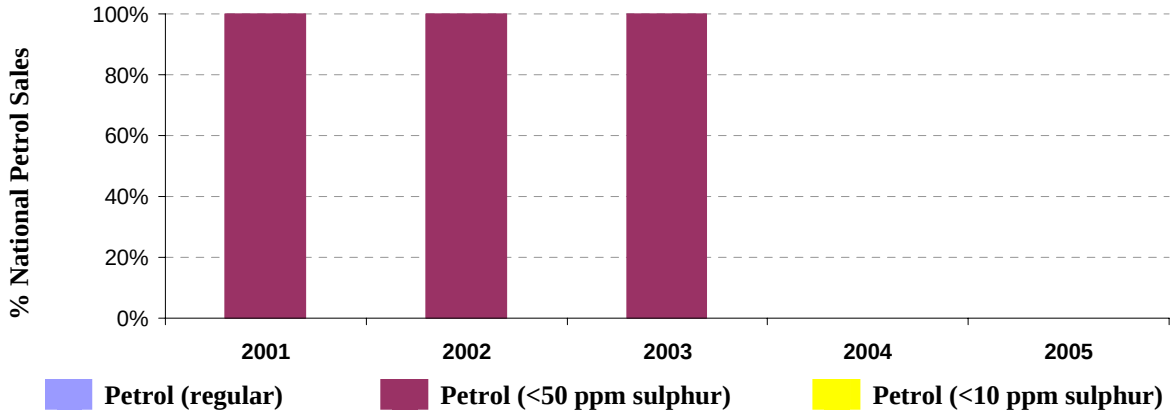
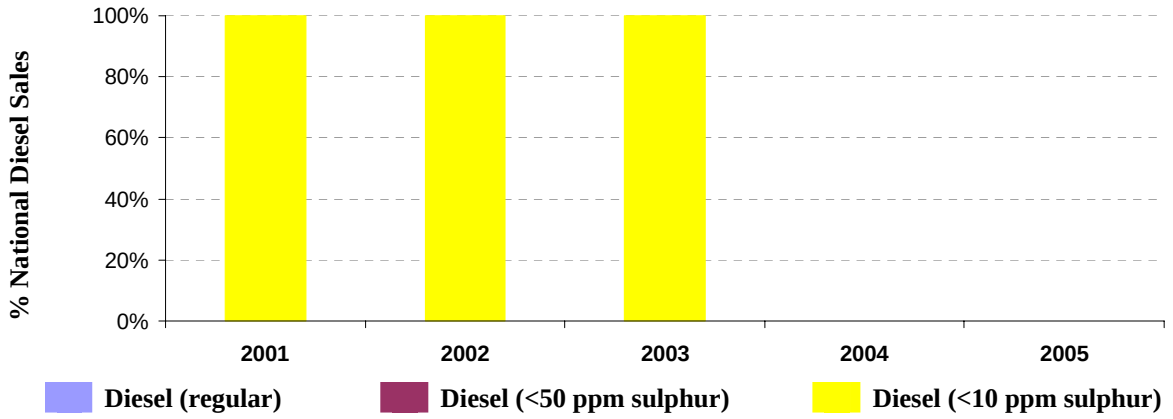


Figure 15.4: Temporal trends in national sales of low sulphur diesel (%)



16 United Kingdom

16.1 FUEL AVAILABILITY 2003

The following table lists the fuels that were reported to be available nationally in 2003, whether full sales data were provided and the category (the reference number) under which sampling measurements were reported.

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

16.1.1 Sales

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

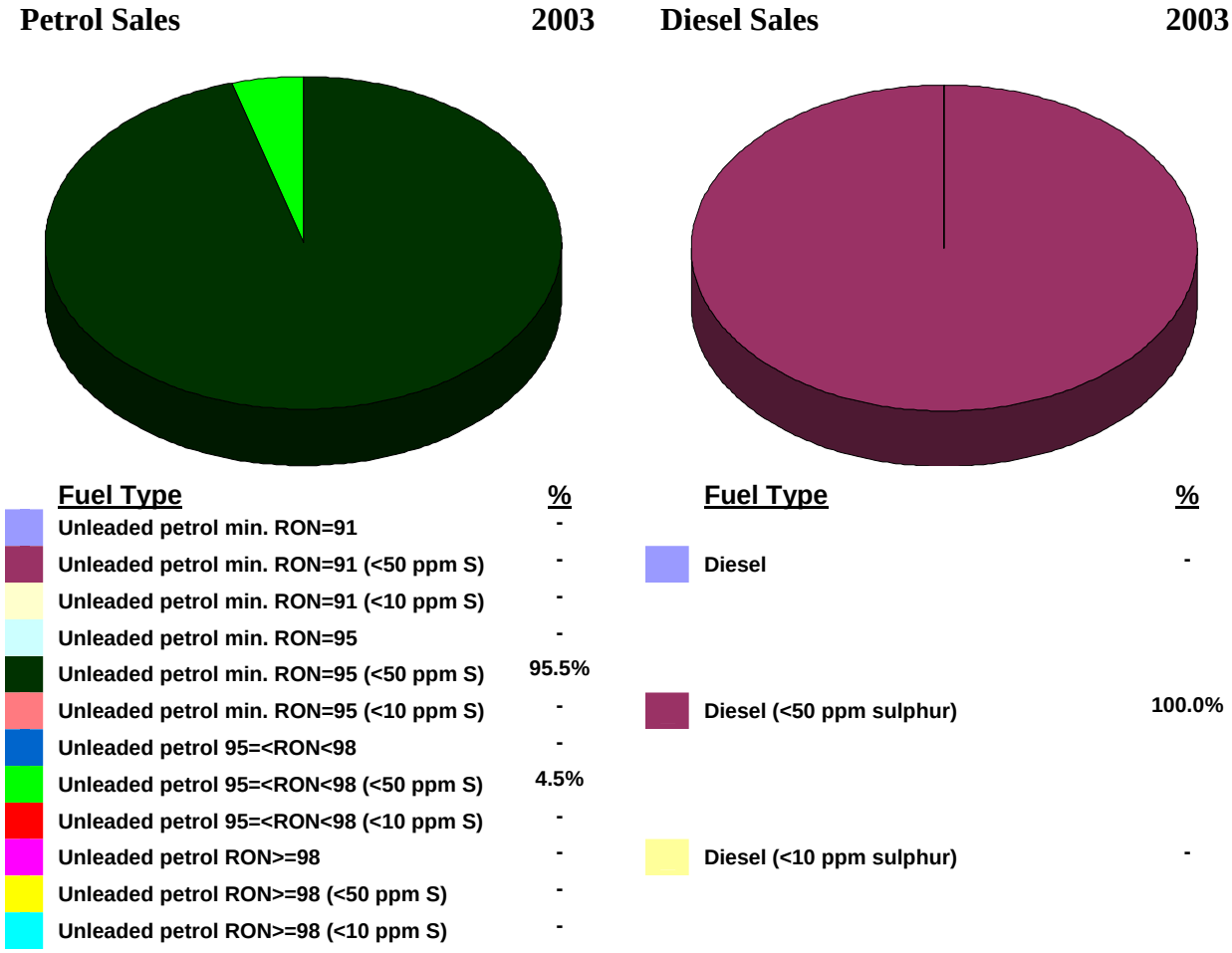


Figure 16.1 above shows the wide availability of low sulphur (<50 ppm) fuels on the UK market in 2003, with 100% of all petrol and diesel fuel sold being low sulphur. For petrol,

there was a change from 33% of RON95 fuel sold being low sulphur (<50ppm) in 2001, to 96% of fuel being RON95 low sulphur fuel in 2002 and 2003. The remaining 4% of fuel was accounted for by RON98 fuel (includes LRP and Super Unleaded), down from 6% in 2001.

16.1.2 Sulphur content

Geographic availability of sulphur-free fuels: There were very limited supplies of petrol or diesel containing <10ppm sulphur marketed in the UK during 2003 (only sold in Edinburgh). Actual volume sales were essentially negligible compared to national sales volumes of fuel. A tax incentive is planned for September 2004 to encourage introduction of these grades of fuel.

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

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

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

	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003**	**2004**	**2005**
Petrol	49	41	37		
Diesel	40	40	38		

16.2 FUEL QUALITY MONITORING 2003

16.2.1 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).

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), who compile and send it on to DTI.

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. Data from a survey carried out by the auto industry in 2002 has also been included.

Number of samples taken: 3003 petrol and 2272 diesel

Specification of test methods: testing carried out in NAMAS/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.

In last year's report, it was estimated that around 4% of diesel consumed on UK roads was rebated gas oil, which had been laundered to remove the fiscal markers and dye. It was also reported that new measures would come into place to combat this. To counteract these criminal activities Customs and Excise introduced the Registered Dealers in Controlled Oil, (RDCO) scheme that came into force in April 2003. The scheme requires all businesses selling red diesel or kerosene to be authorised by Customs, to exercise a duty of care when selling these fuels, to maintain information on their sales and to supply sales data to Customs monthly. The early indications are that the introduction of the scheme has made it more difficult for would be fraudsters to obtain red diesel to launder. Customs have continued to seek out offenders and through investigations have discovered and shutdown 46 laundering plants in 2003, an increase of 21% on 2002 (37 plants).

16.2.2 Petrol reporting

Sampling

Summer Period:	Arctic: 1st June to 31st August
Number of samples:	3003
Frequency of sampling:	Throughout the year

Reporting

Fuel grades:	3; with premium unleaded <50 ppm S reported in a single table and Super Unleaded and Lead Replacement Petrol recorded together.
Parameters:	All parameters were measured.
Other:	

Exceedances of Directive 98/70/EC limit values

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

1. Petrol RON 95

Detail:	Some samples exceeded the limit values for RON, MON, summer vapour pressure, distillation at 100°C, olefins and benzene (limits min. 95, min 85, max. 70 kPa, 46.0°C, 18.0 %v/v and 1.0 %v/v respectively) with values reaching 94.5, 84.5, 71.7 kPa, 44.6°C, 21.4%v/v and 1.1%v/v respectively.
Statistical significance:	Some of the samples were beyond the tolerance limit values for RON (94.6) and therefore were non compliant with the Directive, however the other samples were within the tolerance limits for the other parameters and were compliant.

Member State's notes:

Exceedances of Directive 98/70/EC limit values

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

2. Petrol RON 97/LRP

Detail:	1 sample exceeded the limit value for summer vapour pressure (70 kPa) with a value of 84.2 kPa, some samples exceeded the limit value for olefins and benzene (18.0%v/v and 1.0%v/v respectively), with 21.6%v/v and 1.1%v/v.
Statistical significance:	This value for summer vapour pressure was beyond the tolerance limit (71.7 kPa) and was noncompliant with the Directive. The values for olefins and benzene were within the tolerance limits for those test methods.
Member State's notes:	The result appears to be almost certainly caused by the very low throughput of the LRP grade at the site, which resulted in a small quantity of winter grade remaining in the storage tank (a little more so in 2003 as the demand for as LRP reduced further). This grade is not expected to remain as a mainstream grade, and will become less available as demand increases, ultimately being replaced by bottled additives in all but a few sites. This will simultaneously alleviate the problem.

16.2.3 Diesel reporting

Sampling

Number of samples:	2272
Frequency of sampling:	Throughout the year

Reporting

Fuel grades:	1
Parameters:	All parameters measured
Other:	

Exceedances of Directive 98/70/EC limit values

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

Diesel

Detail:	Some samples exceeded the limit value for Cetane number (min. 51.0) with values as low as 50.0.
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:	

16.3 TEMPORAL TRENDS

The following Figure 16.2 to Figure 16.4 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2003, total petrol sales fell by 9% and diesel sales rose by 8%. 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 16.2: Temporal trends in national sales of petrol and diesel (million litres)

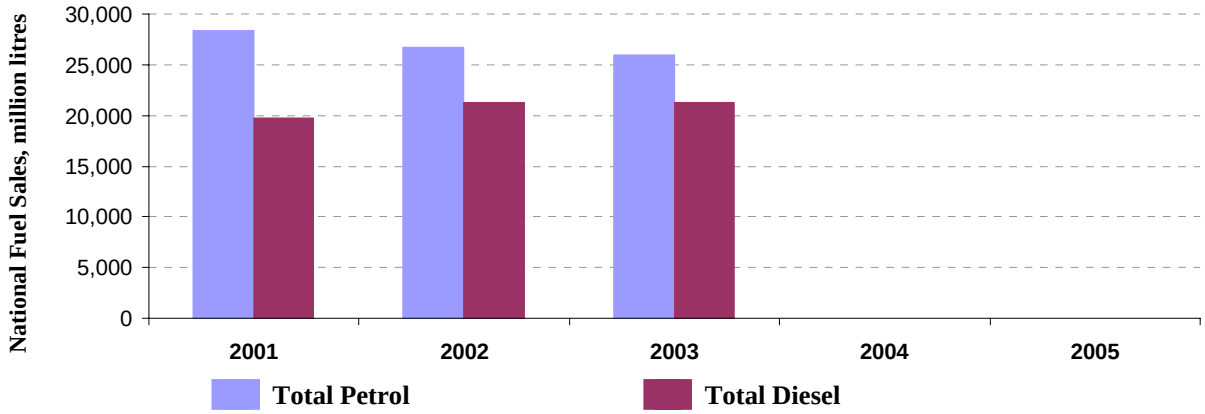


Figure 16.3: Temporal trends in national sales of low sulphur petrol (%)

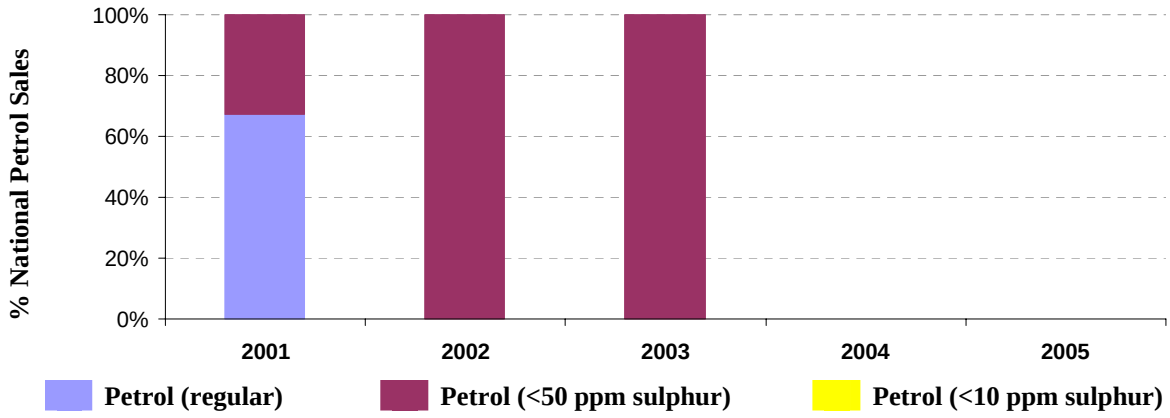
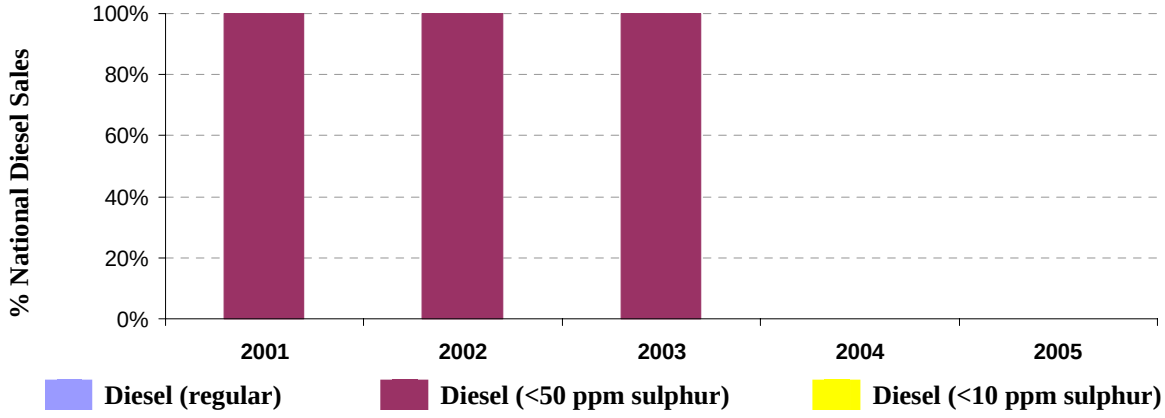


Figure 16.4: Temporal trends in national sales of low sulphur diesel (%)



17 EU Summary

17.1 FUEL AVAILABILITY 2003

17.1.1 Sales

Figure 17.1: EU Fuel sales proportions by fuel type (%)

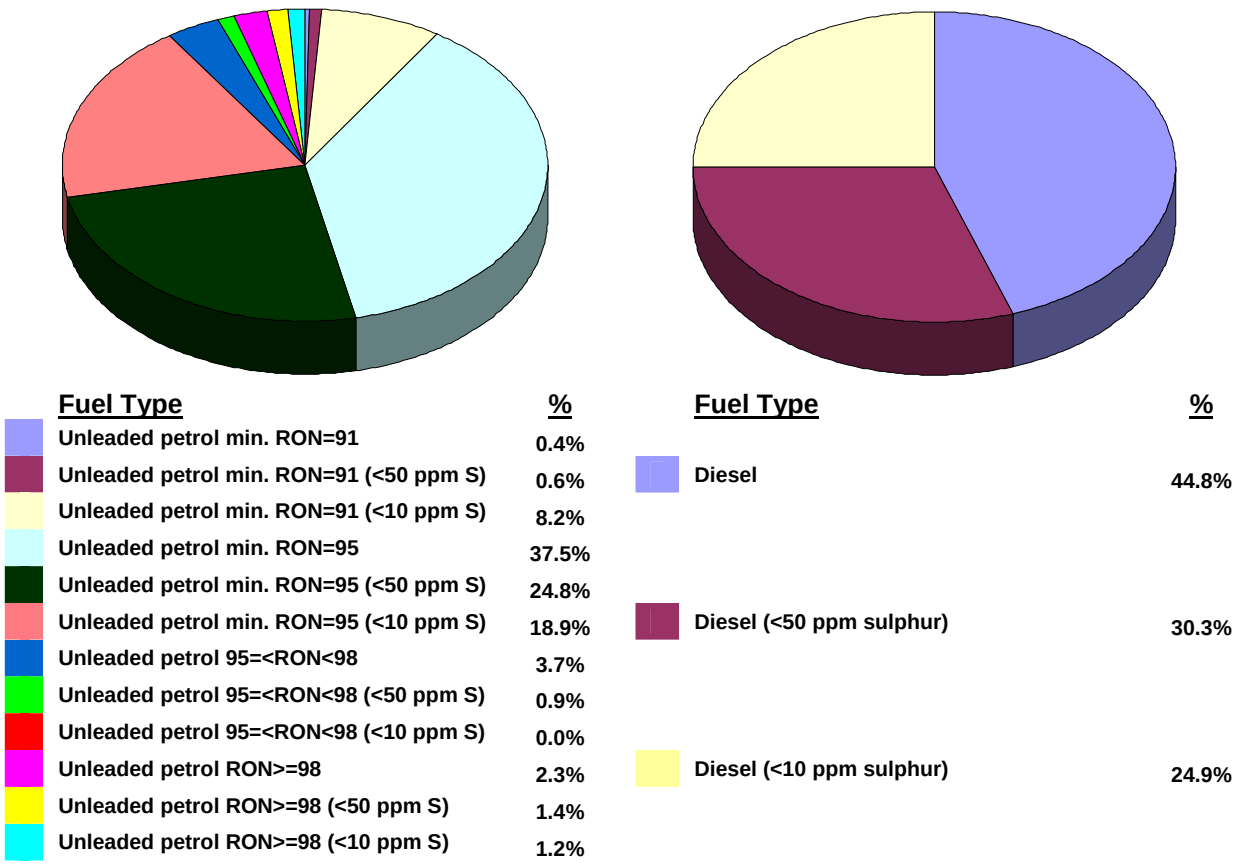
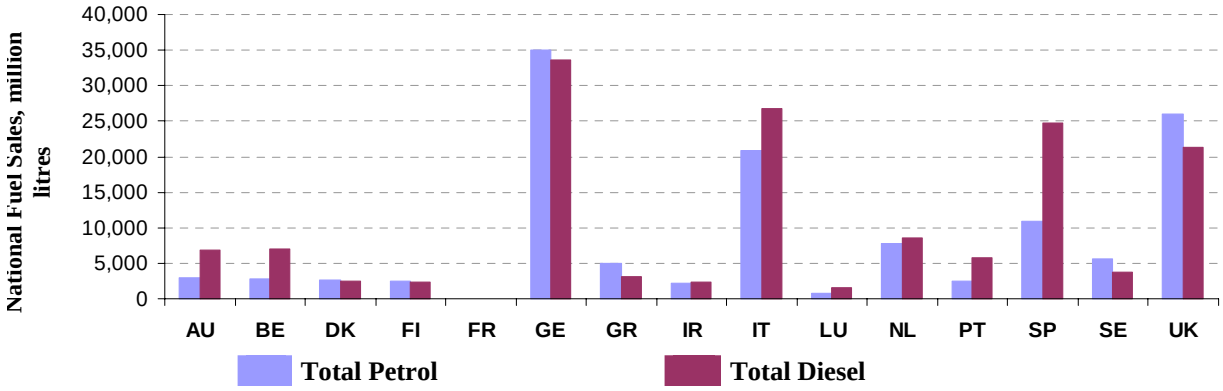


Figure 17.1 (see also Table 17.1) show the 2003 data (excluding France as no submission was provided for 2003). Whilst a wide variety of RON and sulphur grade fuels were available across the EU in 2003, the majority of sales still comprised RON95 (81%, with 37.5% regular, 24.8% low sulphur and 18.9% sulphur free). Of all petrol sold, 44% was regular sulphur grade, 28% low sulphur (<50 ppm) and 28% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 45%, 30% and 25%. Compared to 2001 and 2002 the quantities of <50 ppm and <10 ppm fuels remained fuels increased significantly. The primary reason for that much larger portion of <10 ppm fuels available in 2003 is the complete transfer of the German market to sulphur free fuels. If data from France were included in the 2003 analysis the proportions of low sulphur and sulphur free fuels would be significantly lower (assuming similar sales in France to 2002).

Table 17.1: 2003 EU fuel sales by fuel type (million litres)

ID No.	Million litres / Fuel grade	Austria AU	Belgium BE	Denmark DK	Finland FI	France FR	Germany GE	Greece GR	Ireland IR	Italy IT	Luxembourg LU	Netherlands NL	Portugal PO	Spain SP	Sweden SV	UK UK	EU15 EU	EU15 % Total
1	Unleaded petrol min. RON=91	0	0	504	0		0	0	0	0	15	0	0	0	0	0	519	0.4%
2	Unleaded petrol min. RON=91 (<50 ppm S)	810	0	0	0		0	0	0	0	0	0	0	0	0	0	810	0.6%
3	Unleaded petrol min. RON=91 (<10 ppm S)	0	0	0	0		10,439	0	0	0	0	0	0	0	0	0	10,439	8.2%
4	Unleaded petrol min. RON=95	0	1,946	2,062	2,147		0	3,513	1,240	20,894	569	7,404	0	7,932	0	0	47,707	37.5%
5	Unleaded petrol min. RON=95 (<50 ppm S)	1,946	0	0	0		0	0	13	0	0	0	0	0	4,855	24,766	31,580	24.8%
6	Unleaded petrol min. RON=95 (<10 ppm S)	0	0	0	0		23,188	0	872	0	0	0	0	0	0	0	24,060	18.9%
7	Unleaded petrol 95=<RON<98	0	0	0	0		0	1,083	5	0	0	0	1,809	1,772	0	0	4,669	3.7%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	0	0	0	0		0	0	0	0	0	0	0	0	0	1,166	1,166	0.9%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0.0%
10	Unleaded petrol RON>=98	0	0	27	322		0	350	0	0	0	344	657	1,183	0	0	2,882	2.3%
11	Unleaded petrol RON>=98 (<50 ppm S)	0	904	0	0		0	12	0	0	185	0	0	0	683	0	1,783	1.4%
12	Unleaded petrol RON>=98 (<10 ppm S)	127	0	0	0		1,373	0	0	0	0	0	0	0	0	0	1,500	1.2%
	Petrol (regular)	**0**	**1,946**	**2,593**	**2,469**		**0**	**4,945**	**1,245**	**20,894**	**583**	**7,748**	**2,466**	**10,888**	**0**	**0**	**55,777**	**43.9%**
	Petrol (<50 ppm sulphur)	**2,756**	**904**	**0**	**0**		**0**	**12**	**13**	**0**	**185**	**0**	**0**	**0**	**5,538**	**25,932**	**35,338**	**27.8%**
	Petrol (<10 ppm sulphur)	**127**	**0**	**0**	**0**		**35,001**	**0**	**872**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**35,999**	**28.3%**
	Total Petrol	**2,883**	**2,850**	**2,593**	**2,469**		**35,001**	**4,957**	**2,129**	**20,894**	**768**	**7,748**	**2,466**	**10,888**	**5,538**	**25,932**	**127,115**	**100.0%**
13	**Diesel**	6,868	0	0	2		0	3,077	0	26,745	0	0	5,712	24,814	0	0	67,217	44.8%
14	**Diesel (<50 ppm sulphur)**	0	6,970	2,415	2,262		0	48	2,286	0	1,600	8,535	0	0	0	21,306	45,423	30.3%
15	**Diesel (<10 ppm sulphur)**	0	0	0	0		33,591	0	0	0	0	0	0	0	3,799	0	37,389	24.9%
	Total Diesel	**6,868**	**6,970**	**2,415**	**2,264**		**33,591**	**3,124**	**2,286**	**26,745**	**1,600**	**8,535**	**5,712**	**24,814**	**3,799**	**21,306**	**150,029**	**100.0%**

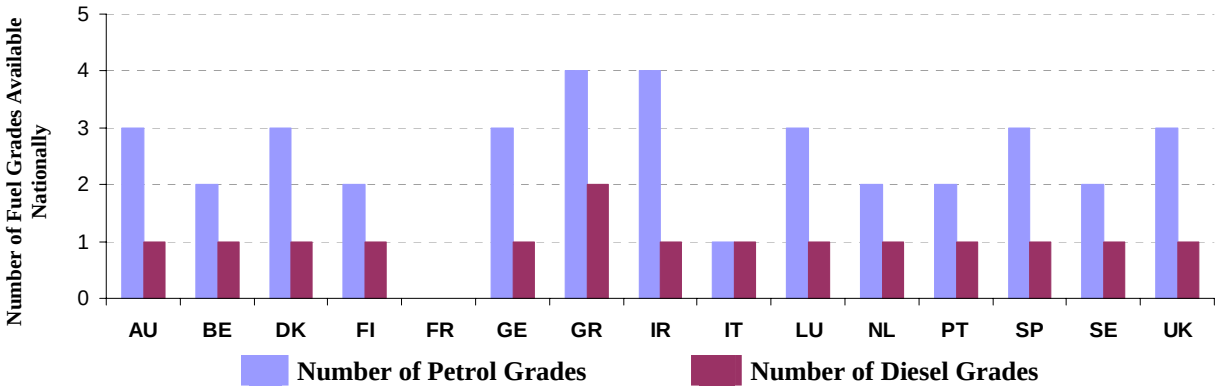
Figure 17.2: National fuel sales by fuel type across the EU (million litres)



Similarly to 2001 and 2002, the largest total sales of fuels (of submissions received) in 2003 were made in Germany, Italy, Spain and the United Kingdom (Figure 17.2). Whilst diesel sales are dominant in many Member States, there are still variations in relative sales of petrol and diesel.

As in 2001 and 2002, there is also still a variation in the number of grades of fuel reported to be available across the EU (Figure 17.3) in 2003, with clearly more petrol grades available, despite the larger quantities of diesel sold (though less than in 2001). Six Member States, two more than in 2001, defined *national fuel grades* for low (<50 ppm) or sulphur free (<10 ppm) fuels in 2002. In 2003 this had risen to seven Member States (with the availability of low sulphur fuel grades in Greece). Reporting of fuel sales under the Commission Decision (which allows Member States to define their own "national fuel grades") has also been varied again, though improved since 2001.

Figure 17.3: Number of fuel grades available nationally by fuel type across the EU



17.1.2 Sulphur content

Already in 2001 and 2002 low sulphur fuels were available in many countries across the EU, even though mandatory introduction is not required until 2005 (see Figure 17.4 and Figure 17.5). Italy and Portugal are yet to introduce separately marketed low (<50 ppm) or sulphur free (<10 ppm) fuels. Compared to 2002, Greece has introduced petrol and diesel fuels of the <50 ppm quality and Belgium has introduced a <50 ppm petrol grade.

As in 2001 and 2002, sulphur free petrol was only available in Austria, Germany and Ireland, however sulphur free diesel was available in Germany as well as Sweden in 2003. In 2002 seven countries (only three in 2001) had fully moved over to low or sulphur free diesel fuel; it is not yet clear whether more Member States have changed due to late submissions again this year. Sweden and Germany had moved completely over to low sulphur diesel in 2003, but only Germany had fully switched to sulphur free petrol.

Figure 17.4: National sales of low sulphur petrol grades across the EU (%)

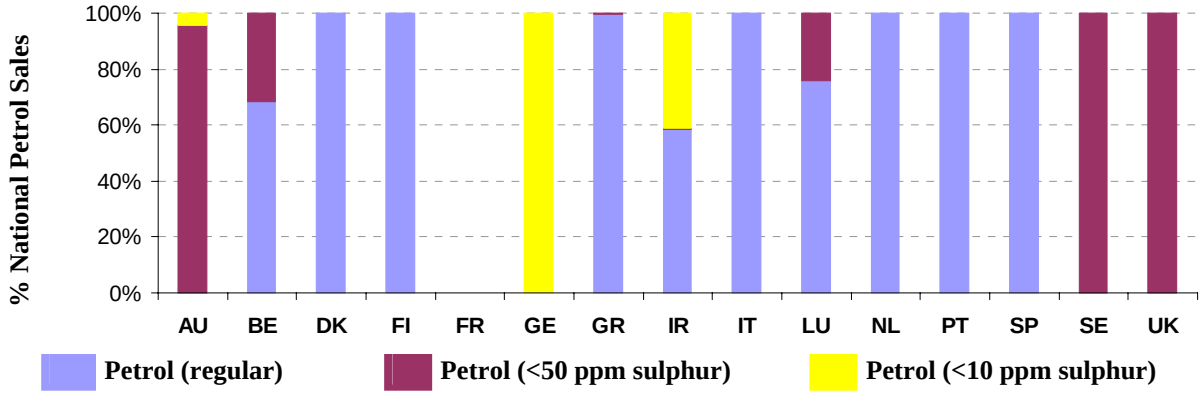
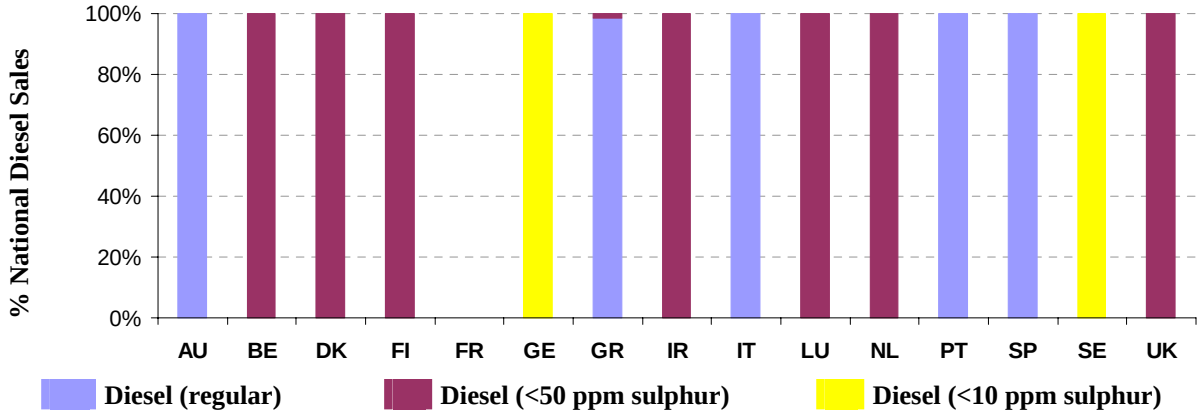


Figure 17.5: National sales of low sulphur diesel grades across the EU (%)



In some Member States, although separate low or zero sulphur fuel grades, or separate sales figures were not available in 2003, fuels complying with these criteria were available (e.g. Denmark, Finland, Italy and the Netherlands). This can be seen in Figure 17.6, 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).

Figure 17.6: Average sulphur content of petrol and diesel grades across the EU (%)

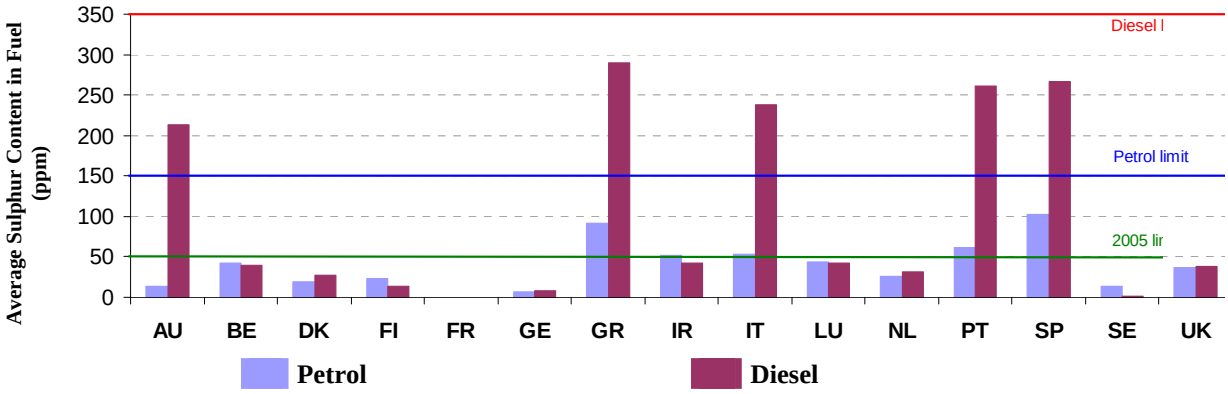


Table 17.2 demonstrates that the annual average sulphur content of petrol and diesel fuels sold in the EU is decreasing, and together with Figure 17.6 shows that much of the petrol fuel sold already complies with the 2005 sulphur limit (<50 ppm sulphur in petrol and diesel fuels).

Table 17.2: Annual trend in average sulphur content in petrol and diesel fuels

EU	Average Sulphur Content, ppm				
Fuel / Year	**2001**	**2002**	**2003***	**2004**	**2005**
Petrol	68	51	31		
Diesel	223	169	102		

*Excludes France.

17.2 FUEL QUALITY MONITORING 2003

17.2.1 Description of systems

A number of different approaches have been made in implementing Fuel Quality Monitoring Systems across the EU. These range from simple sampling at a range of fuel retail stations at certain periods during the year (e.g. Netherlands) through to integration of sampling and analysis of all refinery or imported batches into the requirements for distribution of fuels within the country, together with random sampling across the distribution chain throughout the year (e.g. Sweden and the UK). The systems active in several Member States were designed for other purposes – explaining some of the variations in coverage and application across the EU. A greater degree of homogeneity is expected from 2004, from when Member States are required to report in accordance to the new European Standard, EN 14274[5]. In fact,

[5] EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

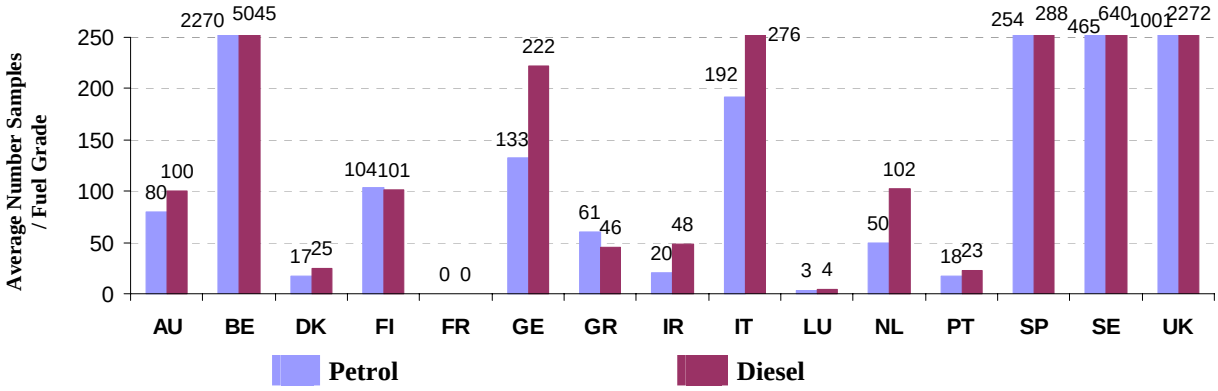
a few amendments or changes have already been made to the Monitoring Systems since the 2001 and 2002 reporting rounds, with Austria, Finland, Germany, Italy and the Netherlands moving their systems towards compliance with the recently adopted EN 14274. Presumably other Member States are saving major revisions for the changes necessary to comply with the amended Directive, which states that: *"Member States shall establish a fuel quality monitoring system in accordance with the requirements of the relevant European Standard"* (EN 14274 & EN 14275[6]) from 1 January 2004. Alternative monitoring systems may be permitted provided such systems ensure the results are of an equivalent confidence. However as yet it is not clear whether any of the existing systems would meet this criteria. A discussion of the changes resulting from these new standards is provided in section 18.1.3. At the moment it is not known exactly how Member States will implement the requirements of the amended Directive.

There was still a wide range of sampling intensities across the EU in 2003 (Figure 17.7). Whilst there are currently no requirements on Member States on the numbers and locations of samples taken in their FQMS, there are a number of factors useful 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. These factors are taken into account in the new European Standard, where the minimum number of samples per fuel grade (in each of the winter and summer periods) is 50, 100 or 200, depending on the statistical model (A, B or C) and the size of the country (i.e. 100, 200 or 400 samples per year, per fuel grade).

The countries defined as “large” are France, Germany, Italy, Spain and the UK according to the definition contained in the European Standard (>15million tonnes automotive fuel sales per year). Using these criteria it can be seen (Figure 17.7) that only Germany, Italy, Sweden and the UK already would appear to already approach satisfying these specifications for sampling numbers. However, it should be noted that the standard specifies individual samples taken at separate refuelling stations. Samples from separate sites is not always specified in existing submissions and in some cases sampling takes place at other points of the distribution chain also. In fact the Swedish system only samples from the refineries and terminals, and the UK, which samples across the entire distribution chain, has not supplied information on the number of samples taken from refuelling stations. In terms of design and sample numbers (from refuelling stations), the monitoring systems in Austria, Finland, Germany, Italy, the Netherlands and Spain approach compliance with EN 14274. The major discrepancy seems to be due to a misunderstanding: 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. The reason for this duel reporting is there are differences between summer and winter fuel grades, however some of the national systems only carry out enough samples to meet requirements for one of these periods, and/or with a combined full-year analysis.

[6] EN 14275:2003 - Automotive fuels - Assessment of petrol and diesel fuel quality -Sampling from retail site station pumps and commercial site fuel dispensers.

Figure 17.7: Fuel Quality Monitoring sampling rate across the EU (average number of samples per fuel grade)



In terms of compliance with Directive 98/70/EC, only four Member States (Luxembourg, Portugal, Spain and Sweden) are in complete compliance with limit values for both petrol and diesel for all samples (compared to five in 2001 and 2002). However, only Luxembourg, Portugal and Spain also provided complete reporting across the range of parameters specified for monitoring in the Directive[7]. More information on reporting on petrol and diesel analysis is provided in the following sections. Detail on specific exceedances is provided in the individual country chapters.

17.2.2 Petrol reporting

In 2003, nine of the Member States reported at least one petrol sample that was non-compliant with Directive 98/70/EC (compared to ten in 2001 and nine in 2002). Of these, the main parameters of concern were research octane number (RON, 14+ samples), summer vapour pressure (DVPE, 10+ samples) and distillation - evaporation at 100°C (6+ samples). However, 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. The complete reported submissions for each Member State are included in Appendix 3.

17.2.3 Diesel reporting

For diesel reporting, five of the Member States reported at least one sample that was non-compliant with Directive 98/70/EC (compared to four in 2001 and six in 2002). Of these, the parameters of concern were sulphur content (5 samples), distillation 95% point (2 samples), cetane number (1 sample), density (1 sample) and PAH (1 sample). However, 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. The complete reported submissions for each Member State are included in Appendix 3.

[7] Although all oxygenates were not measured (other than ethers with more than 5 carbon atoms per molecule), Portugal have stated no other oxygenates are added to the fuel.

17.2.4 Summary of Compliance with 98/70/EC

The following Table 17.3 summarises the compliance of Member States with Directive 98/70/EC for the year 2003 reporting in terms of the results of analysis of samples against limit values and the reporting format and content. As in 2001 and 2002 the quality of the compliance assessment suffers in some cases from the incomplete information provided by Member Sates. Details of action taken with regard to limit value non-compliance by Member States will be included where provided in the individual country chapters of this report.

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.

Table 17.3: Summary of Member State compliance with 98/70/EC for 2003 reporting.

Member State	Limit value non-compliance (95% confidence limits) (1)				Incomplete reporting				Late report (2)	Notes
	Petrol		Diesel		Petrol		Diesel			
Austria	X	6 / 240	X	1 / 100	X	1 / 18			X	(3)
Belgium	X	>10 / 4539	X	>2 / 5045	X	1 / 18			X	(4)
Denmark	X	1 / 52			X	9 / 18				(5)
Finland	X	3 / 207								
France	No report submitted for 2003									
Germany	X	2 / 399	X	1 / 222					X	
Greece			X	2 / 91						
Ireland	X	8 / 80							X	
Italy	X	4 / 192	X	2 / 276						
Luxembourg									X	
Netherlands	X	1 / 100							X	
Portugal					X	5 / 18				(6)
Spain									X	
Sweden					X	6 / 18				
United Kingdom	X	2 / 3003							X	
Total EU	**9**		**5**		**5**		**0**		**9**	

Notes:

(1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete.
(2) Directive 98/70/EC states that Member States should submit monitoring reports by no later than 30th June each year.
(3) Leaded petrol has been forbidden in Austria since 1993. Random testing of lead content was carried out until 1998, whereupon it was ceased as samples always complied with the regulations.
(4) The total number of samples in non-compliance was not confirmed by Belgium; only the minimum number of non-compliant samples could be established from their submission.
(5) Only parameters expected to have significant impact on the environment were measured by Denmark. For petrol: RON, MON, oxygen content and all oxygenates (except ethers/MTBE) were not measured.
(6) Although all oxygenates were not measured (other than ethers with more than 5 carbon atoms per molecule), Portugal have stated no other oxygenates are added to the fuel.

17.3 TEMPORAL TRENDS

The following Figure 17.8 to Figure 17.10 show the trend in Fuel Quality Monitoring reporting in terms of total fuel sales and low sulphur fuel sales as a proportion of total sales in the European Union (excluding France as no submission was provided for 2003). Total sales of petrol and diesel have 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, however this is 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 of low sulphur (<50 ppm) and zero sulphur (<10 ppm) petrol have increased from 17% and 2% respectively in 2001 to 28% each of total sales in 2003 (25% assuming similar sales in France in 2003 as for 2002). Sales of low sulphur and sulphur free diesel have increased from 21% and 2% respectively in 2001 to 30% and 25% in 2002 (25% and 20% assuming similar sales in France in 2003 as for 2002).

Figure 17.8: Temporal trends in EU Sales of petrol and diesel (million litres)

Figure 17.9: Temporal trends in EU Sales of low sulphur petrol (%)

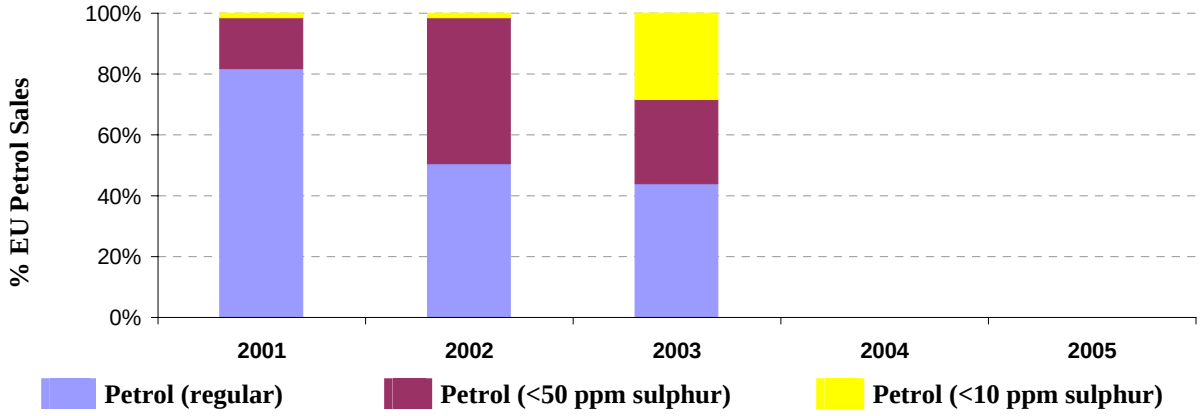
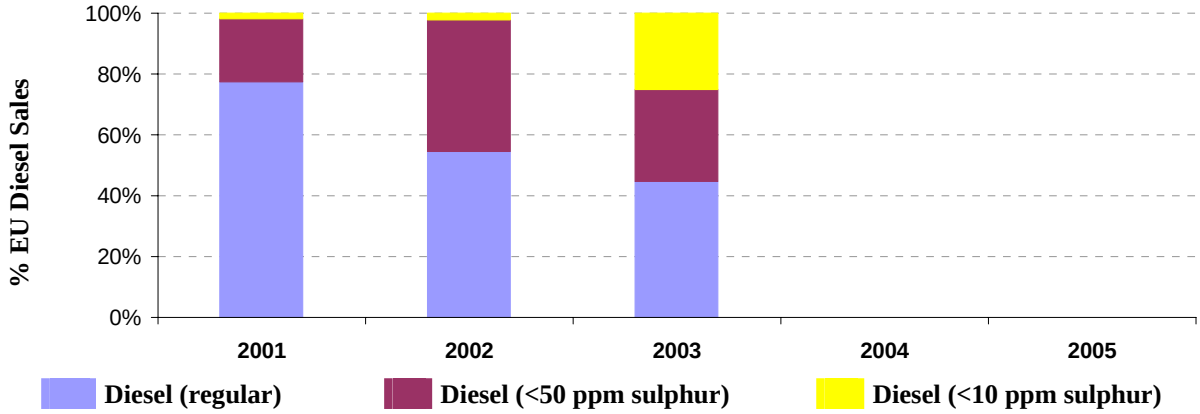


Figure 17.10: Temporal trends in EU Sales of low sulphur diesel (%)



18 DISCUSSION & RECOMMENDATIONS

18.1 DISCUSSION

18.1.1 2003 Reporting Submissions

18.1.1.1 Completeness

The format for reporting agreed with Member States was officially established with 'Commission Decision 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, the last of the submissions was received by the end of 2002 and a number of submissions were not sent in electronic format at all (France, Italy, Portugal and Spain). In addition to this a number of submissions were not entirely complete - the most common deficiency being lack of coverage of all specified fuel quality parameters. In most cases submissions were not sufficiently explained and necessitated further communications with the designated national contact to obtain clarifications. Being the first year of reporting, it was perhaps to be expected that there were a few areas in need of improvement. This naturally caused some delay to the analysis and reporting on the 2002 submissions and complicated the establishment of compliance with the Directive in some cases.

The situation for the second year of reporting was on the whole improved, however some Member States (France, Luxembourg and Spain) had still not submitted their reports by the end of September 2003. Similarly these same Member States, together with Belgium had still not submitted their submissions on 2003 monitoring by September 2004, again resulting in delay to the production of this summary report. France stated in November 2004 that they would not be providing a report for 2003. However, all submissions finally received on 2003 monitoring (with the exception of from Spain) were in electronic format – an improvement on 2001 and 2002.

An extended electronic reporting form (in Microsoft Excel) was recommended in the 2001 and 2002 summary reports[8] for the subsequent year's submissions in order to enhance the usefulness of information provided and facilitate more meaningful analysis. Many of the Member States have provided the 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 were received from most Member State contacts for most points of clarification regarding the 2004 submissions. 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.

[8] *EU Fuel Quality Monitoring - 2001 Summary Report*. Final report produced for the European Commission, DG Environment by Nikolas Hill, AEA Technology Environment. June 2003.
EU Fuel Quality Monitoring - 2002 Summary Report. Final report produced for the European Commission, DG Environment by Nikolas Hill, AEA Technology Environment. March 2004.

18.1.1.2 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 2004 update is complete and it has been designed to incorporate reported data for subsequent years. 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).

18.1.2 The Current Reporting Format

In addition to the gaps/omissions in reporting, it has been clear from reporting that there are number of areas where the current reporting format may be improved to enhance the usefulness and uniformity of the information and data that is submitted. There are number of areas which are currently rather open-ended in the requirement for reporting (Description of Fuel Quality Monitoring System and Geographical Availability of Sulphur Free Fuels), resulting in a large range of level of detail provided by Member States. Other areas (e.g. Total Sales table) could benefit from revision to provide clearer reporting and there is a general need to request pertinent additional information to be submitted where there are either exceedances to limit values or omissions in the information provided. This also reduces the need to return to Member States for clarifications or additional information (as discussed in the previous section). The effectiveness of the new European Standard (EN 14274) in addressing these issues is discussed in section 18.1.3. A number of recommendations for improvement were also made in the previous summary reports and agreement has now been reached on amendments to the reporting format (see section 18.2).

18.1.3 Reporting from 2004

As already discussed, 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 be 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 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 of 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. As already mentioned a separate piece of work has investigated this area – discussed in section 18.1.4. Nevertheless the adoption of this standard by Member States in reporting should ensure consistency in the data available for definition/measurement of a parameter for geographic 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.

In addition to the European Standard, 2004 reporting will include submissions received from the 10 new Member States the first time.

18.1.4 Geographical Availability of Sulphur-Free Fuels

The format and detail of information provision is not specified in Commission Decision 2002/159/EC. Whilst this is not critical at this time, 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"*[9], with a complete conversion to sulphur free fuels by 2009, subject to a review for diesel fuel in 2005[10]. Within this amendment it is also stated that *"The Commission shall develop guidance for recommending what…. constitutes availability on an appropriately balanced geographical basis"*[11,12,]. Member States are also required to report annually on this availability under the amended Directive[13].

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[14]. The Commission will publish a Recommendation based on this work.

[9] Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC
[10] 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.
[11] Recital (10) of Directive 2003/17/EC
[12] Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC
[13] Article 8 of Directive 98/70/EC, as amended by Directive 2003/17/EC
[14] *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.

18.2 RECOMMENDATIONS

There are number of revisions to the existing reporting format, as well as that laid out in the new European Standard, which would enhance the usefulness of the information and facilitate more meaningful analysis of EU trends in order to highlight areas of concern/needing particular attention. The recommendations identified in the previous summary reports were used to develop a common format for reporting from 2004. In developing this common reporting format it has been advantageous to consider several things:

(1) The current common reporting format, as laid out in Commission Decision 2002/159/EC (see Appendix 1);
(2) Experience from the 2001 and 2002 reporting using the current format;
(3) The requirements/formats laid out in the new European Standard (EN 14274: 2003);
(4) Development of guidance/recommendations on measures of the geographical availability of sulphur free fuels.

The requirements of the new European Standard essentially expand upon what is already required under the current reporting format. It therefore made sense to develop a new format for reporting based on that of the current format, expanding it to include additional elements from EN 14274: 2003 and in line with guidance on options to measure geographical availability of sulphur free fuels. As discussed, there were also a few areas where the existing reporting format could be enhanced to assist analysis of submissions and reduce the need to return to Member States for additional information. For example, the original reporting format did not provide space for/require reporting of useful additional information such as:

- Exclusions from monitoring/reporting (e.g. fuel grades with very low % sales, certain fuel parameters, geographical areas left outside the monitoring programme, etc);
- Further details on exceedances of parameter tolerance limits (i.e. number of samples, values, enforcement action taken as a result of exceedances, etc);
- Other additional information deemed relevant by the Member State.

In addition, if a Member State is using its own national system 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. Finally, in relation to reporting on the availability of sulphur free fuels, it was clear the format needed to take into account a number of considerations. It needed to be in line with the recommended measurement options, ensuring enough information is provided for understanding national situations whilst at the same time minimising the volume of information requested and providing flexibility/room for Member States' own measurement criteria or other additional supporting information.

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 and it is anticipated it will be sent out with the Commission Recommendation on criteria for assessing availability of sulphur free fuels. The Excel reporting templates recommended in the previous years' reports were submitted to the European Commission and Member States with a request that they template were used for reporting of 2002 and 2003 data. Following the success of these templates, the 2003 reporting template has been revised and expanded (see Appendix 5) to be consistent with the common format for reporting from 2004. The use of the template should assist Member States in their data reporting and facilitate accurate data collation and analysis for the 2004 summary report.

Appendices

CONTENTS

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

CONTENTS

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 [1], 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

[1] 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 [1], as last amended by Commission Directive 2000/71/EC [2], 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.

[1] OJ L 350, 28.12.1998, p. 58.
[2] 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) (1)	
Unleaded petrol (minimum RON = 95) (1)	
Unleaded petrol (minimum RON = 95 and less than 50 ppm sulphur) (2)	
Sulphur-free unleaded petrol (less than 10 ppm sulphur) (3)	
Unleaded petrol (95 ≤ RON < 98)	
Unleaded petrol (RON ≥ 98)	
Diesel fuel (4)	
Diesel fuel (less than 50 ppm sulphur) (5)	
Diesel fuel (less than 10 ppm sulphur) (6)	

(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 10 ppm.
(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 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.

Brief description of the geographical extent to which sulphur-free petrol and diesel are marketed within the territory of a Member State.

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.

Sommer period (defined for petrol volatility)	

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

Appendix I

Market fuels used in vehicles with spark ignition engines (petrol)

Country	
Reporting year	
Parent or national fuel grade	

Parameter	Unit	Analytical and statistical results					Limiting value (1)			
							National specification, if any		According to 98/70/EC	
		Number of samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum
Research octane No	—								95	—
Motor octane No	—								85	
Vapour pressure, DVPE	kPa								—	60,0
Distillation:										
— evaporated at 100 °C	%(v/v)								46,0	—
— evaporated at 150 °C	%(v/v)								75,0	—
Hydrocarbon analysis:										
— olefins	%(v/v)									18,0
— aromatics	%(v/v)									42,0
— benzene	%(v/v)									1,0
Oxygen content	%(m/m)								—	2,7
Oxygenates:										
— Methanol	%(v/v)								—	3
— Ethanol	%(v/v)								—	5
— Iso-propyl alcohol	%(v/v)								—	10
— Tert-butyl alcohol	%(v/v)								—	7
— Iso-butyl alcohol	%(v/v)								—	10
— Ethers with five or more carbon atoms per molecule	%(v/v)								—	15
— other oxygenates	%(v/v)								—	10
Sulphur content	mg/kg								—	150
Lead content	g/l								—	0,005

(1) The limiting values are 'true values' and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

Number of samples in month						**Total**	
January		April		July		October	
February		May		August		November	
March		June		September		December	

Appendix II

Market fuels used in vehicles with compression ignition engines (diesel)

Country	
Reporting year	
Parent or national fuel grade	

Parameter	Unit	Analytical and statistical results					Limiting value (1)			
							National specifications		According to 98/70/EC	
		Number of samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum
Cetane No	—								51,0	—
Density at 15 °C	kg/m³								—	845
Distillation — 95 % Point	°C								—	360
Polycyclic aromatic hydrocarbons	%(m/m)								—	11
Sulphur content	mg/kg								—	350

(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			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		Total	

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

CONTENTS

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

*Based on information provided by the German Environmental Protection Agency, Italy, Irish EPA & CEN

Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproduc-ibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Min.	Max.
Research Octane Number (RON)	--	95		EN 25164	1993	0.6	94.6	
(RON 91 fuel only)	--	91				0.6	90.6	
Motor Octane Number (MON)	--	85		EN 25163	1993	0.9	84.5	
(RON 91 fuel only)	--	81				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	1988	Depends on test conditions		
-- evaporated at 150 °C	% (v/v)	75		EN-ISO 3405	1988	Depends on test conditions		
Hydrocarbon analysis								
-- Olefins	% (v/v)		18.0	ASTM D1319	1995	4.6		20.7
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	1995	4.6		23.7
-- Aromatics	% (v/v)		42.0	ASTM D1319	1995	3.7		44.2
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.3		1.2
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
Sulphur content	mg/kg		150	EN ISO 14596	1998	30		168
				EN ISO 8754	1995			
				EN 24260	1994	18.6		161
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
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
Lead content	g/l		0.005	EN 237	1996	0.002		0.0062

Diesel

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproduc-ibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Min.	Max.
Cetane number	--	51.0	--	EN-ISO 5165	1998	4.3	48.5	
Density at 15 °C	kg/m^3		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	Depends on test conditions		
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50		380
				EN ISO 8754	1995			
				EN 24260	1994	42.4		375
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
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	3.4		12
				EN ISO 8754	1995			
				EN 24260	1994	3.4		12

Appendix 3: 2002 Member State Fuel Quality Submission Tables

CONTENTS

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 only separate reporting tables for summer and winter period sampling were provided, data were combined in the following manner for each of the parameters:

Number of samples (N): direct sum of the two values;

Minimum: the lowest of the two values;

Maximum: the highest of the two values;

Mean (m): Mean of 2 data sets = $((m_1*n_1) + (m_2*n_2)) / N$

Where:
N = total number of samples
m_1 = mean data set 1, m_2 = mean data set 2
n_1 = no. samples in data set 1, n_2 = no. samples in data set 2

In accordance with:
Mean = sum of sample values / number of samples

Standard deviation: This was estimated on the basis of the following approximation (in the absence of knowing the raw data values):

Overall SD = $\sqrt{[\ \{\ (sd_1^2*(n_1-1)) + (sd_2^2*(n_2-1))\ \}\ /(N-1)\ ]}$

Where: sd_1 = standard deviation of data set 1, etc.

The true formula for standard deviation is:

SD = $\sqrt{[(\text{sum}(\text{all data values}) - \text{mean})^2\ /(N-1)]}$

Where x = data value

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Austria

Year: 2003

FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s

National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	100	89.8	96.4	92.9	0.81	91	0	95	--
MOTOR OCTANE NO.	--	100	80.6	84.9	82.6	0.45	82.5	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	100	55	89	69	11.35	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	100	50	67	56	3.18	46	71	46.0	--
evaporated at 150	%(v/v)	100	79	93	84	2.84	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	7.5	17.9	12.2	2.44	0	0	--	18.0
aromatics	%(v/v)	100	27.2	35.8	31.4	1.94	0	0	--	42.0
benzene	%(v/v)	100	0.5	1	0.7	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1	0.2	0.14	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
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0	5.4	0.8	0.78	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	100	4.3	86.1	19.3	15.87	0	150	--	150
LEAD CONTENT	g/l	100	0	0	0	0	0	0	--	0.005

Notes:

For one sample the measured RON value was beyond the tolerance limits for the test methods. For one sample the measured MON the value was beyond the tolera limits. For two samples the measured DVPE values were beyond the summer tolerance limits.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Austria

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	100	94.7	97.7	95.9	0.51	95	0	95	--
MOTOR OCTANE NO.	--	100	84.1	85.8	85.1	0.28	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	100	57	89	70	11.91	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	100	48	62	52	2.66	46	71	46.0	--
evaporated at 150	%(v/v)	100	78	91	84	2.68	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	4.4	16.4	11.1	2.39	0	0	--	18.0
aromatics	%(v/v)	100	30.2	42.1	37.3	2.83	0	0	--	42.0
benzene	%(v/v)	100	0.4	0.9	0.7	0.07	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1.3	0.6	0.25	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
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0	7.3	3.4	1.4	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	100	3.5	66.5	12.7	12.09	0	150	--	150
LEAD CONTENT	g/l	100	0	0	0	0	0	0	--	0.005

Notes:

For one sample the measured MON value was beyond the method tolerance limit. For one sample the DVPE value was beyond the summer tolerance limit.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Austria

Year: 2003

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

National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	40	96.2	100.9	99.2	0.92	98	0	95	--
MOTOR OCTANE NO.	--	40	85	89.1	88.1	0.64	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	40	56	87	65	8.69	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	40	48	56	52	2.22	46	71	46.0	--
evaporated at 150	%(v/v)	40	78	90	87	3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	40	2.2	16	8.5	3.15	0	0	--	18.0
aromatics	%(v/v)	40	35.7	43.2	40.6	1.73	0	0	--	42.0
benzene	%(v/v)	40	0.5	0.8	0.6	0.07	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	40	0.8	2.7	2.1	0.48	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	40	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	40	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	40	4.5	14.8	11.8	2.7	0	0	--	15
Other oxygenate	%(v/v)	40	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	2.6	10.2	4.4	1.74	0	150	--	150
LEAD CONTENT	g/l	40	0	0	0	0	0	0	--	0.005

Notes:

For one sample the measured RON value was beyond the method tolerance limit. For three samples the measured MON values were beyond the tolerance limits. F sample the measured DVPE value was beyond the summer tolerance limit.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Belgium

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade 95 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	2351	93.1	100.6	96.9	0.7842	95	0	95	--
MOTOR OCTANE NO.	--	77	82.8	87.1	85	0.4587	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	1019	50	78.6	57.5	1.93	0	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	2361	45	69.2	52.2	3.0806	46	0	46.0	--
evaporated at 150	%(v/v)	2361	76.4	96.8	85.86	2.2611	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2261	0.5	21	11.53	3.9486	0	18	--	18.0
aromatics	%(v/v)	2321	8.6	58.3	36.66	3.2611	0	42	--	42.0
benzene	%(v/v)	242	0.4	1	0.74	0.15	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2362	0	0.5	0	0	0	3	--	3
Ethanol	%(v/v)	2362	0	0.5	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2362	0	6.7	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	2362	0	3.8	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	2362	0	0.5	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2362	0	13.8	0	0	0	15	--	15
Other oxygenate	%(v/v)	2362	0	4.9	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	244	5	130	48.66	15.9	0	150	--	150
LEAD CONTENT	g/l	0	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 is 0.0001 g/l, and therefore values reported as 0 will fall into the range 0-0.001 g/l.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Belgium

Year: 2003

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade 98 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	2175	95	100.6	99.25	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								--	--
DISTILLATTION:										
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
Tetro-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 oxygenate	%(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	0.0005	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 is 0.0001 g/l, and therefore values reported as 0 will fall into the range 0-0.0001 g/l.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Denmark

Year: 2003

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade RON 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values 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	kPa								--	60
Summer period	kPa	5	56.2	62.1	58.7	2.2	0		--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	14	49.5	61.6	55.3	3.5	0	0	46.0	--
evaporated at 150	%(v/v)	14	79.4	93.9	88.4	4.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	14	2.6	18.2	7.9	5.2	0	21	--	18.0
aromatics	%(v/v)	14	25.7	39	32.5	4.3	0	0	--	42.0
benzene	%(v/v)	14	0.2	1.1	0.71	0.24	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	14	0	0.3	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	14	6	73	28	21	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

Summer period has been defined to: 1st June-31st August.The max. olefin content for RON 92 is 21.0 according to directive 2003/17.The limit of detection for ether with five or more carbon atoms per molecule is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Denmark

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values 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	kPa								--	60
Summer period	kPa	16	55.3	61.7	58.3	1.7	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	32	46.8	61.1	53	4	0	0	46.0	--
evaporated at 150	%(v/v)	32	78.8	92.5	88.4	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	32	0.5	17.1	6.3	4.2	0	0	--	18.0
aromatics	%(v/v)	32	29.6	43.7	36	3.7	0	0	--	42.0
benzene	%(v/v)	32	0.2	1.2	0.79	0.19	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	32	0	3	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	32	1	72	17	15	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

Summer period is defined to: 1st June-31st AugustThe limit of detection for ethers with five or more carbon atoms per molecule is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Denmark

Year: 2003

FuelID: Unleaded petrol RON > 98

National Fuel Grade RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values 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	kPa								--	60
Summer period	kPa	3	42.7	59.9	53.8	9.7	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	6	52.5	56	53.8	1.3	0	0	46.0	--
evaporated at 150	%(v/v)	6	78	91.8	88.3	5.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	0.9	10.4	5.1	3.3	0	0	--	18.0
aromatics	%(v/v)	6	29.5	41.6	36.7	4.3	0	0	--	42.0
benzene	%(v/v)	6	0.3	0.9	0.75	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	0.1	8.8	6.3	3.2	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	3	18	10	6	0	0	--	150
LEAD CONTENT	g/l	6	0	0	0	0	0	0	--	0.005

Notes:

Summer period is defined to: 1st June-31st AugustThe limit of detection for lead content 0.002 g/l, and therefore values reported as 0 will fall into the range 0-0.002

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Finland

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Unleaded petrol RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	95	94.5	97.9	96.30736842	0.597601589	0	0	95	--
MOTOR OCTANE NO.	--	95	84.3	86.9	85.49263158	0.499787189	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	104	59.6	89.6	74.32596154	5.048291069			--	70
Summer period	kPa	51	59.6	68.9	65	2.1	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	99	46.9	64.5	52.01212121	3.245200538	0	0	46.0	--
evaporated at 150	%(v/v)	99	78.1	89.1	84.03636364	2.933793254	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	99	2.5	15.8	7.284848485	1.942200519	0	0	--	18.0
aromatics	%(v/v)	99	19.8	35.2	29.50303	2.657929991	0	0	--	42.0
benzene	%(v/v)	99	0.4	1	0.7	0.099488488	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	99	1.8	2.5	2.1	0.099488488	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	99	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	99	0	0	0.051515152	0.142857143	0	0	--	5
Iso-propyl alcohol	%(v/v)	99	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	99	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	99	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	99	9.9	13.9	11.85454545	0.706529315	0	0	--	15
Other oxygenate	%(v/v)	99	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	104	9.4	130	24.04519231	19.02039784	0	0	--	150
LEAD CONTENT	g/l	99	0	0	0.0004	0.000198977	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 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Finland

Year: 2003

FuelID: Unleaded petrol RON > 98

National Fuel Grade Unleaded petrol RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	93	94.8	101.1	99.01075269	0.773192141	0	0	95	--
MOTOR OCTANE NO.	--	93	84.9	88.6	87.5	0.559016994	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa	102	54.4	88.6	73.85686275	5.339373642			--	70
Summer period	kPa	49	54.4	68.8	64.4	2.9	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	96	42.7	56.1	48.61875	2.188390421	0	0	46.0	--
evaporated at 150	%(v/v)	96	76.5	88.6	85.55625	2.087052821	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	96	3.2	16.8	7.10625	2.698264549	0	0	--	18.0
aromatics	%(v/v)	96	26	38.1	30.925	1.989445837	0	0	--	42.0
benzene	%(v/v)	96	0.3	0.7	0.5	0.099472292	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	96	1.9	2.6	2.2	0.155258698	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	96	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	96	0	0	1.304166667	1.644160321	0	0	--	5
Iso-propyl alcohol	%(v/v)	96	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	96	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	96	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	96	4.2	14.7	9.995833333	3.235347537	0	0	--	15
Other oxygenate	%(v/v)	96	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	103	3	57.4	13.84660194	8.728458076	0	0	--	150
LEAD CONTENT	g/l	96	0	0	0.0004	0.000198945	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 0.5%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Germany

Year: 2003

FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s

National Fuel Grade Benzin Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	59	82.5	93.6	91.4	0.5	91	0	95	--
MOTOR OCTANE NO.	--	110	82.5	85	83	0.53	82.5	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	56	56.1	61.6	59	1.44	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	129	46.7	68.2	56.5	4.7	0	0	46.0	--
evaporated at 150	%(v/v)	129	75.6	97.3	87	4.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	98	1.2	20.7	8.11	3.65	0	21	--	18.0
aromatics	%(v/v)	139	18.8	42.6	32.8	2.91	0	0	--	42.0
benzene	%(v/v)	139	0.3	1.02	0.68	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	72	0	1.7	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	94	0	0.6	0	0	0	0	--	3
Ethanol	%(v/v)	48	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	59	0	0.1	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	59	0	0.2	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	59	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	117	0	9.2	0	0	0	0	--	15
Other oxygenate	%(v/v)	59	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	139	0	15.1	7.9	2.1	50	0	--	150
LEAD CONTENT	g/l	33	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 Oxygen Content is 0.1%(m/m), and therefore values reported as 0 will fall into the range 0-0.1%(m/m). The limit of detection for lead content 0.005g/l, and therefore values reported as fall into the range 0-0.005g/l. Reporting of an average value or standard deviation is therefore not possible for these parameters, because a large part of measured v are "below the limit of detection".

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Germany

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)

National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	57	95	96.4	95.6	0.29	0	0	95	--
MOTOR OCTANE NO.	--	138	82.4	87.9	85.2	0.28	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	84	55.5	65.6	52.8	1.16	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	156	44.2	60.6	53.3	2.8	0	0	46.0	--
evaporated at 150	%(v/v)	156	78	95.8	86.3	2.71	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	121	0.5	20.2	9.3	3.04	0	0	--	18.0
aromatics	%(v/v)	161	22.8	46.3	37.6	2.35	0	0	--	42.0
benzene	%(v/v)	161	0.2	1	0.66	0.11	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	133	0	2.53	0.6	0.32	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	99	0	0.1	0	0	0	0	--	3
Ethanol	%(v/v)	61	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	61	0	0.2	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	147	0	12.5	2.72	0.43	0	0	--	15
Other oxygenate	%(v/v)	53	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	169	1	46	6.95	2	50	0	--	150
LEAD CONTENT	g/l	43	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 Oxygen Content is 0.1%(m/m), and therefore values reported as 0 will fall into the range 0-0.1%(m/m). The limit of detection for lead content 0.005g/l, and therefore values reported as fall into the range 0-0.005g/l. Reporting of an average value or standard deviation is therefore not possible for these parameters, because a large part of measured v are "below the limit of detection".

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Germany

Year: 2003

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

National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	41	98.1	100.5	99.2	0.78	98	0	95	--
MOTOR OCTANE NO.	--	79	87.5	89.8	88.4	0.42	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	36	54.9	78.7	60.7	3.2	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	93	45.2	62	53.8	3.76	0	0	46.0	--
evaporated at 150	%(v/v)	93	75.8	93.8	85.9	3.56	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	65	0.5	15.1	4.95	2.57	0	0	--	18.0
aromatics	%(v/v)	91	24.3	41.9	36.6	2.94	0	0	--	42.0
benzene	%(v/v)	91	0	0.84	0.5	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	78	1.1	2.7	2	0.26	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	38	0	0.1	0	0	0	0	--	3
Ethanol	%(v/v)	42	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	42	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	42	0	0.2	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	42	0	14.2	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	84	0	14.6	10.8	1.93	0	0	--	15
Other oxygenate	%(v/v)	62	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	99	10	12.1	4.5	2.3	10	0	--	150
LEAD CONTENT	g/l	23	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 Oxygen Content is 0.1%(m/m), and therefore values reported as 0 will fall into the range 0-0.1%(m/m). The limit of detection for lead content 0.005g/l, and therefore values reported as fall into the range 0-0.005g/l. Reporting of an average value or standard deviation is therefore not possible for these parameters, because a large part of measured v are "below the limit of detection". The limit of detection for benzene is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1%(v/v).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Greece

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Benzine RON=95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	85	95	96.5	95.6	0.6	0	0	95	--
MOTOR OCTANE NO.	--	85	85	85.1	85	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	33	56.5	60	58.7	0.9	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	52	67	60	3.6	0	0	46.0	--
evaporated at 150	%(v/v)	80	83	93	89.1	2.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	78	1	17.5	10.5	3.6	0	0	--	18.0
aromatics	%(v/v)	80	23	40	29	3.5	0	0	--	42.0
benzene	%(v/v)	85	0.5	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	24	0.7	0.8	0.8	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	71	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	71	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	71	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	71	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	71	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	71	2	13	5.3	2.3	0	0	--	15
Other oxygenate	%(v/v)	71	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	85	10	150	89	43.8	0	0	--	150
LEAD CONTENT	g/l	85	0.001	0.004	0.002	0.001	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Greece

Year: 2003

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Benzine (95 = RON<98) and (LRP) RON =96

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	76	96	97.3	96.2	0.3	0	0	95	--
MOTOR OCTANE NO.	--	76	85	86.1	85	0.1	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	29	46	60	57.3	3.2	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	73	49	68	59.2	3.8	0	0	46.0	--
evaporated at 150	%(v/v)	73	83	99.5	89.2	3.2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	70	3.5	16	11.2	3.3	0	0	--	18.0
aromatics	%(v/v)	72	21.5	41.2	29.5	3.7	0	0	--	42.0
benzene	%(v/v)	76	0.7	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	49	0.5	1.9	1	0.4	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	68	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	68	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	68	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	68	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	68	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	1.3	9	4.9	1.8	0	0	--	15
Other oxygenate	%(v/v)	68	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	76	10	150	101	47.7	0	0	--	150
LEAD CONTENT	g/l	76	1	4	2	1	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Greece

Year: 2003

FuelID: Unleaded petrol RON > 98

National Fuel Grade Benzine RON=98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	81	98	100	98.2	0.4	0	0	95	--
MOTOR OCTANE NO.	--	81	86	88	86.1	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	34	51.6	60	57.8	2	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	77	48	68	59.7	5.2	0	0	46.0	--
evaporated at 150	%(v/v)	77	80	93	88.4	3.7	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	77	1	18	12	2.8	0	0	--	18.0
aromatics	%(v/v)	81	20	39	30	3.6	0	0	--	42.0
benzene	%(v/v)	81	0.8	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	27	0.9	2.5	2.1	0.3	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	5	14	10.5	2.1	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	81	12	150	94.6	43.8	0	0	--	150
LEAD CONTENT	g/l	81	0.001	0.004	0.002	0.001	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Ireland

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade RON<96, RON96, <50 ppm sulphur, <10ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	78	94	97.1	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	78	85	88	86.4	0.71	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	19	49.8	69.9	62.4	5.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	47	63.6	55.7	4	0	0	46.0	--
evaporated at 150	%(v/v)	80	82.3	96.7	90.4	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	80	0.8	17.3	8	3.2	0	0	--	18.0
aromatics	%(v/v)	80	21.3	38	28.8	4.1	0	0	--	42.0
benzene	%(v/v)	80	0.2	1.1	0.69	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	80	0	1.3	0.08	0.19	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	80	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	80	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	80	0	7.1	0.45	1.09	0	0	--	15
Other oxygenate	%(v/v)	80	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	80	0	146	51.8	43.4	0	0	--	150
LEAD CONTENT	g/l	80	0	0.001	0.00004	0.0002	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Ireland

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade RON<96, RON96, <50 ppm sulphur, <10ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	78	94	97.1	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	78	85	88	86.4	0.71	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	19	49.8	69.9	62.4	5.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	47	63.6	55.7	4	0	0	46.0	--
evaporated at 150	%(v/v)	80	82.3	96.7	90.4	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	80	0.8	17.3	8	3.2	0	0	--	18.0
aromatics	%(v/v)	80	21.3	38	28.8	4.1	0	0	--	42.0
benzene	%(v/v)	80	0.2	1.1	0.69	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	80	0	1.3	0.08	0.19	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	80	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	80	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	80	0	7.1	0.45	1.09	0	0	--	15
Other oxygenate	%(v/v)	80	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	80	0	146	51.8	43.4	0	0	--	150
LEAD CONTENT	g/l	80	0	0.001	0.00004	0.0002	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Ireland

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)

National Fuel Grade RON<96, RON96, <50 ppm sulphur, <10ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	78	94	97.1	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	78	85	88	86.4	0.71	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	19	49.8	69.9	62.4	5.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	47	63.6	55.7	4	0	0	46.0	--
evaporated at 150	%(v/v)	80	82.3	96.7	90.4	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	80	0.8	17.3	8	3.2	0	0	--	18.0
aromatics	%(v/v)	80	21.3	38	28.8	4.1	0	0	--	42.0
benzene	%(v/v)	80	0.2	1.1	0.69	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	80	0	1.3	0.08	0.19	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	80	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	80	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	80	0	7.1	0.45	1.09	0	0	--	15
Other oxygenate	%(v/v)	80	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	80	0	146	51.8	43.4	0	0	--	150
LEAD CONTENT	g/l	80	0	0.001	0.00004	0.0002	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Ireland

Year: 2003

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade RON<96, RON96, <50 ppm sulphur, <10ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	78	94	97.1	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	78	85	88	86.4	0.71	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	19	49.8	69.9	62.4	5.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	47	63.6	55.7	4	0	0	46.0	--
evaporated at 150	%(v/v)	80	82.3	96.7	90.4	3.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	80	0.8	17.3	8	3.2	0	0	--	18.0
aromatics	%(v/v)	80	21.3	38	28.8	4.1	0	0	--	42.0
benzene	%(v/v)	80	0.2	1.1	0.69	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	80	0	1.3	0.08	0.19	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	80	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	80	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	80	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	80	0	7.1	0.45	1.09	0	0	--	15
Other oxygenate	%(v/v)	80	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	80	0	146	51.8	43.4	0	0	--	150
LEAD CONTENT	g/l	80	0	0.001	0.00004	0.0002	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Italy

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Petrol

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	192	94.6	97	95.5	0.49	95	0	95	--
MOTOR OCTANE NO.	--	144	84.5	87	85.4	0.46	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	76	50.3	67.7	55.9	2.47	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	144	42	70	53.5	5.75	0	46	46.0	--
evaporated at 150	%(v/v)	89	80	94	88	2.98	0	75	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	192	0.2	16.3	8.3	4.79	0	18	--	18.0
aromatics	%(v/v)	192	12.9	39.9	32.3	4.2	0	40	--	42.0
benzene	%(v/v)	192	0.2	1	0.8	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	192	0	2.4	0.5	0.6	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	192	0	13.5	3	3.35	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	145	1	137	52.9	29.1	0	150	--	150
LEAD CONTENT	g/l	75	0	0	0	0	0	0.005	--	0.005

Notes:

The limit of detection for lead is 0.005g/l, and therefore values reported as 0 will fall into the range 0-0.005g/l. Although all oxygenates were not measured, other th ethers with more than 5 carbon atoms per molecule, no other oxygenates are added to the fuels(1) In order to ensure the compliance with the Directive 98/70/EC, laboratories and organisations qualified to carry out the sampling and the analysis, have been asked to strictly follow the sampling and rules set up by EN ISO 4259 f testing limits. A further improvement is expected from the decision taken by the national standardisation body (UNICHIM) to monitor performance of the involved laboratories through the proficiency testing schemes foreseen for laboratories' accreditation purposes. Besides, in Italy there is a monitoring system carried out by competent national authority in the production and importing sites. Italy carried out successful these action last year. Compared to 2002, in fact, the number of petro diesel fuel samples which do not comply with the specification limits decreased.Further, Italy elaborated a draft of decree necessary to comply with the Directive 2003/17/EC. The draft updated the rules for monitoring system both for marked, produced and imported fuel.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Netherlands

Year: 2003

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Petrol (RON95 and RON98)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	100	95	99.5	96.53	0.2	0	0	95	--
MOTOR OCTANE NO.	--	100	84.6	88.2	85.25	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	50	54.1	65.1	59.21	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	100	46.5	60.7	53.8	1.9	0	0	46.0	--
evaporated at 150	%(v/v)	100	77.9	96.5	87.8	2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	2.3	16.4	9.2	0.4	0	0	--	18.0
aromatics	%(v/v)	100	24.4	42	36.22	2.1	0	0	--	42.0
benzene	%(v/v)	100	0.3	1	0.72	0.04	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1.9	0.71	0.11	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0	0.04	0	0	--	3
Ethanol	%(v/v)	100	0	0	0	0.04	0	0	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0.1	10.2	4.04	0.14	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0.04	0	0	--	10
SULPHUR CONTENT	mg/kg	100	0	44	25.8	1.8	0	0	--	150
LEAD CONTENT	g/l	100	0	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).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Netherlands

Year: 2003

FuelID: Unleaded petrol RON > 98

National Fuel Grade Petrol (RON95 and RON98)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	100	95	99.5	96.53	0.2	0	0	95	--
MOTOR OCTANE NO.	--	100	84.6	88.2	85.25	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	50	54.1	65.1	59.21	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	100	46.5	60.7	53.8	1.9	0	0	46.0	--
evaporated at 150	%(v/v)	100	77.9	96.5	87.8	2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	2.3	16.4	9.2	0.4	0	0	--	18.0
aromatics	%(v/v)	100	24.4	42	36.22	2.1	0	0	--	42.0
benzene	%(v/v)	100	0.3	1	0.72	0.04	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1.9	0.71	0.11	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0	0.04	0	0	--	3
Ethanol	%(v/v)	100	0	0	0	0.04	0	0	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0.04	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0.1	10.2	4.04	0.14	0	0	--	15
Other oxygenate	%(v/v)	100	0	0	0	0.04	0	0	--	10
SULPHUR CONTENT	mg/kg	100	0	44	25.8	1.8	0	0	--	150
LEAD CONTENT	g/l	100	0	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).

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Portugal

Year: 2003

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Euro Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	19	95	96	95.5	0.51	95	0	95	--
MOTOR OCTANE NO.	--	19	85	87	85.3	0.56	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	7	53.8	59.6	57.1	2.48	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	19	46	58.5	49.8	4.04	46	71	46.0	--
evaporated at 150	%(v/v)	19	76	88.7	82.6	3.87	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	9	6.8	12.5	9.3	1.95	0	18	--	18.0
aromatics	%(v/v)	9	29.9	40.3	35.7	3.29	0	42	--	42.0
benzene	%(v/v)	19	0.7	1	0.84	0.09	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	9	0.1	1	0.4	0.34	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	9	0.4	5.4	2.2	1.79	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	19	22	130	68.4	32.86	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 ingnition engines (Petrol)

Country: Portugal

Year: 2003

FuelID: Unleaded petrol RON > 98

National Fuel Grade SuperPlus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	16	98	98	98	0	98	0	95	--
MOTOR OCTANE NO.	--	16	87	88	87.06	0.25	87	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	8	48.9	59.9	57.5	3.72	45	65	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	16	46.2	58	49.3	3.87	46	71	46.0	--
evaporated at 150	%(v/v)	16	77.6	86.6	82.9	2.85	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	16	6.9	10.8	8.6	1.27	0	18	--	18.0
aromatics	%(v/v)	16	30.7	40.6	36	2.74	0	42	--	42.0
benzene	%(v/v)	16	0.7	1	0.9	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	16	0.5	2.6	1.6	0.64	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	16	2.9	14.6	8.9	3.49	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	16	21	71	41.1	13.23	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 ingnition engines (Petrol)

Country: Sweden

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Unleaded gasoline 95, class 1

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	745	95	97	95.4	0	0	0	95	--
MOTOR OCTANE NO.	--	745	85	86.5	95.3	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	393	54	70	64.7	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	745	47	67	52.6	0	47	0	46.0	--
evaporated at 150	%(v/v)	745	75	96	87.4	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	745	0.4	13	6.1	0	0	13	--	18.0
aromatics	%(v/v)	745	27.6	42	37.3	0	0	0	--	42.0
benzene	%(v/v)	745	0.4	1	0.77	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	2.6	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	745	0	8	0.4	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	745	0.1	50	13.9	0	0	50	--	150
LEAD CONTENT	g/l	745	0	0	0	0	0	0.005	--	0.005

Notes:

The limit of detection for lead is 0.003g/l, and therefore values reported as 0 will fall into the range 0-0.003g/l. The additon of ethanol was increased during 2003. Approximately 125 000 m3 of ethanol was added to the gasoline.Ethanol is added mainly at the gantry or in the refinery. When added at the gantry at a depot then dilution effect of ethanol is not shown in the analysis. DVPE is lowered in the base gasoline order to account for the effect of ethanol. The oxygen content has not b filled in due to addition of ethanol at this later stage.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: Sweden

Year: 2003

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade Unleaded 98, class 1

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	184	98	100.5	98.5	0	98	0	95	--
MOTOR OCTANE NO.	--	184	87.5	88.7	87.6	0	87	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	123	58.6	70	67.4	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	184	48	69	52.7	0	47	0	46.0	--
evaporated at 150	%(v/v)	184	78.4	95	86.9	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	184	0.4	12.3	6.1	0	0	13	--	18.0
aromatics	%(v/v)	184	25.4	42	38.9	0	0	0	--	42.0
benzene	%(v/v)	184	0.4	1	0.72	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	184	0	2.7	1.1	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	184	0	14.9	6.6	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	184	0.5	38	5.5	0	0	50	--	150
LEAD CONTENT	g/l	184	0	0	0	0	0	0.005	--	0.005

Notes:

The limit of detection for lead is 0.003g/l, and therefore values reported as 0 will fall into the range 0-0.003g/l.

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: UK

Year: 2003

FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)

National Fuel Grade Premium Unleaded

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	2486	94.5	98.3	95.4	0.32	0	0	95	--
MOTOR OCTANE NO.	--	2437	84.5	88.4	85.3	0.33	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	937	51.9	71.7	68.1	8.28	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	2507	44.6	70	57.1	3.29	0	0	46.0	--
evaporated at 150	%(v/v)	2255	76.5	98.6	72.9	3.08	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2404	0.5	21.4	10.5	2.41	0	0	--	18.0
aromatics	%(v/v)	2408	12.1	37.1	30.2	2.65	0	0	--	42.0
benzene	%(v/v)	2349	0.1	1.1	0.7	0.12	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	698	0	1.8	0.2	0.81	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	265	0	0.8	0	0.1	0	0	--	3
Ethanol	%(v/v)	265	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	265	0	0.2	0	0.01	0	0	--	10
Tetro-butyl alcohol	%(v/v)	265	0	0.1	0	0.01	0	0	--	7
Iso-butyl alcohol	%(v/v)	265	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	730	0	9.9	0.9	0.85	0	0	--	15
Other oxygenate	%(v/v)	213	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	2147	1	57	39.1	7.29	0	0	--	150
LEAD CONTENT	g/l	1085	0	0	0	0	0	0	--	0.005

Notes:

0

Market Fuels used in vehicles with spark ingnition engines (Petrol)

Country: UK

Year: 2003

FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)

National Fuel Grade Super Unleaded and Lead Replacement Petrol

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	424	96.5	99.2	97.3	0.37	0	0	95	--
MOTOR OCTANE NO.	--	402	85.1	88.9	86.6	0.52	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	145	49.1	84.2	64.6	5.84	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	413	46	69	46.6	4.43	0	0	46.0	--
evaporated at 150	%(v/v)	415	78	96.1	91	2.86	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	400	0.8	21.6	10.3	3.36	0	0	--	18.0
aromatics	%(v/v)	364	17	37	31.9	3.15	0	0	--	42.0
benzene	%(v/v)	318	0	1.1	0.7	0.15	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	110	0	1.8	0.2	0.78	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	78	0	0.5	0	0.09	0	0	--	3
Ethanol	%(v/v)	78	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	78	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	78	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	78	0	1.1	0	0.13	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	291	0	9.7	1.2	1.47	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	387	1	57	42.1	8.82	0	0	--	150
LEAD CONTENT	g/l	101	0	0	0	0	0	0	--	0.005

Notes:

0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Austria

Year: 2003

FuelID: Diesel fuel

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	100	48.7	57.1	52.5	1.45	51	0	51	--
DENSITY AT 15 C	kg/m3	100	823	844	836	4.11	820	845	--	845
DISTILLATION-95 C POINT	C	100	323	359	349	5.94	0	360	--	360
PAHs	%(m/m)	100	2	7	4	0.86	0	11	--	11
SULPHUR CONTENT	mg/kg	100	6	485	212.8	0.01	0	350	--	350

Notes: For one sample the measured sulphur content was beyond the method tolerance limit.

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Belgium

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: diesel 50 s

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values 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%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v).

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Denmark

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel (annex IV)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	25	49.4	55.3	52.6	1.4	0	0	51	--
DENSITY AT 15 C	kg/m3	25	825	844.8	837.8	5	0	0	--	845
DISTILLATION-95 C POINT	C	25	342.7	355.1	348.9	3.7	0	0	--	360
PAHs	%(m/m)	25	0.1	3.9	1.5	0.7	0	0	--	11
SULPHUR CONTENT	mg/kg	25	3	42	28	11	0	50	--	350

Notes: With effect from 1st of June 1999 fiscal incentives has been introduced in order to promote auto diesel with sulphur content below 50 ppm. The incentive is 0.18 Dkr pr litr (app. 2.4 Euro cents pr. litre)

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel fuel (max. 50 mg/kg)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	91	51.4	60.3	55.77032967	1.556884353	0	0	51	--
DENSITY AT 15 C	kg/m3	98	810	839	829.5102041	5.848605438	0	0	--	845
DISTILLATION-95 C POINT	C	98	301.1	357.2	337.5255102	13.63856721	0	0	--	360
PAHs	%(m/m)	98	0.3	2.6	1.107142857	0.494922674	0	0	--	11
SULPHUR CONTENT	mg/kg	101	1.2	48.2	14.05049505	9.702499678	0	50	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Germany

Year: 2003

FuelID: Diesel fuel (<10 ppm sulphur)

National Fuel Grade: Dieselkraftstoff schwefelfrei 10ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	222	49.8	61.1	54	1.7	0	0	51	--
DENSITY AT 15 C	kg/m3	222	822.2	841.2	831.9	3.4	0	0	--	845
DISTILLATION-95 C POINT	C	222	316.5	365	346	6.9	0	0	--	360
PAHs	%(m/m)	177	0.3	19.4	3.27	2.13	0	0	--	11
SULPHUR CONTENT	mg/kg	222	4	34	7.95	3	0	50	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece

Year: 2003

FuelID: Diesel fuel

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	78	511	602	553	16	0	0	51	--
DENSITY AT 15 C	kg/m3	91	823	845	835	548	0	0	--	845
DISTILLATION-95 C POINT	C	87	2990	3670	3580	94	0	0	--	360
PAHs	%(m/m)	76	5	90	41	26	0	0	--	11
SULPHUR CONTENT	mg/kg	86	180	570	294	576	0	0	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel <50 ppm Sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	78	511	602	553	16	0	0	51	--
DENSITY AT 15 C	kg/m3	91	823	845	835	548	0	0	--	845
DISTILLATION-95 C POINT	C	87	2990	3670	3580	94	0	0	--	360
PAHs	%(m/m)	76	5	90	41	26	0	0	--	11
SULPHUR CONTENT	mg/kg	5	45	50	47	19	0	50	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	10	51	53.9	52.4	1	0	0	51	--
DENSITY AT 15 C	kg/m3	48	825.6	843.9	836.6	5	0	0	--	845
DISTILLATION-95 C POINT	C	48	324.8	362.7	349.9	8.7	0	0	--	360
PAHs	%(m/m)	48	1.2	6.4	3.6	1.4	0	0	--	11
SULPHUR CONTENT	mg/kg	48	4	79	42	17.5	0	0	--	350

Notes: Sulphur method used: EN ISO 8754 1995; Density method used: EN ISO 12185 1996

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy

Year: 2003

FuelID: Diesel fuel

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	147	49	58.5	52.1	1.53	51	0	51	--
DENSITY AT 15 C	kg/m3	276	822	845	837	4.47	0	845	--	845
DISTILLATION-95 C POINT	C	276	347	368	357.3	3.36	0	360	--	360
PAHs	%(m/m)	172	1.4	8.9	4.3	1.47	0	11	--	11
SULPHUR CONTENT	mg/kg	259	3	390	238	88.37	0	350	--	350

Notes: (1) In order to ensure the compliance with the Directive 98/70/EC, laboratories and organisations qualified to carry out the sampling and the analysis, have been asked to strictly follow the sampling and rules set up by EN ISO 4259 for testing limits. A further improvement is expected from the decision taken by the national standardisation body (UNICHIM) to monitor performance of the involved laboratories through the proficiency testing schemes foreseen for laboratories' accreditation purposes. Besides, in Italy there is a monitoring system carried out by competent national authority in the production and importing sites. Italy carried out successful these action last year. Compared to 2002, in fact, the number of petrol and diesel fuel samples which do not comply with the specification limits decreased.Further, Italy elaborated a draft of decree necessary to comply with the Directive 2003/17/EC. The draft updated the rules for monitoring system both for marked, produced and imported fuel.

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Netherlands

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel <50 ppm Sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	102	49.7	57.4	52.66	1.52	0	0	51	--
DENSITY AT 15 C	kg/m3	102	823.4	840.7	832.27	0.42	0	0	--	845
DISTILLATION-95 C POINT	C	102	318.7	359.5	351.67	5.05	0	0	--	360
PAHs	%(m/m)	102	1.9	6.6	4.61	0.85	0	0	--	11
SULPHUR CONTENT	mg/kg	102	10	65	31.18	18	0	0	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Portugal

Year: 2003

FuelID: Diesel fuel

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	23	51	58.3	52.7	1.99	51	0	51	--
DENSITY AT 15 C	kg/m3	23	821.3	845	840.4	6.57	820	845	--	845
DISTILLATION-95 C POINT	C	23	350	360	359.6	2.09	0	360	--	360
PAHs	%(m/m)	7	3	4	3.6	0.34	0	11	--	11
SULPHUR CONTENT	mg/kg	23	113	350	260.7	64.79	0	350	--	350

Notes: 0

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Sweden

Year: 2003

FuelID: Diesel fuel (<10 ppm sulphur)

National Fuel Grade: Diesel, class 1

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	640	50.1	56.2	52.9	0	50	0	51	--
DENSITY AT 15 C	kg/m3	640	808.2	820	813.7	0	800	820	--	845
DISTILLATION-95 C POINT	C	640	244	285	281.1	0	0	285	--	360
PAHs	%(m/m)	640	0	0	0	0	0	0.02	--	11
SULPHUR CONTENT	mg/kg	640	0	5	1.8	0	0	10	--	350

Notes: Cetane Index reported instead of cetane number, Polycycli aromatic hydrocarbon are reported as tri-aromatics+, which is what is in the specification for class 1 diesel, <0,02 vol-%. The limit of detection for PAH is 0.02%(m/m), and therefore values reported as 0 will fall into the range 0-0.02%(m/m).

Market fuels used in vehicles with compression ignition engines (Diesel)

Country: UK

Year: 2003

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications Min.	National Specifications Max.	EC Limit values Min.	EC Limit values Max.
CETANE NUMBER	--	1483	50	60.1	53.1	1.06	0	0	51	--
DENSITY AT 15 C	kg/m3	2233	820.2	835.1	831.3	3.2	0	0	--	845
DISTILLATION-95 C POINT	C	1009	308.3	347.9	339.5	4.31	0	0	--	360
PAHs	%(m/m)	712	0.1	6.5	2.8	0.82	0	0	--	11
SULPHUR CONTENT	mg/kg	2078	3	54	38.3	6.18	0	0	--	350

Notes: 0

Appendix 4: 2004 Fuel Quality Monitoring Reporting Format

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[15], as last amended by Directive 2003/17/EC[16], 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[17].

From 2004 Member States are required to report according to the requirements of the European Standard EN 14274: 2003[18], 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.

Reporting Year:	
Country:	
Date Report Completed:	
Organisation Responsible for Report:	
Address of Organisation:	
Person Responsible for Report:	
Telephone Number:	
Email:	

[15] OJ L 350, 28.12.1998, p. 58.
[16] OJ L76/10, 22.3.2003, p. 10
[17] O.J. L 53 of 23.2.2002, p.30
[18] 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.

Summer Period		
	Start	
	End	
Winter Period		
	Start	
	End	

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 (Petrol, per grade; Diesel)	
Fuel Quality Monitoring System model:	**Yes/No**	**Small Country**	**Large Country**
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--

If Member States **are** using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in Annex I (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States **are not** using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries & distribution terminals):

- Organisations responsible for sampling, analysis and reporting;
- Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
- Frequency of sampling and selection of sampling points;
- Assessment that shows the monitoring system's equivalency to the CEN system.

Description of National Fuel Quality Monitoring System (give once and up-date if necessary):

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) (1)		
Regular unleaded petrol (minimum RON=91 & <50 ppm sulphur)		
Regular unleaded petrol (minimum RON=91 & <10 ppm sulphur)		
Unleaded petrol (minimum RON=95) (1)		
Unleaded petrol (minimum RON=95 & <50 ppm sulphur) (2)		
Unleaded petrol (minimum RON=95 & <10 ppm sulphur) (3)		
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 (4)		
Diesel fuel (<50 ppm sulphur) (5)		
Diesel fuel (<10 ppm sulphur) (6)		

(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
Total National sales <10 ppm sulphur petrol		
Total National sales <10 ppm sulphur diesel		

Details of petrol RON grades available with <10 ppm sulphur:
Are <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)?

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[19]. 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.

Description of the geographical availability of sulphur free fuels or additional notes:

Option (A): Proportion of refuelling stations with sulphur free grades available by region

See Annex II for reporting table format.

[19] 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
Petrol						
Diesel						

Option (C): Availability of sulphur free fuels at large refuelling stations

	Petrol	Diesel
National criteria for definition of *"large refuelling stations"* in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

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).

General Summary of Analysis and Additional Information:

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 [1]

Country:	
Fuel type (petrol or diesel):	
Statistical Model (A, B or C) [2]	
Period & Year	

	Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability Factor [3]	Proportion of total samples	Min. number of Samples per grade	Actual number of samples taken					
						Grade:	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
						Name/ID:					
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
	Total										

(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 [1]

Country:	
Fuel type (petrol or diesel):	
Period & Year	

Regional Parameters				**Regional availability (NUTS Level 3) of sulphur free fuel at refuelling stations** [2]		
NUTS Region Description [2]		**NUTS Code** [2]	**No. of refuelling stations**	**Minimum %**	**Maximum %**	**Mean %**
LEVEL 2 Regions		--	--	--	--	--
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				
<insert extra rows as needed>						
LEVEL 1 Regions		--	--	--	--	--
Region 1		E.g. XX1				
Region 2		E.g. XX2				
Etc.		E.g. XX3				
<insert extra rows as needed>						
National Total		**E.g. XX**				

(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)

(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

Additional Comments:

ANNEX III: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) in 2004

Country	
Fuel grade:	
National specification:	
Period & Year:	

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC			
		No. of Samples	Min.	Max.	Mean	Standard Deviation	Min.	Max.	Min.	Max.	Method	Date
Research Octane Number	--							--	95 (2)	--	EN 25164	1993
Motor Octane Number	--							--	85 (3)	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 (4)	PrEN 13016-1	1997
Distillation:												
- evaporated at 100 °C	%(V/V)								46.0	--	PrEN ISO 3405	1999
- evaporated at 150 °C	%(V/V)								75.0	--		
Hydrocarbon Analysis:												
- olefins	%(V/V)									18.0 (5)	ASTM D 1319	1995
- aromatics	%(V/V)								--	42.0	ASTM D 1319	1995
- benzene	%(V/V)									1.0	EN 238	1996
Oxygen content	% (m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates:												
- Methanol	%(V/V)								--	3		
- Ethanol	%(V/V)								--	5		
- Iso-propyl alcohol	%(V/V)								--	10	EN 1601	1997
- Tert-butyl alcohol	%(V/V)								--	7	Or	
- Iso-butyl alcohol	%(V/V)								--	10	prEN 13132	1998
-Ethers containing 5 or more carbon atoms per molecule	%(V/V)								--	15		
- other oxygenates	%(V/V)								--	10		
Sulphur content	mg/kg								--	150	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						**Total:**	
January		**April**		**July**		**October**	
February		**May**		**August**		**November**	
March		**June**		**September**		**December**	

Comments

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 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 & Year:	

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC			
		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 ºC (2)	Kg/m^3								--	865	EN ISO 3575 EN ISO 12185	1998 1996
Distillation, 95% Point	^oC								--	360	PrEN ISO 3405	1998
Polycyclic aromatic hydrocarbons (PAH) (3)	%(m/m)								--	11	IP 391	1995
Sulphur content (4)	mg/kg								--	350	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994

Sample Numbers in Month			
January		**July**	
February		**August**	
March		**September**	
April		**October**	
May		**November**	
June		**December**	
		Total:	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

Comments

ANNEX V: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) from 2005

Country	
Fuel grade:	
National specification:	
Period & Year:	

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC			
		No. of Samples	Min.	Max.	Mean	Standard Deviation	Min.	Max.	Min.	Max.	Method	Date
Research Octane Number	--							--	95 (2)	--	EN 25164	1993
Motor Octane Number	--							--	85 (3)	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 (4)	PrEN 13016-1	1997
Distillation:												
- evaporated at 100 °C	%(V/V)								46.0	--	PrEN ISO 3405	1999
- evaporated at 150 °C	%(V/V)								75.0	--		
Hydrocarbon Analysis:												
- olefins	%(V/V)									18.0 (5)	ASTM D 1319	1995
- aromatics	%(V/V)								--	35.0	ASTM D 1319	1995
- benzene	%(V/V)									1.0	EN 238	1996
Oxygen content	% (m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates:												
- Methanol	%(V/V)								--	3		
- Ethanol	%(V/V)								--	5		
- Iso-propyl alcohol	%(V/V)								--	10	EN 1601	1997
- Tert-butyl alcohol	%(V/V)								--	7	Or	
- Iso-butyl alcohol	%(V/V)								--	10	prEN 13132	1998
-Ethers containing 5 or more carbon atoms per molecule	%(V/V)								--	15		
- other oxygenates	%(V/V)								--	10		
Sulphur content	mg/kg								--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						**Total:**	
January		**April**		**July**		**October**	
February		**May**		**August**		**November**	
March		**June**		**September**		**December**	

Comments

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 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

Country	
Fuel grade:	
National specification:	
Period & Year:	

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC			
		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 ºC (2)	Kg/m^3								--	865	EN ISO 3575 EN ISO 12185	1998 1996
Distillation, 95% Point	ºC								--	360	PrEN ISO 3405	1998
Polycyclic aromatic hydrocarbons (PAH) (3)	%(m/m)								--	11	IP 391	1995
Sulphur content (4)	mg/kg								--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994

Sample Numbers in Month			
January		**July**	
February		**August**	
March		**September**	
April		**October**	
May		**November**	
June		**December**	
		Total:	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

Comments

Appendix 5: Proposed 2004 Excel Reporting Template

CONTENTS

EU Fuel Quality Monitoring Submissions – 2004 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 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 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 2004 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

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 & CEN

Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducability, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Research Octane Number (RON)	--	95		EN 25164	1993	0.6	94.6	
(RON 91 fuel only)	--	91				0.6	90.6	
Motor Octane Number (MON)	--	85		EN 25163	1993	0.9	84.5	
(RON 91 fuel only)	--	81				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	1988	Depends on test conditions		
-- evaporated at 150 °C	% (v/v)	75		EN-ISO 3405	1988	Depends on test conditions		
Hydrocarbon analysis								
-- Olefins	% (v/v)		18.0	ASTM D1319	1995	4.6		20.7
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	1995	4.6		23.7
-- Aromatics	% (v/v)		42.0	ASTM D1319	1995	3.7		44.2
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.3		1.2
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
Sulphur content	mg/kg		150	EN ISO 14596	1998	30		168
				EN ISO 8754	1995			
				EN 24260	1994	18.6		161
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
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
Lead content	g/l		0.005	EN 237	1996	0.002		0.0062

Diesel

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproducability, 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^3		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	Depends on test conditions		
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50		380
				EN ISO 8754	1995			
				EN 24260	1994	42.4		375
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
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

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:

Summer Period	
Start	
End	
Winter Period	
Start	
End	

* Normal = 1st May to 30th September; Arctic = 1st June to 31st August

Member States should indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C and whether it is based on the large or small country framework. Alternatively, the Member State should indicate if they are using their own nationally defined system.

Country Size (L = Large, S = Small)	

		Minimum number of samples each period (Petrol, per grade; Diesel)	
Fuel Quality Monitoring System model used:	**Yes / No**	**Small Country**	**Large Country**
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--

If Member States **are** using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in **Annex I** (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States **are not** using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries & distribution terminals):
· Organisations responsible for sampling, analysis and reporting;
· Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
· Frequency of sampling and selection of sampling points;
· Assessment that shows the monitoring system's equivalency to the CEN system.

Description of National Fuel Quality Monitoring System (give once and up-date if necessary):

Total Sales of Petrol and Diesel

Year:

Member states are requested to complete the following table, as applicable detailing the quantities of each type and grade of petrol and diesel fuel marketed in their territory.

***NB: Please do not report national fuel grade sales under more than one category.**

Fuel Grade	Name of national fuel grade	National sales total		No. Samples Taken
		Litres	Tonnes	
Regular unleaded petrol (minimum RON = 91)[1]				
Regular unleaded petrol (minimum RON = 91 & < 50 ppm Sulphur)				
Regular unleaded petrol (minimum RON = 91 & < 10 ppm Sulphur)				
Unleaded petrol (minimum RON = 95)[1]				
Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)[2]				
Unleaded petrol (minimum RON = 95 & < 10 ppm Sulphur)[3]				
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)				
Total unleaded petrol (<150 ppm Sulphur)				
Total unleaded petrol (<50 ppm Sulphur)				
Total unleaded petrol (150 ppm Sulphur)				
Total Petrol				
Diesel fuel[4]				
Diesel fuel (< 50 ppm sulphur)[5]				
Diesel fuel (< 10 ppm sulphur)[6]				
Total Diesel				

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
Total National sales <10 ppm sulphur petrol		
Total National sales <10 ppm sulphur diesel		

Details of petrol RON grades available with <10 ppm sulphur:
Are <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)?

Where Member States choose to apply the measures in their national territories, they are also requested to complete, as far as possible, the following tables with detailed information (Options A to D) on the geographical availability of sulphur free petrol and diesel in their territories, as outlined in the Commission Guidance note[1]. Member States should also take into account any specific provisions made for special cases in the Commission Guidance.

[1] The more detailed reporting on geographical availability is not needed until the 2005 monitoring reports, but would be useful if Member States were also able to provide it from 2004.

Where the more detailed information is not available, or additional notes/clarifications are needed or other guidance than that given by the Commission is used, the Member States are requested to provide a description on the extent to which sulphur free fuels are marketed in their territory (i.e. geographical availability). This free form text box should also be used to provide any additional information such as the special cases outlined in the Commission Guidance note.

Description of the geographical availability of sulphur free fuels or additional notes:

Option (A): Proportion of refuelling stations with sulphur free grades available by region

See Annex II for reporting table format.

Option (B): Average distance between refuelling stations with sulphur free grades available

	No. Refuelling Stations		Distance between refuelling stations			
	<10 ppm	All	With <10 ppm grades			All
	Number	Number	Min.	Max.	Mean	Mean
Petrol						
Diesel						

Option (C): Availability of sulphur free fuels at large refuelling stations

	Petrol	Diesel
National criteria for definition of "*large refuelling stations*" in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

ANNEX I: Fuel Quality Monitoring System Regional Sampling of Petrol and Diesel (1)

Country:	
Fuel type (petrol or diesel):	
Statistical Model (A, B or C) (2)	
Reporting Year:	
Period (Summer or Winter):	

Min. number of samples per grade:	

Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability factor (3)	Proportion of total samples	Min. number of Samples per grade (4)	Actual number of samples taken					
					Grade:	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
					Name/ID:					
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
			-	-						
Remainder	--	--	--							
Total										

(1) As defined in Annexes B and C of EN 14274:2003

(2) Definitions according to those provided in EN 14274:2003.

(3) Only for statistical Model A

(4) For grades comprising <10% total sales, the minimum is calculated as: %sales x min. for parent grade (at least 1 sample)

Additional Notes (e.g. identification of grades comprising <10% total sales)

ANNEX II: Options (A) - Proportion of Refuelling Stations with Sulphur Free Grade Available by Region (1)

Country:	
Fuel type (petrol or diesel):	
Year:	
Period (Summer or Winter):	

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.

Regional Parameters				% of refuelling stations with sulphur free fuel available (2)		
NUTS Region Description (2)		NUTS Code (2)	No. of refuelling stations	Minimum %	Maximum %	Mean %
LEVEL 2 Regions	**Region Names**	--	--	**By (NUTS) level 3 region:**		
Region 1		E.g. XX11				
Region 2		E.g. XX12				
Region 3		E.g. XX13				
Region 4		E.g. XX21				
Region 5		E.g. XX22				
Region 6		E.g. XX31				
<insert extra rows as needed>						
LEVEL 1 Regions	**Region Names**	--	--	**By (NUTS) level 2 region:**		
Region 1		E.g. XX1				
Region 2		E.g. XX2				
Region 3		E.g. XX3				
<insert extra rows as needed>						
National Total		**E.g. XX**				

(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.ht)

(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

Additional Comments:

Annex III: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) in 2004

Country		
Reporting Year		
Period (Summer / 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 (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70 EC			
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum	Method	Date
Research Octane Number	--								95 (2)		EN 25164	1993
Motor Octane Number	--								85 (3)		EN 25163	1993
Vapour Pressure, DVPE	kPa									(4)		
--summer period only										60.0	PrEN 13016-1	1997
Distillation												
-- evaporated at 100 °C	% (v/v)								46.0		PrEN ISO 3405	1999
-- evaporated at 150 °C	% (v/v)								75.0			
Hydrocarbon analysis												
-- Olefins	% (v/v)									18.0 (5)	ASTM D 1319	1995
-- Aromatics	% (v/v)									42.0	ASTM D 1319	1995
-- Benzene	% (v/v)									1.0	EN 238	1996
Oxygen content	% (m/m)									2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates												
-- Methanol	% (v/v)									3		
-- Ethanol	% (v/v)									5		
-- Iso-propyl alcohol	% (v/v)									10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)									7	Or	
-- Iso-butyl alcohol	% (v/v)									10	prEN 13132	1998
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)									15		
-- other oxygenates	% (v/v)									10		
Sulphur content	mg/kg									150	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l									0.005	EN 237	1996

Sampling frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		Total	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 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						Notes on exceedences		
		Method	Date	Reproducability, R	Tolerance limits			No. samples	Values	Details/action taken
					Minimum	Maximum	Exceeded?			
Research Octane Number (RON)	--	EN 25164	1993	0.6	94.6		Yes			
(RON 91 fuel only)	--			0.6	90.6		Yes			
Motor Octane Number (MON)	--	EN 25163	1993	0.9	84.5		Yes			
(RON 91 fuel only)	--			0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3		61.8				
--summer period (arctic or severe weather condit	kPa	EN 13016-1	2000	3.2		71.9				
Distillation										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	1988		46.0		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	1988		75.0		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	1995	4.6		20.7				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	1995	4.6		23.7				
-- Aromatics	% (v/v)	ASTM D1319	1995	3.7		44.2				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996	0.3		1.2				
Oxygen content	% (m/m)	EN 1601	1997	0.3		2.9				
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4		3.2				
-- Ethanol	% (v/v)	EN 1601	1997	0.3		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6		7.4				
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8		10.5				
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1		15.6				
-- other oxygenates	% (v/v)	EN 1601	1997	0.8		10.5				
Sulphur content	mg/kg	EN ISO 14596	1998	30		167.7				
		EN ISO 8754	1995							
		EN 24260	1994	18.6		161.0				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN ISO 8754	1995							
		EN 24260	1994	6.8		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				
Lead content	g/l	EN 237	1996	0.002		0.0062				

Annex IV: Market Fuels used in the Compression Ignition Engines (Diesel) in 2004

Country	
Reporting year	
Period (Summer / Winter)	
Parent fuel grade	
National fuel grade	

Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specifications		According to 98/70/EC			
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum	Method	Date
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C (2)	kg/m3									845	EN ISO 3575 EN ISO 12185	1998 1996
Distillation -- 95-%-Point	°C									360	PrEN ISO 3405	1998
Polycyclic aromatic hydrocarbons (PAH) (3)	% (m/m)									11	IP 391	1995
Sulphur content	mg/kg									350	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994

Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		Total	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

Other notes (optional):

Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590						Notes on exceedences		
		Method	Date	Reproducability, R	Tolerance limits			No. samples	Values	Details/action taken
					Minimum	Maximum	Exceeded?			
Cetane number	--	EN-ISO 5165	1998	4.3	48.4		Yes			
Density at 15 oC	kg/m3	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51						
Distillation -- 95% Point	oC	EN-ISO 3405	1988			360.0				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.3				
Sulphur content	mg/kg	EN ISO 14596	1998	50		379.7				
		EN ISO 8754	1995			350.0				
		EN 24260	1994	42.4		375.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.9				
		EN ISO 8754	1995							
		EN 24260	1994	6.8		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				

Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005

Country		
Reporting Year		
Period (Summer / 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 (1)				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70 EC			
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum	Method	Date
Research Octane Number	--								95 (2)		EN 25164	1993
Motor Octane Number	--								85 (3)		EN 25163	1993
Vapour Pressure, DVPE	kPa									(4)		
--summer period only										60.0	PrEN 13016-1	1997
Distillation												
-- evaporated at 100 °C	% (v/v)								46.0		PrEN ISO 3405	1999
-- evaporated at 150 °C	% (v/v)								75.0			
Hydrocarbon analysis												
-- Olefins	% (v/v)									18.0 (5)	ASTM D 1319	1995
-- Aromatics	% (v/v)									42.0	ASTM D 1319	1995
-- Benzene	% (v/v)									1.0	EN 238	1996
Oxygen content	% (m/m)									2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates												
-- Methanol	% (v/v)									3		
-- Ethanol	% (v/v)									5		
-- Iso-propyl alcohol	% (v/v)									10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)									7	Or	
-- Iso-butyl alcohol	% (v/v)									10	prEN 13132	1998
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)									15		
-- other oxygenates	% (v/v)									10		
Sulphur content	mg/kg									50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l									0.005	EN 237	1996

Sampling frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		Total	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 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						Notes on exceedences		
		Method	Date	Reproducability, R	Tolerance limits			No. samples	Values	Details/action taken
					Minimum	Maximum	Exceeded?			
Research Octane Number (RON)	--	EN 25164	1993	0.6	94.6		Yes			
(RON 91 fuel only)	--			0.6	90.6		Yes			
Motor Octane Number (MON)	--	EN 25163	1993	0.9	84.5		Yes			
(RON 91 fuel only)	--			0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3		61.8				
--summer period (arctic or severe weather condit	kPa	EN 13016-1	2000	3.2		71.9				
Distillation										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	1988		46.0		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	1988		75.0		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	1995	4.6		20.7				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	1995	4.6		23.7				
-- Aromatics	% (v/v)	ASTM D1319	1995	3.7		44.2				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996	0.3		1.2				
Oxygen content	% (m/m)	EN 1601	1997	0.3		2.9				
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4		3.2				
-- Ethanol	% (v/v)	EN 1601	1997	0.3		5.2				
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9		10.5				
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6		7.4				
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8		10.5				
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1		15.6				
-- other oxygenates	% (v/v)	EN 1601	1997	0.8		10.5				
Sulphur content	mg/kg	EN ISO 14596	1998	30		167.7				
		EN ISO 8754	1995							
		EN 24260	1994	18.6		161.0				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN ISO 8754	1995							
		EN 24260	1994	6.8		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				
Lead content	g/l	EN 237	1996	0.002		0.0062				

Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	
Period (Summer / Winter)	
Parent fuel grade	
National fuel grade	

Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value (1)				Test method (more recent versions may also be used)	
							National Specifications		According to 98/70/EC			
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum	Method	Date
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C (2)	kg/m^3									845	EN ISO 3575 EN ISO 12185	1998 1996
Distillation -- 95-%-Point	°C									360	PrEN ISO 3405	1998
Polycyclic aromatic hydrocarbons (PAH) (3)	% (m/m)									11	IP 391	1995
Sulphur content	mg/kg									50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994

Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		Total	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

Other notes (optional):

Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590						Notes on exceedences		
		Method	Date	Reproducability, R	Tolerance limits			No. samples	Values	Details/action taken
					Minimum	Maximum	Exceeded?			
Cetane number	--	EN-ISO 5165	1998	4.3	48.4		Yes			
Density at 15 oC	kg/m3	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51						
Distillation -- 95% Point	oC	EN-ISO 3405	1988			360.0				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.3				
Sulphur content	mg/kg	EN ISO 14596	1998	50		79.7				
		EN ISO 8754	1995			50.0				
		EN 24260	1994	42.4		75.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.9				
		EN ISO 8754	1995							
		EN 24260	1994	6.8		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				