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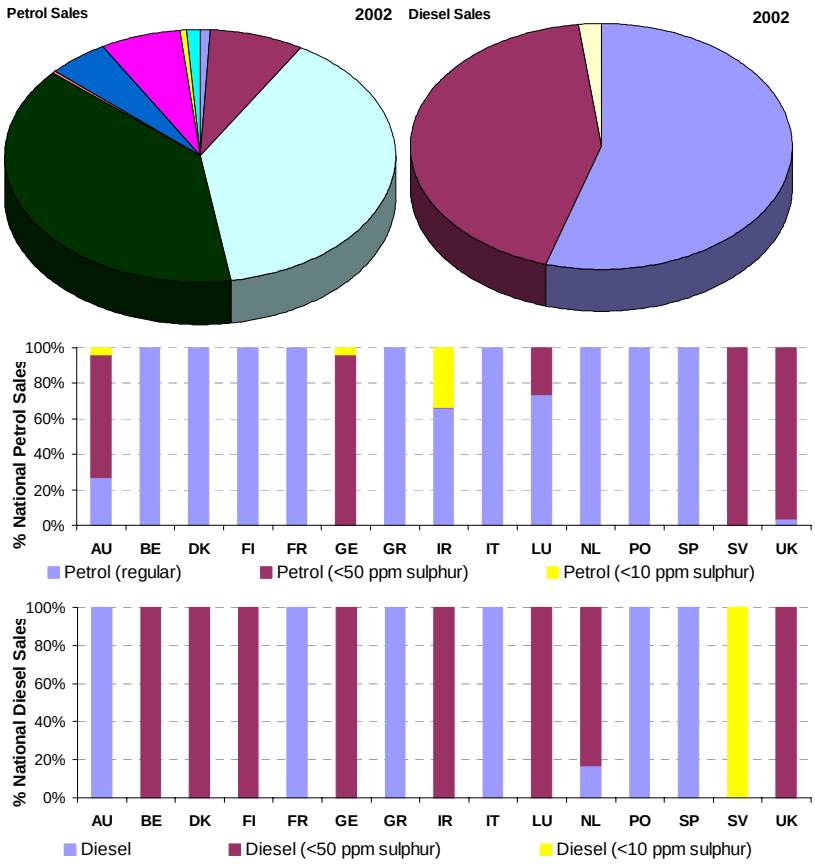
AEAT/ED50196/R2 Final

EU Fuel Quality Monitoring – 2002 Summary Report

Final report produced for the European Commission, DG Environment

Nikolas Hill, AEA Technology Environment



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1 Introduction

This report produced for DG Environment represents a consolidation of the second year of Member States' submissions under Directive 98/70/EC[1], summarising the quality of petrol and diesel in the community for the year 2002. 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 of 18/02/2002, 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) and a summary of the submissions received was presented in the *EU Fuel Quality Monitoring - 2001 Summary Report* (AEA Technology Environment, June 2003).

1.1 REPORT STRUCTURE

This report follows the same format developed for the preceding year's reporting, agreed with the European Commission and validated at an expert meeting 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 2002 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 derive 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 sections briefly outline the main policy drivers relating to fuel consumption, carbon dioxide emissions, air quality and their influence on fuel quality legislation.

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

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, in 2003 this is being reviewed in consideration with 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 of 2009 for complete penetration of zero sulphur diesel fuel is to be confirmed no later than 31st December 2005, to ensure there is no overall increase in greenhouse gas emissions resulting from this transition. This analysis shall consider developments in refinery processing technologies, expected fuel economy improvements of vehicles and the rate at which new fuel efficient technologies are introduced into the vehicle fleet.

[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 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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 (%)

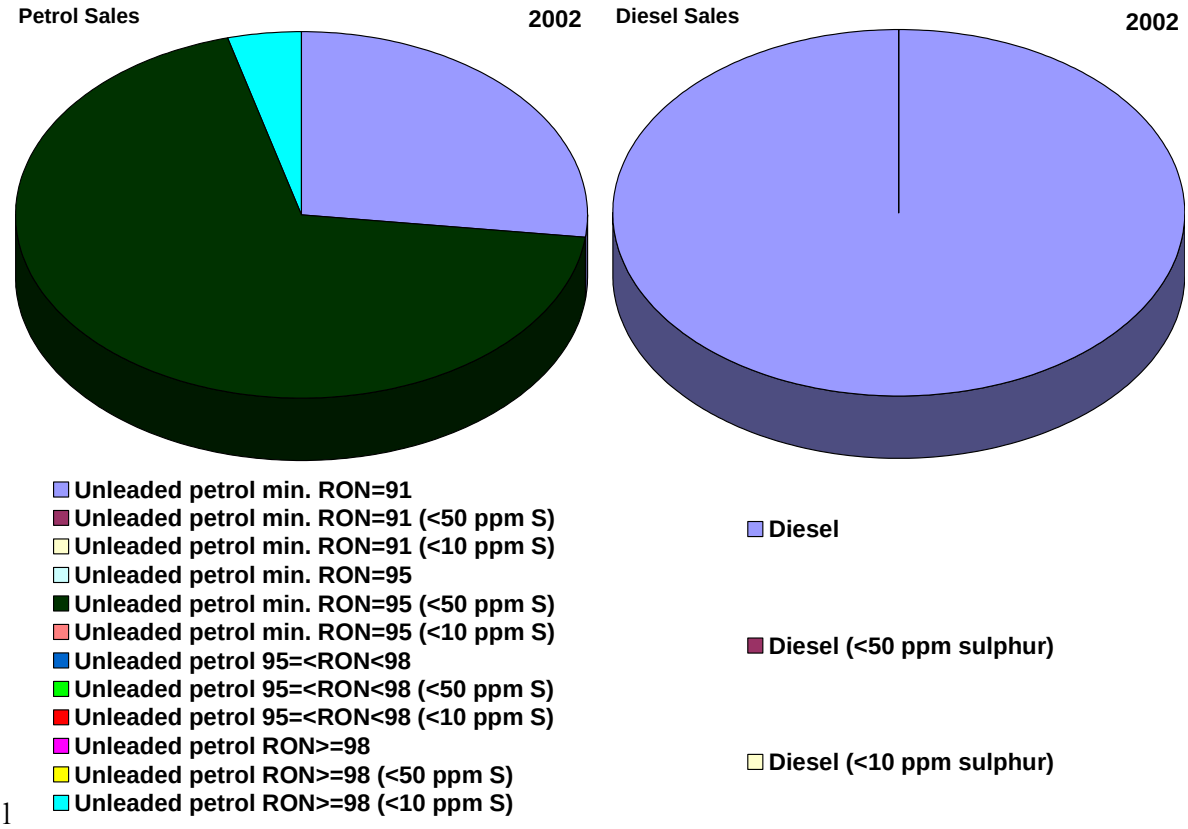

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Figure 2.1 clearly shows that RON91 petrol was still sold widely in Austria in 2002, accounting for 27% sales, only slightly down on 2001 (30%), sales of low sulphur (<50 ppm) RON95-98 petrol has increased to 69% (from 65% in 2001). Sales of sulphur free (<10 ppm) petrol (available at RON>98 grade throughout Austria), are essentially unchanged at just over 4% of sales. No low sulphur diesel grades were available in Austria in 2002.

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 2002. 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 first January 2004 a countrywide availability of sulphur free petrol and diesel will be guaranteed.

Average sulphur content of all petrol sold: 17 ppm (21 ppm in 2001)

Average sulphur content of all diesel sold: 236 ppm (277 ppm in 2001)

Additional information: Although not required by national legislation, analysis of samples of RON 91 petrol in 2002 have found it 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].

2.2 FUEL QUALITY MONITORING 2002

2.2.1 Description of system

Responsible organisation(s): Umweltbundesamt GmbH (Environmental Protection Agency), with the Oil Institute carrying out controls/sampling and analysis on behalf of the industry.

Location(s) of sampling: The Federal area was split into four regions for which sampling was carried out at petrol stations throughout Austria.

Time/frequency of sampling: a region was tested every quarter.

Number of samples taken: in each region 10 samples of each petrol type and 30 samples of diesel are taking each year.

Specification of test methods: not specified, assumed to comply with Directive 98/70/EC

Collection of sales data: Reporting obligation 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: 60; Winter: 60

Frequency of sampling: Quarterly (February, May, July and October)

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: olefins, aromatics, all oxygenates, 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. Super Petrol

Detail: MON (minimum 85) and summer vapour pressure (maximum 60) limit values were exceeded by some samples, with 84.9 and 60.2 respectively.

Statistical significance: The tolerance limit for statistical significance for MON is 84.5 and for the vapour pressure test method is 61.7 kPa, therefore none of the samples can be said to be in non-compliance with the Directive.

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.)

1. Super Plus Petrol

Detail: Summer vapour pressure limit (60 kPa) exceeded by 3.2 kPa on average in all samples. Individual values in exceedance reached a maximum of 73.7.

Statistical significance: The tolerance limit for statistical significance for the vapour pressure test method is 61.7 kPa. 10 samples were in non-compliance with the Directive, with values of: 73.7, 66.8, 62.0, 67.3, 65.9, 73.2, 68.7, 70.7, 63.3 and 68.8.

Member State's notes:

2.2.3 Diesel reporting

Sampling

Number of samples: Summer: 60; Winter: 60

Frequency of sampling: Quarterly (February, May, July and October)

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.)

1. Diesel

Detail: Limits for Cetane number (min. 51), distillation-95% point (max. 360 C) and sulphur content (max. 350 ppm) have been exceeded by some samples (up to values of 49.3, 363.6 and 481 respectively).

Statistical significance: The tolerance limits for statistical significance for Cetane number is 48.5, therefore this sample cannot be said to be noncompliant.

Seven samples exceeded the tolerance limit for distillation, with values of 361.4, 360.2, 360.8, 362.0, 362.2, 361.6 and 363.6. The tolerance limit for sulphur is 380 and only one sample exceeded this limit, with 481 ppm. These samples are therefore noncompliant with the Directive.

Member State's notes:

2.3 TEMPORAL TRENDS

The following Figures 2.2 to 2.4 show the 5 year 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 10% and 14% respectively. However, of the petrol sales, regular grade (RON 91) sales have the decreased by 2%, low sulphur (< 50 ppm) grade sales have increased by 15%, that sulphur-free (< 10 ppm) grade sales have only increased by 3%.

Figure 2.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

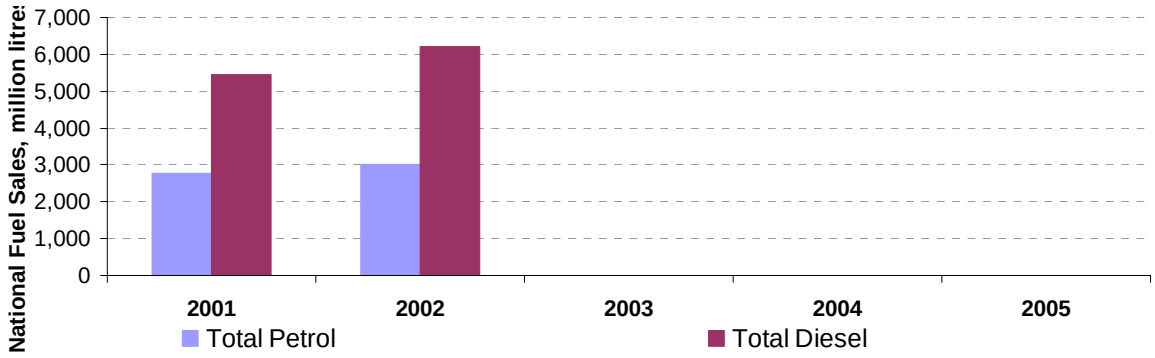


Figure 2.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

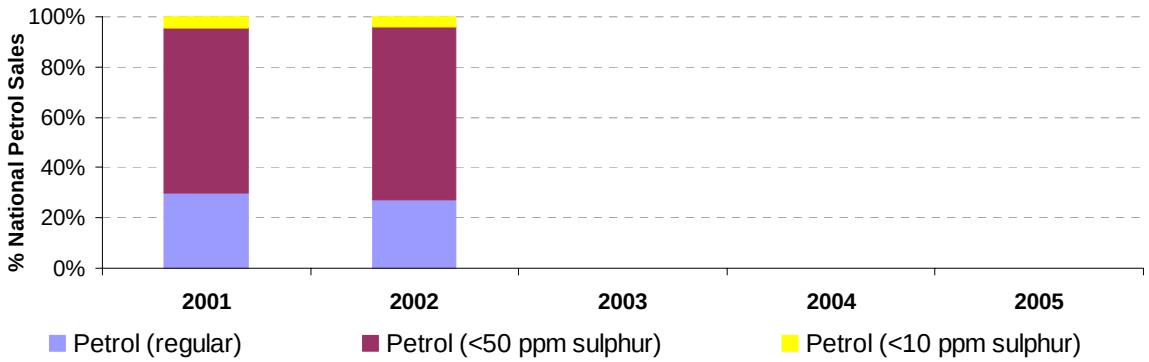
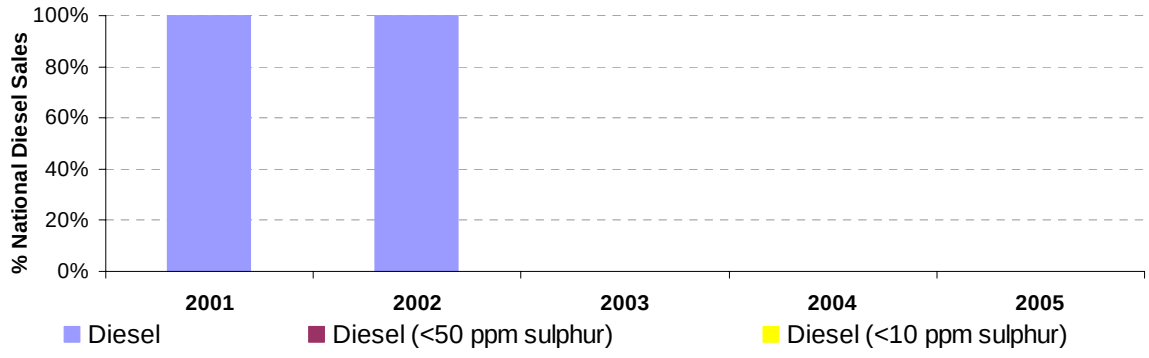


Figure 2.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



3 Belgium

3.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	Regular	Super Plus	Yes	10
13	Diesel Fuel	< 50 ppm	Diesel 50S	Yes	14

3.1.1 Sales

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

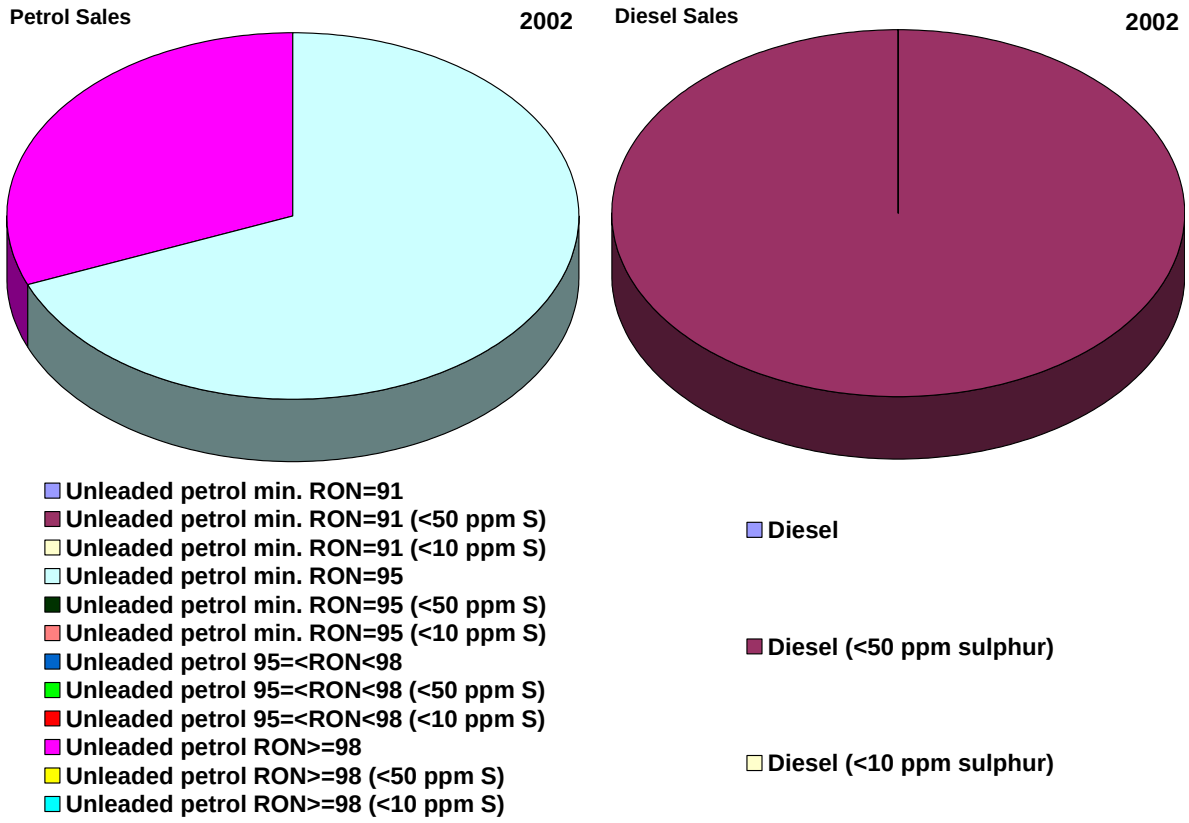


Figure 3.1 above shows that the majority (69%) of petrol sold in Belgium in 2002 was still RON95 (up from 66% in 2001), with the remainder being sales of RON < 98 fuel. Between 2001 and 2002 Belgium has switched completely from regular diesel to low sulphur diesel (< 50 ppm).

3.1.2 Sulphur content

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

Average sulphur content of all petrol sold: 44 ppm (68 ppm in 2001)

Average sulphur content of all diesel sold: 47 ppm (269 ppm in 2001)

[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].

3.2 FUEL QUALITY MONITORING 2002

3.2.1 Description of system

Responsible organisation(s): FAPETRO (Fonds d'Analyse des produits Petroliers) on behalf of the Ministry of Economic Affairs.

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

Time/frequency of sampling: 210 samples per week.

Number of samples taken: 4169 on all petrol fuels, and 5140 on diesel fuel spread fairly evenly across the year.

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

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

Other details: 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 a taking. 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 takings. 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 reality, it is rarely the pump attendant who pays, but instead the brand of the oil station.

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).

Belgium takes 10,000 samples each year so there are always some non-compliant samples, especially from heating oil contamination. 620 files have been opened as a result of 2002 sampling; warning letters were issued for some minor infringements and court action was taken for others.

3.2.2 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	4169
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 and other oxygenates.
Other:	Results for lead were all presented as < 5 mg/l

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 (43 samples), distillation-evaporation at 100 C & 150 C, olefins, aromatics, benzene (3 samples) and ethers with 5 or more carbon atoms per molecule. The number of samples exceeding these limits was not provided in all cases.
Statistical significance:	The maximum/minimum values of all the exceedances were beyond the tolerance limits of statistical significance for each parameter. Therefore a number of samples were non-compliant with the Directive.
Member State's notes:	See section 3.2.1

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 98

Detail:	Some samples exceeded the limit values for RON, MON, summer vapour pressure (189 samples), distillation-evaporation at 100 C & 150 C, aromatics and ethers with 5 or more carbon atoms per molecule. The number of samples exceeding these limits was not provided in all cases.
Statistical significance:	The maximum/minimum values of all the exceedances were beyond the tolerance limits of statistical significance for each parameter. Therefore one or more 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:	5140
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.)

1. Diesel

Detail:	Some samples exceeded the limit values for Cetane no., Density at 15 C (3 samples) and Distillation 95% point, however no information was supplied on the numbers of samples exceeding the limits in most cases, 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 Figures 3.2 to 3.4 show the 5 year 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 decreased by 3%, whilst those of diesel have increased by 4%. However, of the petrol sales, regular grade (RON 95) sales have increased by 1%, whilst RON >98 grade sales have only decreased by 11%.

Figure 3.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

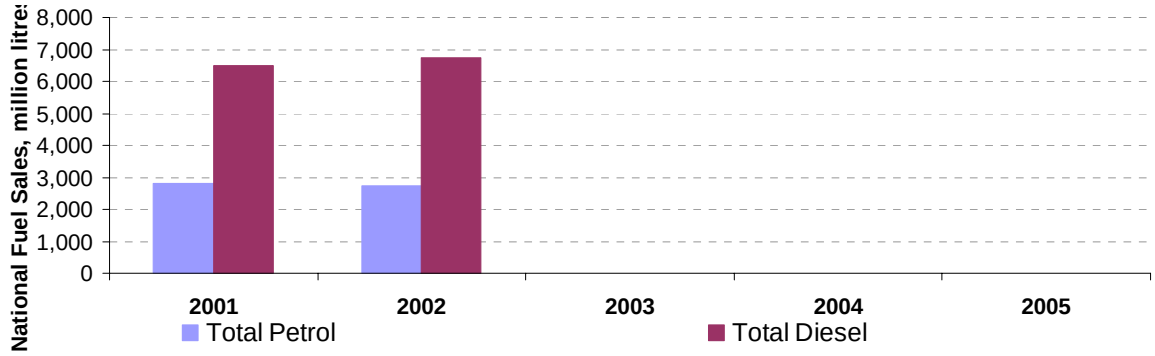


Figure 3.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

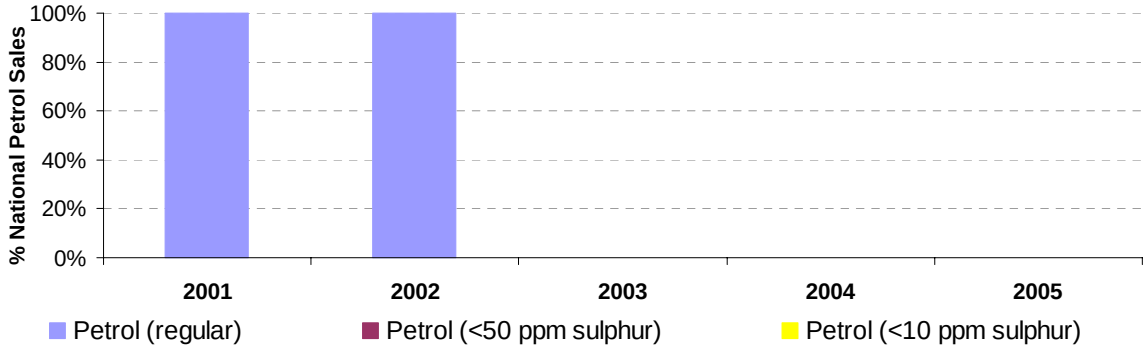
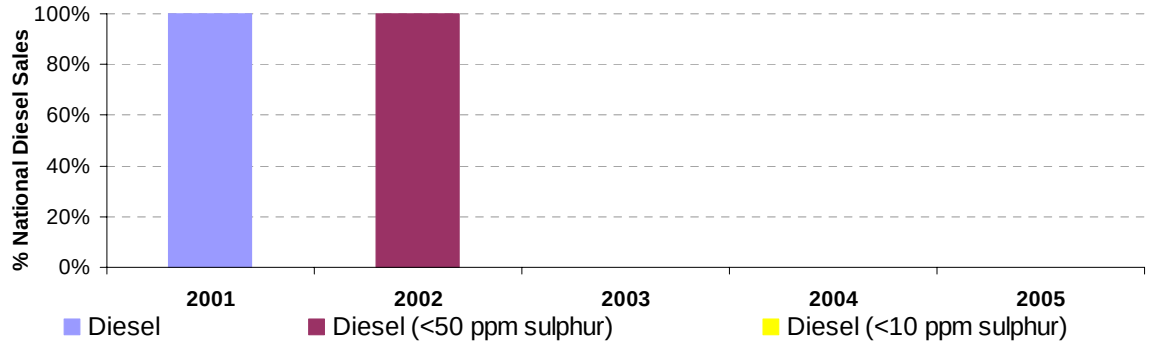


Figure 3.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



4 Denmark

4.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	-	Yes	14

4.1.1 Sales

Figure4.1: National Fuel sales proportions by fuel type (%)

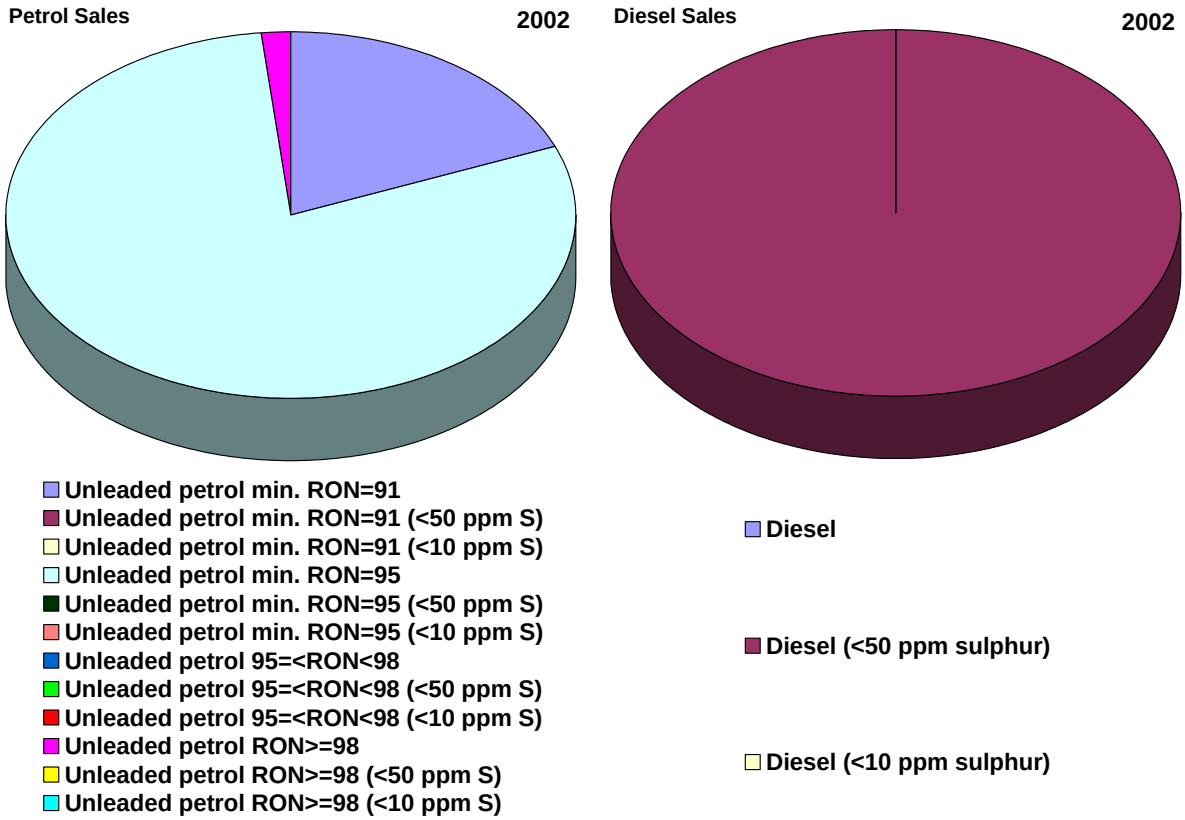


Figure 4.1 above shows that 19% of fuel sales were at the lowest RON91 petrol fuel grade - the same as for 2001. The majority of sales (79%) were RON95 grades, up from 76% in 2001, and the remainder of sales were RON>98. Whilst there were no low sulphur (<50 ppm) petrol grades available in Denmark in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

4.1.2 Sulphur content

Geographic availability of sulphur-free fuels: none available in 2002.

Average sulphur content of all petrol sold: 40 ppm (47 ppm in 2001)

Average sulphur content of all diesel sold: 48 ppm (51 ppm in 2001)

Additional information: Although not required by national legislation, analysis of samples of RON > 98 petrol in 2002 have found it meets the low sulphur (< 50 ppm) quality standard. Most of the samples of RON 95 petrol also met this 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].

4.2 FUEL QUALITY MONITORING 2002

4.2.1 Description of system

Responsible organisation(s): Danish Environmental Protection Agency, sampling analysis by Saybolt 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 (August), half in wintertime (November).

Number of samples taken: petrol - 39; diesel - 20

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

Collection of sales data: not specified.

Other details: There were two exceedances in 2002, both due to vapour pressures. These exceedances were explored by the refineries and were found to be due to winter grade fuel being left in tanks.

4.2.2 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	39
Frequency of sampling:	August and November only

Reporting

Fuel grades:	The analysis results for the three fuel grades were reported separately.
Parameters:	Only parameters expected to have significant impact on the environment were measured. RON, MON, distillation, oxygen content and all oxygenates (except 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

None.

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:	The vapour pressure summer limit value (60 kPa) was exceeded by two samples (61.2 and 64.1 kPa). The aromatic limit (42%) was exceeded by one sample (42.5%) and the sulphur limit (150 ppm) was exceeded by one sample (153 ppm).
Statistical significance:	The statistical significance tolerance limit for vapour pressure is 61.7 kPa and the tolerance limit for aromatics is 44.0% and for sulphur 180 ppm. Therefore only one sample (for vapour pressure) was in breach of the Directive.
Member State's notes:	A new measurement showed a vapour pressure below the tolerance limit.

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 98

Detail:	The aromatic limit (42%) was exceeded by 6 samples (42.4, 42.5, 42.7, 42.8, 44.7 and 47.2).
Statistical significance:	The statistical significance tolerance limit for aromatics is 44.1%. Therefore two samples was in breach of the Directive.
Member State's notes:	The explanation has been identified to analytical problems related to samples with high content of MTBE.

4.2.3 Diesel reporting

Sampling

Number of samples:	20
Frequency of sampling:	August and November 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.)

1. Diesel

Detail: The sulphur limit value (350 ppm) was exceeded by one sample (527 ppm).

Statistical significance: The statistical significance tolerance limit for sulphur is 380 ppm. Therefore the sample was in breach of the Directive.

Member State's notes: A new measurement one month later both at the service station and at the terminal storage showed a value of 30 ppm. The high value has therefore been removed from the reported statistics.

4.3 TEMPORAL TRENDS

The following Figures 4.2 to 4.4 show the 5 year 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 2% increase in the sales of diesel. The sales of RON91 and RON95 petrol only increased by 2% and 5% respectively, but there was a 69% 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)

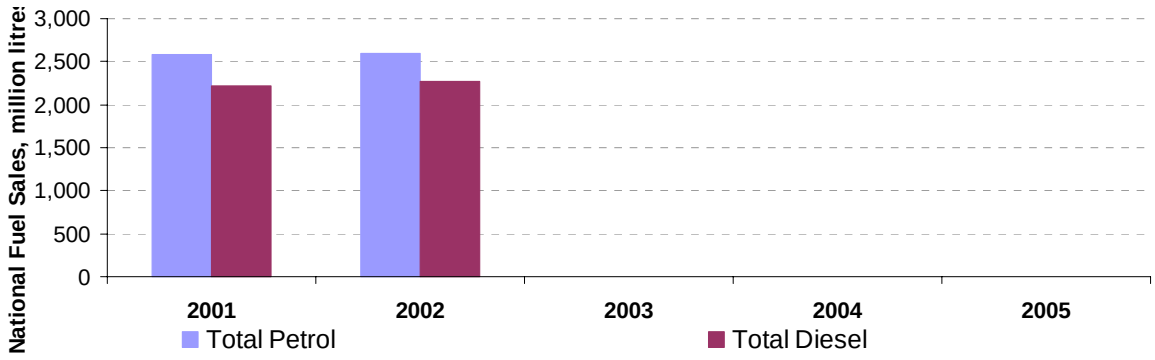


Figure 4.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

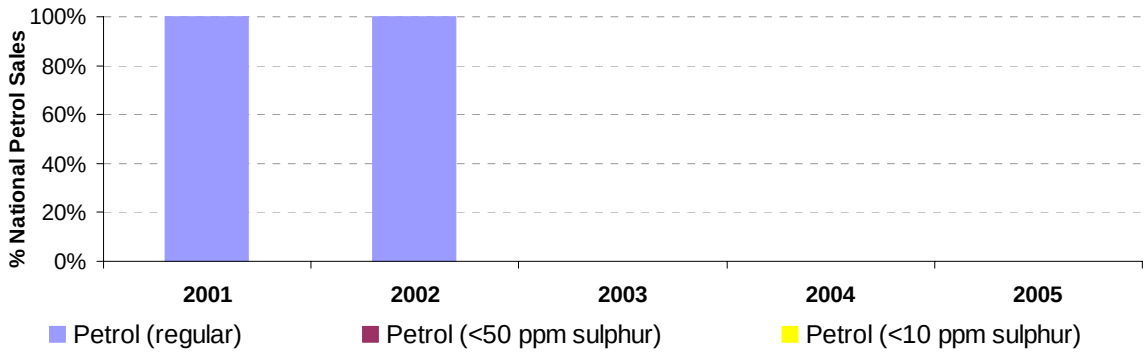
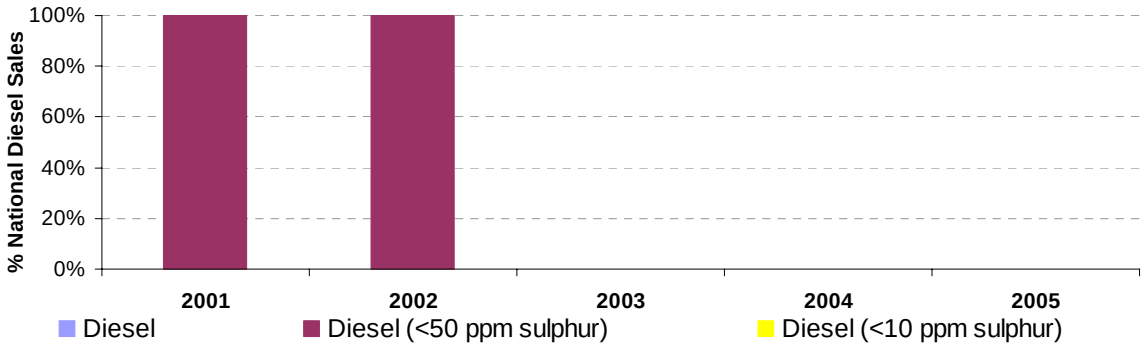


Figure 4.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



5 Finland

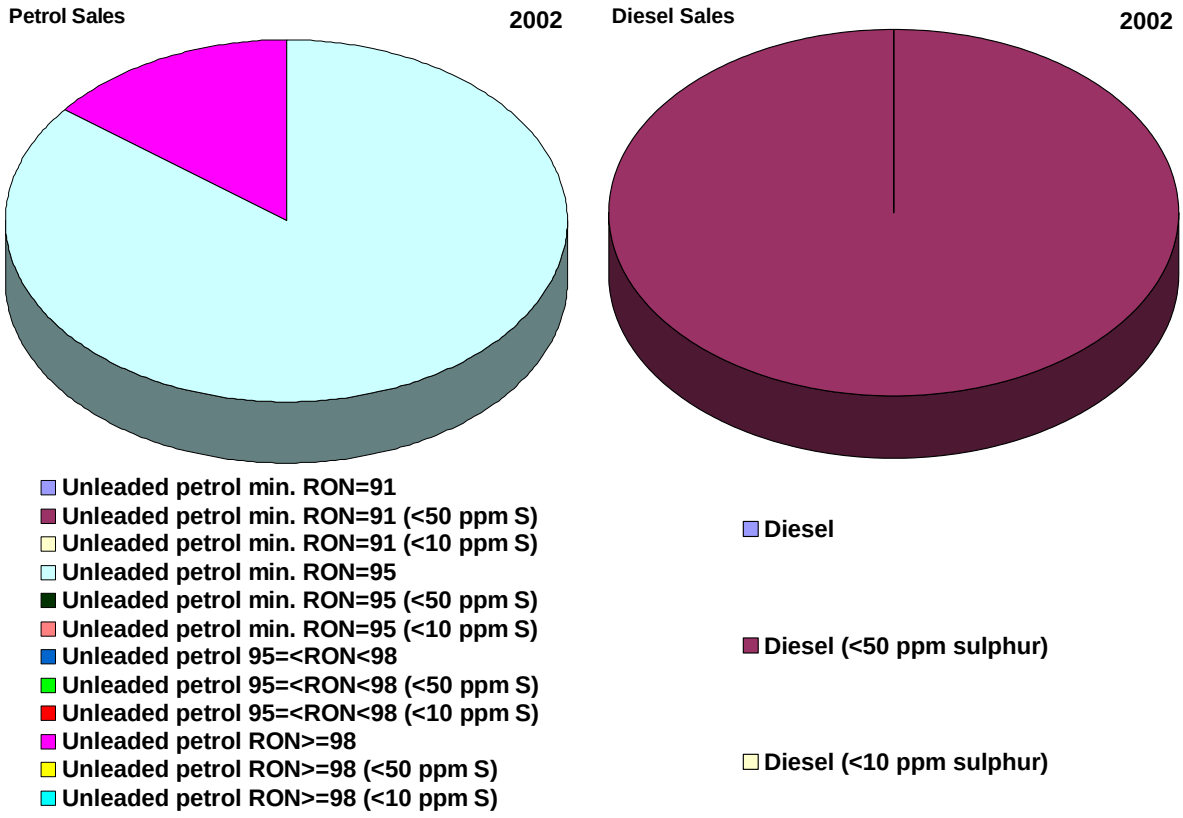
5.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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, 86% were of RON95 (95 octane) classification (up from 85% in 2001), with the remainder being of RON>98. Almost all of diesel oil sold was low sulphur diesel (< 50 ppm), although not required by national standards and the average sulphur content was among the lowest of all Member States. 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 of fuels is 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. Neither have any tax rebates been given so far to sulphur-free grades.

Average sulphur content of all petrol sold: 53 ppm (84 ppm in 2001)

Average sulphur content of all diesel sold: 24 ppm (33.6 ppm in 2001)

Additional information: sulphur-free petrol (RON 98) and diesel fuel were found in the samples analysed. The lowest sulphur content found in RON 95 grade petrol was 12 mg/kg (average 57.2 mg/kg), while for RON 98 grade petrol it was 5.0 mg/kg (average 72.4 mg/kg) and for diesel fuel 3.7 mg/kg (average 23.6 mg/kg).

[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].

5.2 FUEL QUALITY MONITORING 2002

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 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: 190 petrol; 99 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 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:	190
Frequency of sampling:	Monthly

Reporting

Fuel grades:	Two grades reported separately, with separate tables for summer and winter sampling.
Parameters:	All parameters measured regularly except lead.
Other:	10% of the samples taken in 2002 were tested for lead content. All complied with the Directive limits.

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

None

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 98

Detail:	Three samples exceeded the limit value for ethers with 5 or more carbon atoms per molecule (15 %m/m), with values of 15.1, 15.9 and 16.5 %m/m. One sample also exceeded the distillation at 100 C limit (46.0 kPa min.) with a value of 45.2.
Statistical significance:	The statistical significance tolerance limit (95% confidence) for ethers with 5 or more carbon atoms per molecule was 15.6 %m/m, therefore two of the samples were in breach of the Directive. The distillation at 100 C minimum limit of statistical tolerance was 43.7, and the sample was therefore compliant with the Directive.
Member State's notes:	The Customs Laboratory uses test method specific tested (validated) expanded uncertainty, which is taken into account when test result are compared with the limit values. As for the limit value exceedances for ethers, the expanded uncertainty of the test method is plus/minus 10 % [i.e. 90% confidence limits]. This means, that accepted results are within the range of 13,5 - 16,5 v/v %. Since the maximum observed value was 16,5 v/v % the Customs Laboratory is of the opinion that all samples comply with the requirements of the Directive.

5.2.3 Diesel reporting

Sampling

Number of samples: 99

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.)

1. Diesel

Detail: One sample exceeded the distillation 95% point limit value (360 C) with a value of 360.3. One sample also exceeded the Cetane no. limit value (min. 51) with a value of 50.7.

Statistical significance: The tolerance limit for distillation is 378 C. Therefore the sampled exceedance cannot be said to be statistically significant, and the fuel was compliant with the Directive. The tolerance limit for Cetane no. is 48.5, and therefore this sample was also compliant.

Member State's notes:

5.3 TEMPORAL TRENDS

The following Figures 5.2 to 5.4 show the 5 year 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 2002 – of 2% in both cases. 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 12.0 and 57.2 mg/kg and for >= RON 98 petrol 5.0 and 25.8 mg/kg respectively, lower than the year before for both qualities.

Figure 5.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

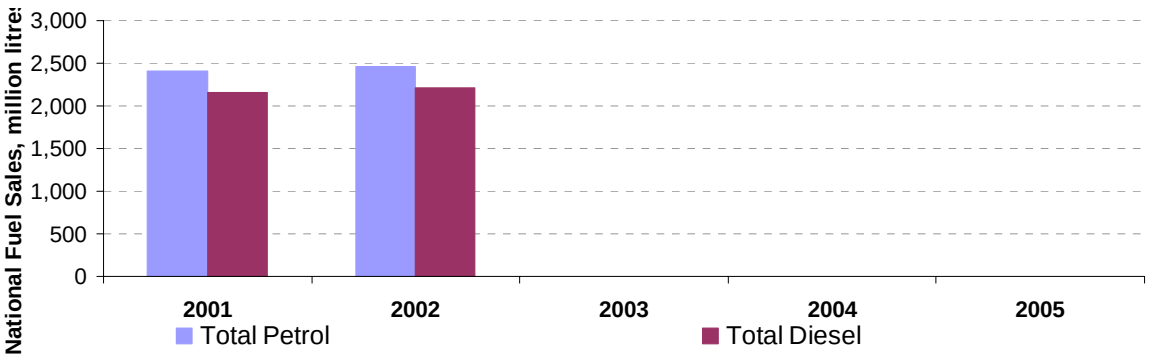


Figure 5.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

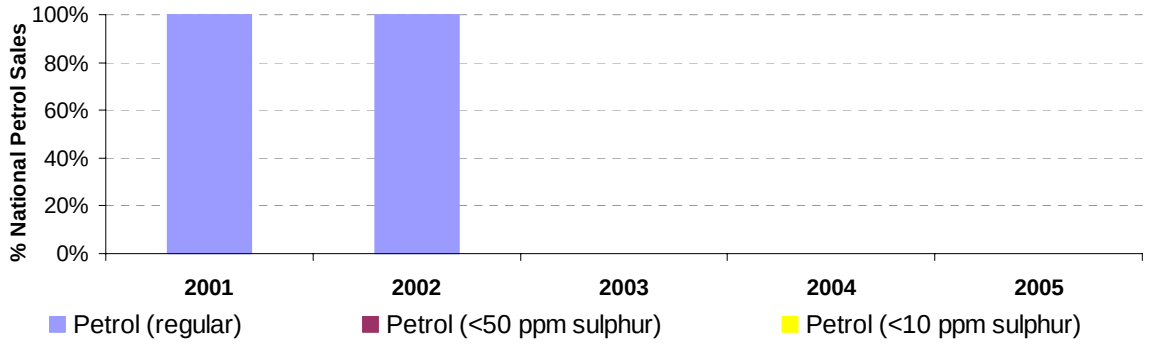
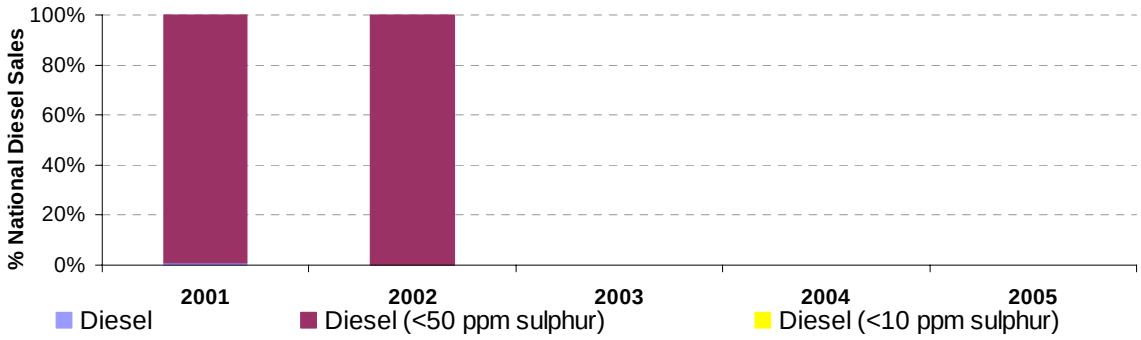


Figure 5.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



6 France

6.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	SP 95	Yes	4
7	Petrol 95 = < RON < 98	Regular	Super ARS (97 IOR)	Yes	7
10	Petrol RON > = 98	Regular	SP 98	Yes	10
13	Diesel Fuel	Regular	-	Yes	13
14		< 50 ppm	-	No	-

6.1.1 Sales

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

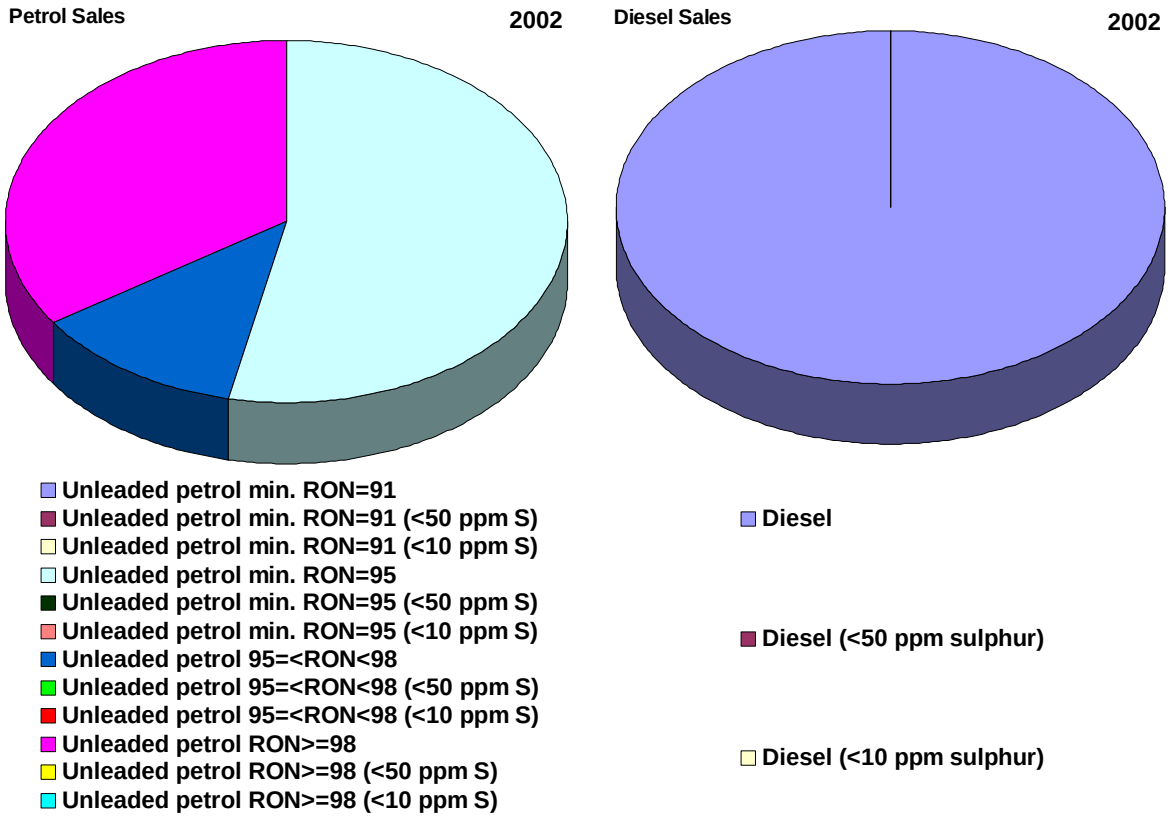


Figure 6.1 shows the proportions of fuel sales in France in 2002. No low sulphur (<50 ppm) fuel grades were available, and petrol grades individually accounted for 53% RON95 (48% in 2001), 12% RON95-98 (16% in 2001) and 35% RON>98 (36% in 2001).

6.1.2 Sulphur content

Geographic availability of sulphur-free fuels: Although no sulphur free fuels were available in France in 2002, around 340,000 tonnes of low sulphur diesel fuels (< 50 ppm) were distributed in refuelling stations of Ile de France and in the region of Grenoble. Low sulphur diesel fuels were also distributed to bus fleets particularly in Paris (RATP).

Average sulphur content of all petrol sold: 103 ppm (93 ppm in 2001)

Average sulphur content of all diesel sold: 308 ppm (295 ppm in 2001)

[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].

6.2 FUEL QUALITY MONITORING 2002

6.2.1 Description of system

Responsible organisation(s): Ministry of Industry

Location(s) of sampling: Petrol samples taken from three different regions:Yvelines, Aude and Puy de Dôme. Diesel fuels were sampled in six regions: le Nord, le Pas de Calais, les Pyrénées Orientales and la Seine et Marne, le Bas-Rhin and la Savoie. The types of locations sampled were not specified.

Time/frequency of sampling: sampling was carried out on a quarterly basis.

Number of samples taken: 88 petrol samples and 81 diesel samples were taken.

Specification of test methods: test methods were as outlined in the Directive and EN228:2000, EN 590:1999

Collection of sales data: not specified.

Other details: France has an old monitoring system that is not yet adapted to the new Directive. The 2002 report was prepared using this old system, which did not provide sufficient data, a new system will be in operation from 2003. Where there are quality exceedances, the refinery is contacted for explanation - nonconformity triggers a legal system with sanctions and penalties.

6.2.2 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	88
Frequency of sampling:	Quarterly

Reporting

Fuel grades:	3 grades reported in separate tables
Parameters:	RON, MON, vapour pressure, olefins, aromatics, oxygen content, and all oxygenates are **not** measured.
Other:	The current fuel quality monitoring system is old and will also be used in 2002 reporting, however it will be revised in 2003 to include further detail.

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 (SP95)

Detail:	One sample exceeded the limit for lead (0.005 g/l) with 0.012 g/l.
Statistical significance:	The exceedance for lead was within the tolerance limit (2 g/l)) and therefore was compliant with the Directive.
Member State's notes:	See 6.2.1 other details.

6.2.3 Diesel reporting

Sampling

Number of samples:	81
Frequency of sampling:	Quarterly

Reporting

Fuel grades:	1
Parameters:	Distillation - 95% point and PAH are 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. Diesel

Detail:	One sample was above the maximum limit for sulphur (350 mg/kg) with 355 mg/kg.
Statistical significance:	The sample is within the tolerance limits for the test method (380 mg/kg), and are therefore in compliance with the Directive.
Member State's notes:	See 6.2.1 other details.

6.3 TEMPORAL TRENDS

The following Figures 6.2 to 6.4 show the 5 year 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 a small degrease in sales of petrol (down 3%) and a small increase in sales of diesel (up 4%) between 2001 and 2002. No low sulphur petrol was on sale in either year, and only limited sales of low sulphur diesel (not recorded in the sales data).

Figure 6.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

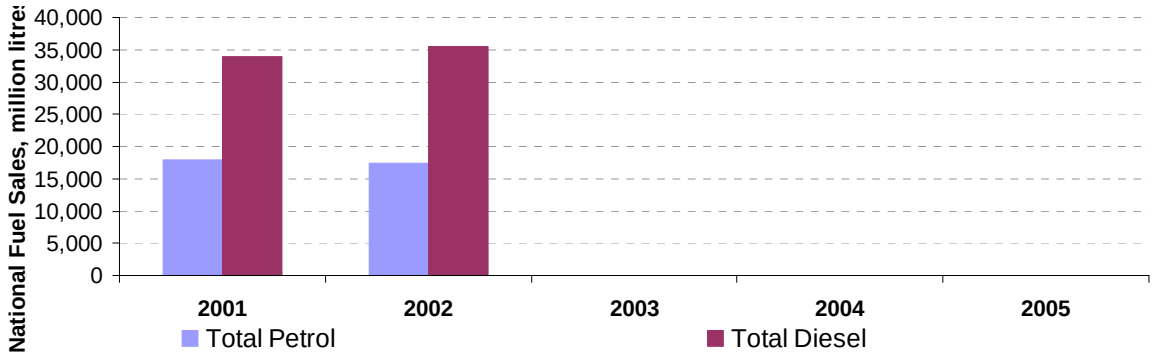


Figure 6.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

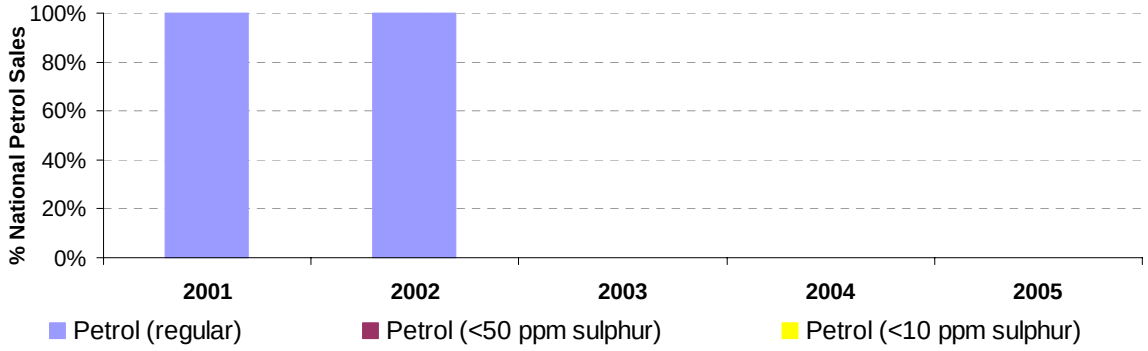
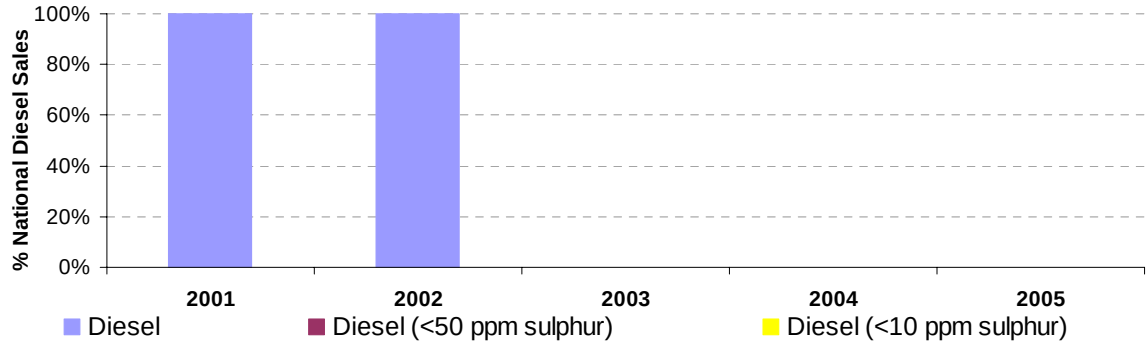


Figure 6.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



7 Germany

7.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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
2	Petrol min. RON = 91	< 50 ppm	Benzin Normal	Yes	1
5	Petrol min. RON = 95	< 50 ppm	Eurosuper	Yes	5
12	Petrol RON > = 98	< 10 ppm	Super Plus	Yes	12
14	Diesel Fuel	< 50 ppm	Dieselkraftstoff, winiger als 50ppm	Yes	14
14	Diesel Fuel	< 10 ppm	Dieselkraftstoff, schwefelfrei	Included with < 50 ppm	15

7.1.1 Sales

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

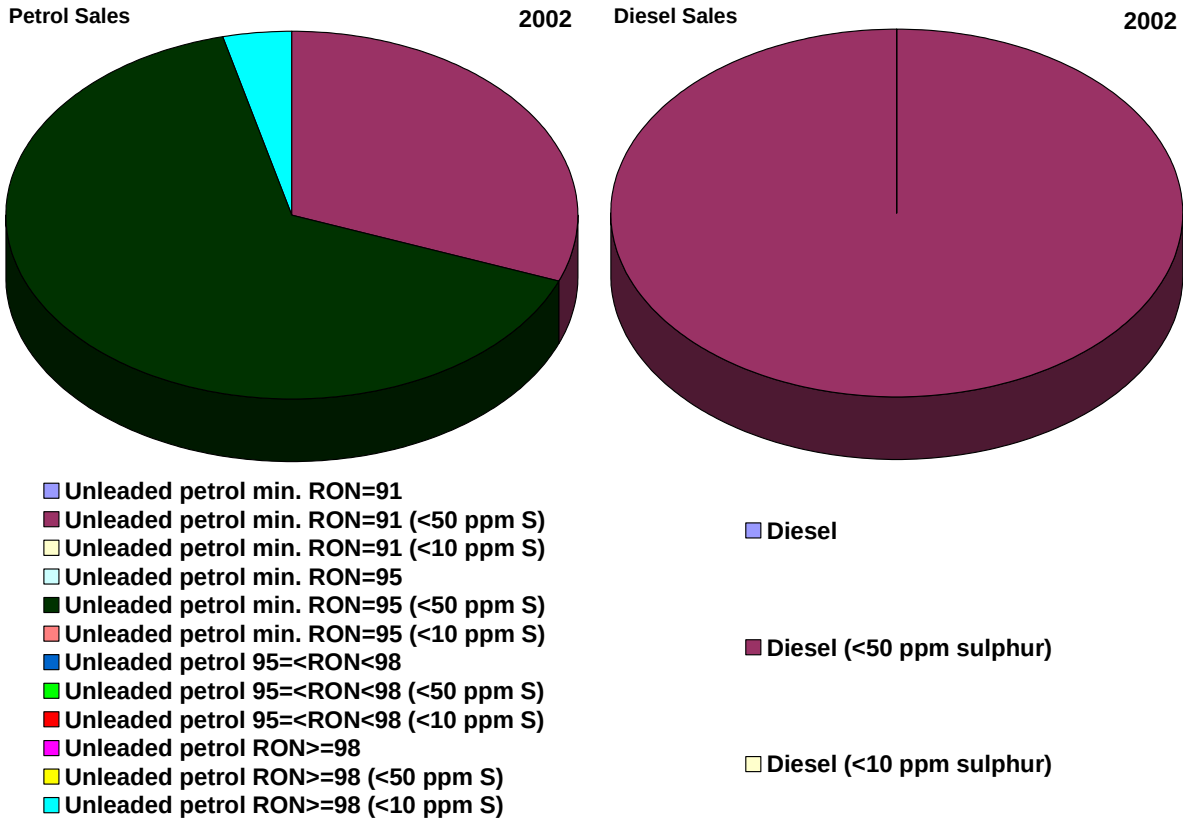


Figure 7.1 shows that a wide variety of different fuel grades at varying sulphur levels were available on the German market in 2002. All fuel sold had transferred from regular to low

sulphur grades from 2001 to 2002. Whilst most of the fuel sold was low RON95 quality (65%), 31% of fuel sold was still RON91. RON>98 petrol was only available as sulphur free (<10 ppm) in 2002 (as in 2001) and most of diesel sold was low sulphur (<50 ppm), the rest being zero sulphur (< 10 ppm), however separate sales data was not available for the two grades.

7.1.2 Sulphur content

Geographic availability of sulphur-free fuels: super plus Petrol (98 octane) was offered as sulphur free throughout Germany since winter 2000. Sales of low sulphur fuels were promoted since November 2002 through tax incentives and sales of sulphur free fuels were promoted from January 2003 through tax incentives.

Average sulphur content of all petrol sold: 23 ppm (54 ppm in 2001)

Average sulphur content of all diesel sold: 31 ppm (249 ppm in 2001)

Additional information: Although not required by national legislation, analysis of samples of RON 91 petrol in 2002 have found it 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].

7.2 FUEL QUALITY MONITORING 2002

7.2.1 Description of system

Responsible organisation(s): Federal Environmental Protection Agency, and the Federal Offices underneath it.

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

Time/frequency of sampling: monthly across the year.

Number of samples taken: 792 petrol and 325 diesel.

Specification of test methods: Gemäß DIN EN 228 bzw. DIN EN570.

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: 429

Frequency of sampling: Monthly across the year

Reporting

Fuel grades: 3 grades reported separately

Parameters: Partially, 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) with the highest being 61.4 kPa.

Statistical significance: None of the samples exceeded the tolerance limit for vapour pressure (61.7 kPa). Therefore these samples were compliant with the Directive.

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.)

1. Petrol RON95

Detail: Some samples exceeded the min. limit for RON and MON (95 and 85 respectively) with min. values of 94.8 and 82.3 respectively. Some samples also exceeded the vapour pressure limit for summer (60 kPa) with the highest being 61.0 kPa.

Statistical significance: The tolerance limit for RON is min. 94.6, therefore the samples were compliant with the Directive. However the tolerance limit for MON is 84.5, and 1 sample was noncompliant with the Directive. None of the samples exceeded the tolerance limit for vapour pressure (61.7 kPa). Therefore these samples were compliant with the Directive.

Member State's notes: It could not be proved that the petrol station owner was either negligent or deceiving with respect to the complaint.

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 RON98

Detail:	Some samples exceeded the min. limit value for RON (95) with min. 92.2 and some samples also exceeded the vapour pressure limit for summer (60 kPa) with the highest being 71.4 kPa.
Statistical significance:	3 samples exceeded the tolerance limits for vapour pressure (61.97 kPa) and 6 for RON (94.6 min.) respectively. Therefore these samples were noncompliant with the Directive.
Member State's notes:	It could not be proved that the petrol station owner was either negligent or deceiving with respect to the complaint.

7.2.3 Diesel reporting

Sampling

Number of samples:	262
Frequency of sampling:	Monthly throughout the year

Reporting

Fuel grades:	2 grades are reported separately
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. Diesel <50 ppm S

Detail:	Some samples were below the limit for Cetane no. (51 mg/kg) with 49.3.
Statistical significance:	The samples were within the tolerance limits (48.5), and therefore compliant with the Directive.
Member State's notes:	

7.3 TEMPORAL TRENDS

The following Figures 7.2 to 7.4 show the 5 year 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 2002, sales of petrol decreased by 2%, while sales of diesel decreased by 14%. Most sales standard petrol transferred to low sulphur fuels with a consequent 369% increase in the sales of low sulphur petrol. The situation was similar for diesel, with a 492% increase in the sales of low-sulphur diesel.

Figure 7.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

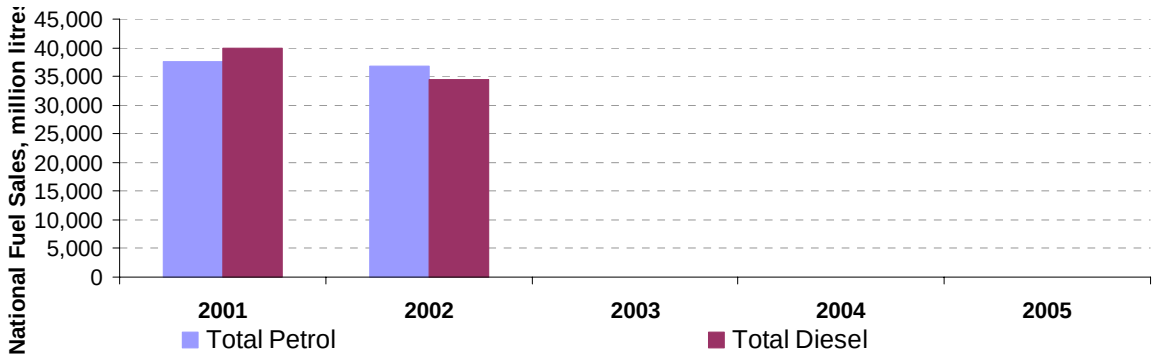


Figure 7.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

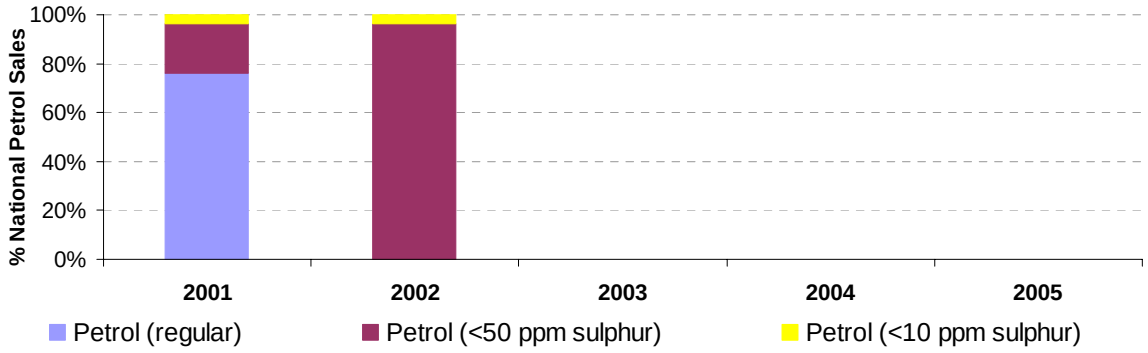
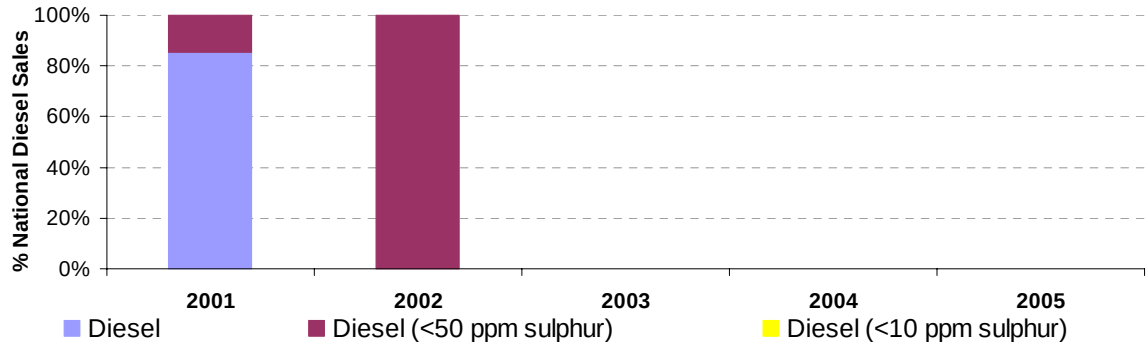


Figure 7.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



8 Greece

8.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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 RON > = 98	Regular	-	Yes	10
13	Diesel Fuel	Regular	-	Yes	13

8.1.1 Sales

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

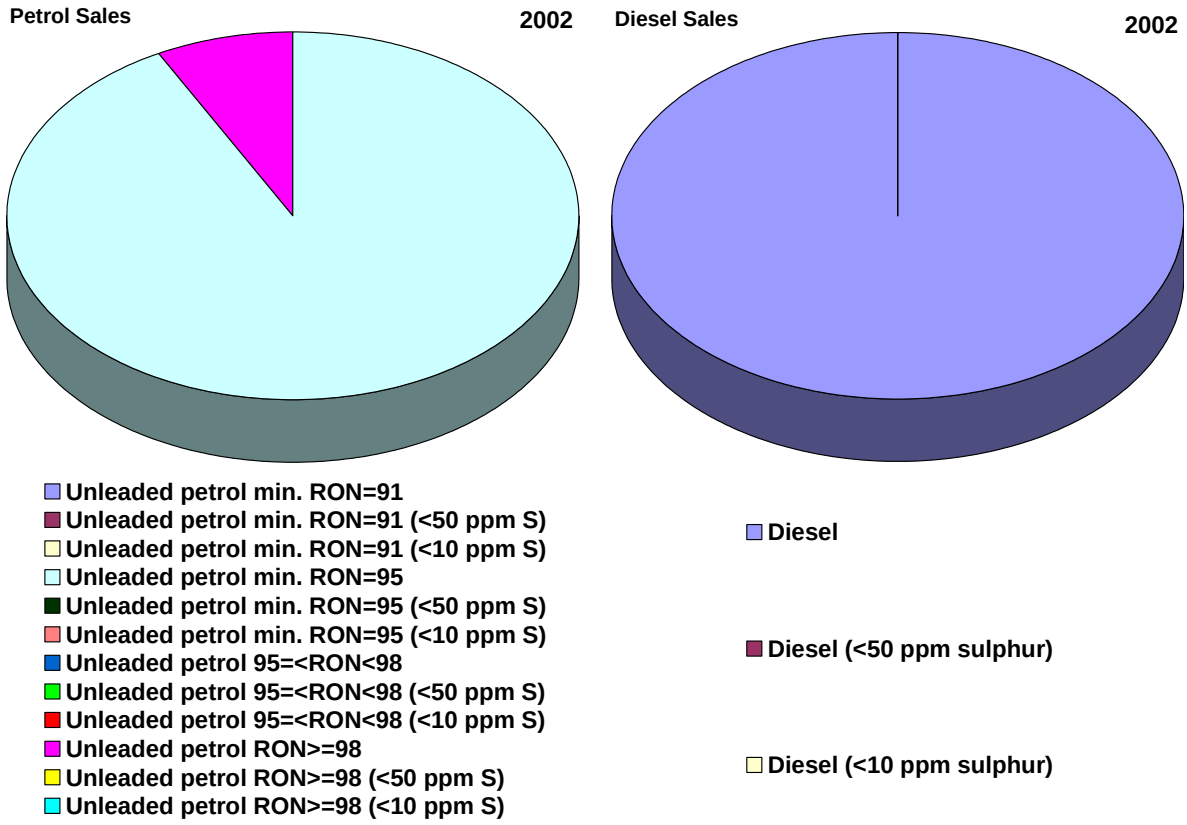


Figure 8.1 above shows that only two grades of petrol were available in Greece in 2002, with the majority of petrol sold, 92% (93% in 2001), being RON95 (95 octane) level. No low or sulphur free fuels were available in 2002.

8.1.2 Sulphur content

Geographic availability of sulphur-free fuels: not available

Average sulphur content of all petrol sold: 72 ppm (108 ppm in 2001)

Average sulphur content of all diesel sold: 500 ppm (281 ppm in 2001)

Additional information: The high average diesel sulphur content 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].

8.2 FUEL QUALITY MONITORING 2002

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: 151 petrol and 82 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:	151
Frequency of sampling:	Monthly throughout the year

Reporting

Fuel grades:	Two fuel grades reported separately.
Parameters:	Oxygen content and all oxygenates were not measured, except ethers with more than five carbon atoms per molecule.
Other:	Only ethers were added, and were in compliance with the Directive.

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

None.

8.2.3 Diesel reporting

Sampling

Number of samples: 82

Frequency of sampling: 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.)

1. Diesel

Detail: 10 samples exceeded the limit value for sulphur (300 mg/kg), with 364 kg/m3.

Statistical significance: This was beyond the zone of tolerance for this parameter (380 mg/kg) and was therefore noncompliant with the Directive.

Member State's notes: Ten of the analysed samples (2 January, 1 February, 1 April, 1 June, 2 August, 1 September, 1 November), which were sampled from liquid fuel sales outlets were found to be contaminated with heating oil or marine oil or were of unknown origin with high sulphur content.

8.3 TEMPORAL TRENDS

The following Figures 8.2 to 8.4 show the 5 year 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 12% between 2001 and 2002, with sales of diesel increasing by 6%. No low sulphur fuel was on sale but sales of RON 95-98 petrol were transferred (or re-classified) to RON98 petrol in the reporting submission.

Figure 8.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

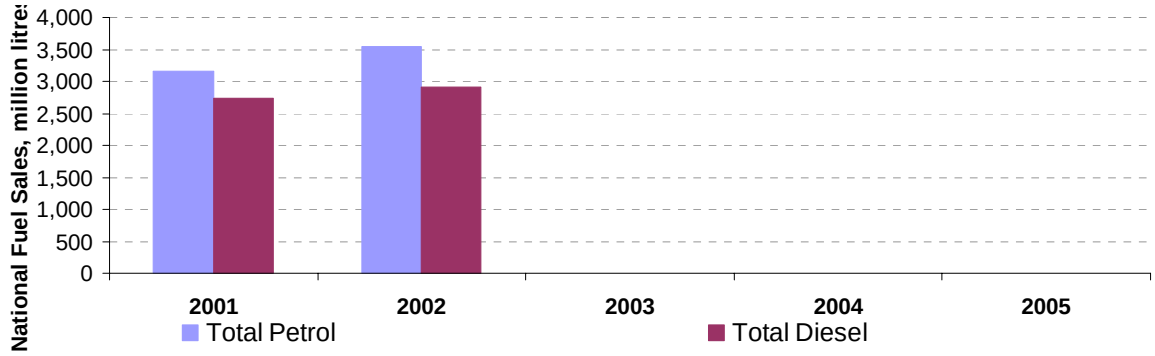


Figure 8.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

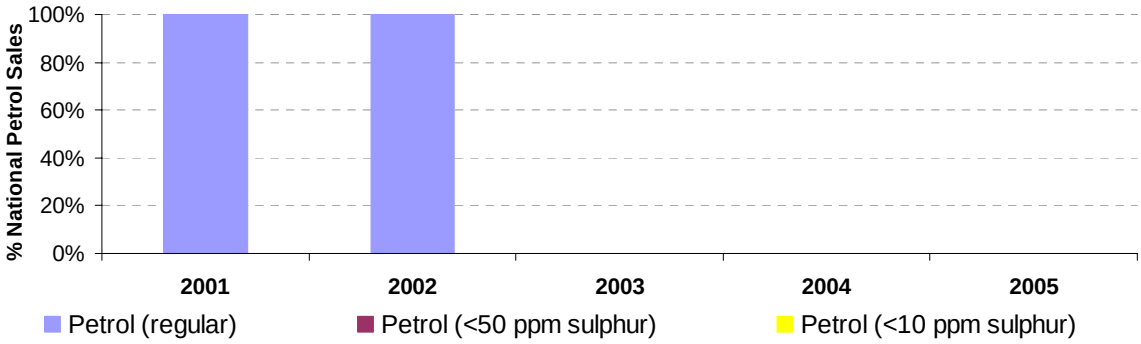
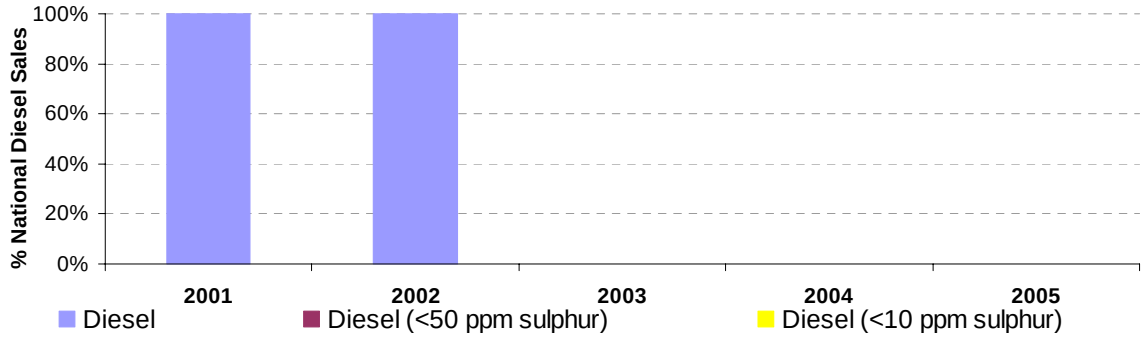


Figure 8.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



9 Ireland

9.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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
13	Diesel Fuel	< 50 ppm	Diesel fuel	Yes	13

9.1.1 Sales

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

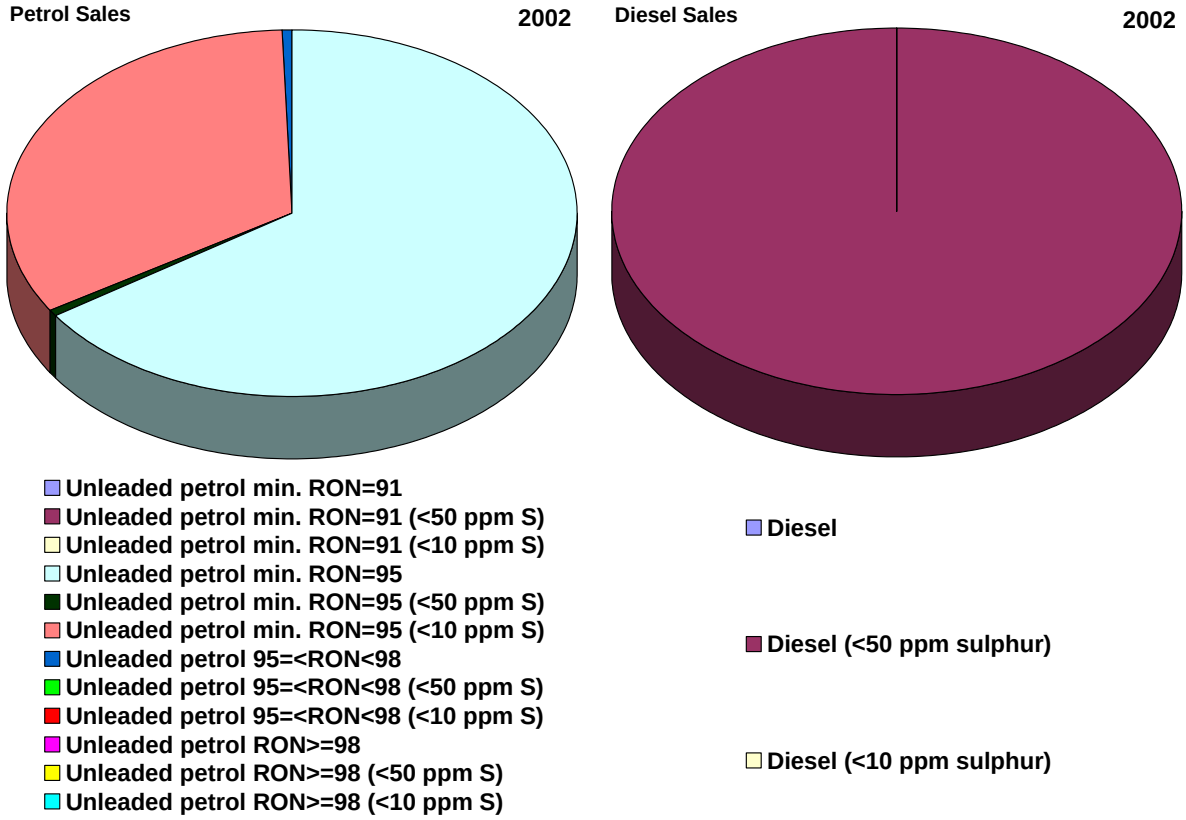


Figure 9.1 shows that 2002 diesel was only available as one grade, with petrol being available only at RON 95 grade (RON<96 national grade) but at various levels of sulphur. The majority of sales being of RON95 grade at regular sulphur content (66% sales, up from 63% in 2001) and also sulphur free (33%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

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 36% of national sales of petrol in 2002 and geographically covers Munster, parts of the midlands, western seaboard and south-eastern region.

Average sulphur content of all petrol sold: 57 ppm (83 ppm in 2001)

Average sulphur content of all diesel sold: 49 ppm (231 ppm in 2001)

[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].

9.2 FUEL QUALITY MONITORING 2002

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: 64 petrol and 50 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:	64
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.)

1. Petrol

Detail:	7 samples exceeded some of the parameter limit values: 2 RON (94.0 and 93.4), 1 MON (84.4), 1 summer vapour pressure, RVP (72.6 kPa), 1 olefins (21.2 % v/v), 1 aromatics (42.6 % v/v) and 1 benzene (1.2 % v/v)).
Statistical significance:	The relevant tolerance limits are 94.6 (RON), 84.5 (MON), 72.9 RVP), 22.0 (olefins), 44.0 (aromatics) and 1.2 (benzene). See Member State's notes below (relating to the samples outside of the tolerance limits).
Member State's notes:	4 samples (6% of total) encompassing 5 parameters (2 RON, 1 MON, 1 RVP, 1 benzene) appear to indicate relatively minor non-compliances despite EU based refinery certification as compliant. 1 RON analysis was disputed by industry as were a number of additional 100° C distillation parameters where delay between sampling and analysis was cited as a material effect on the parameter. Some samples were not retained by industry for later cross-comparative analysis. Irish authorities are engaged with relevant suppliers, the trade representative body (IPIA), the State Laboratory and external industry experts to understand and reduce any seeming discrepancy between refinery certification and downstream analytical results, with a view to strengthening existing procedures as appropriate.

9.2.3 Diesel reporting

Sampling

Number of samples: 50

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.)

1. Diesel

None.

9.3 TEMPORAL TRENDS

The following Figures 9.2 to 9.4 show the 5 year 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 2002, petrol sales increased by 4% but diesel sales were stable. There was a 30% decrease in the sales of low sulphur petrol, but an 8% increase of standard petrol. Diesel sales switched completely from regular grade to low sulphur (< 50 ppm) diesel.

Figure 9.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

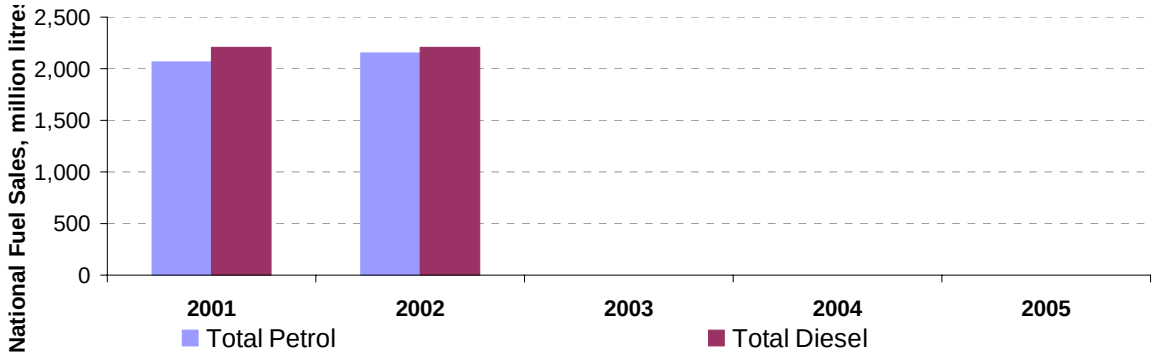


Figure 9.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

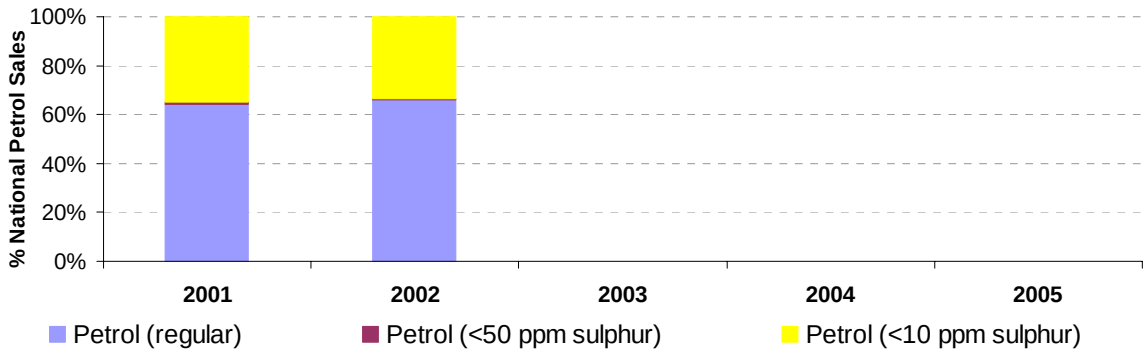
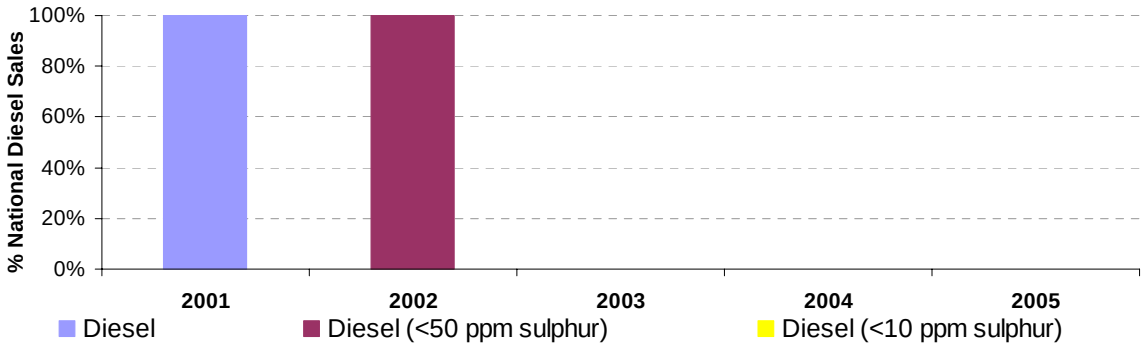


Figure 9.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



10 Italy

10.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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 (%)

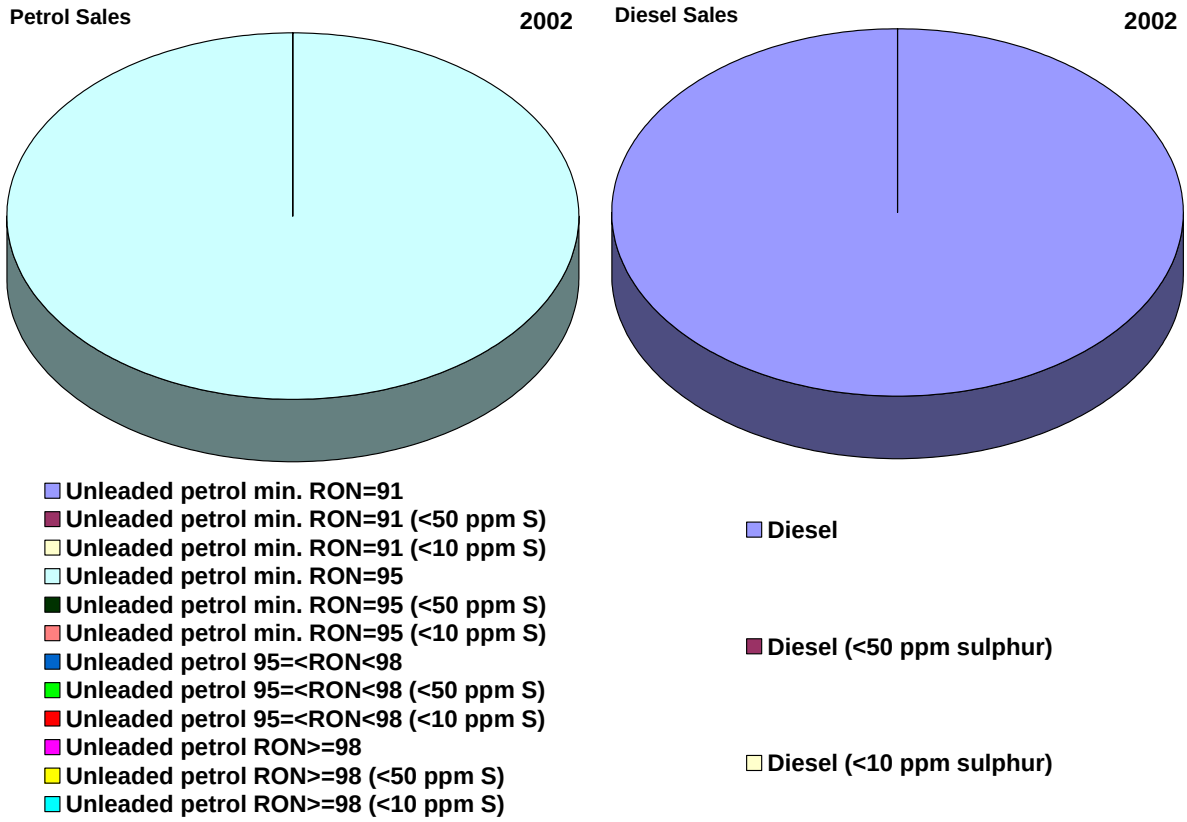


Figure 10.1 shows that all of petrol sales accounted for were of RON95 grade and all diesel fuel sold was of the regular grade.

10.1.2 Sulphur content

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

Average sulphur content of all petrol sold: 51 ppm (61 ppm in 2001)

Average sulphur content of all diesel sold: 246 ppm (273 ppm in 2001)

[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].

10.2 FUEL QUALITY MONITORING 2002

10.2.1 Description of system

Responsible organisation(s): APAT

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: 375 petrol and 392 diesel.

Specification of test methods: in accordance with the Directive.

Collection of sales data: Not specified.

Other details: In light of the fact that the national quality control system for fuels used in vehicles, has not yet been brought in, and the fact that technical standard prEN 14274 is still at the public inquiry stage and it has therefore not been possible to use it as an official point of reference for collecting data on the ecological implications of petrol and diesel fuel consumed, the Italian report was been drawn up on the basis of monitoring carried out in the form of sampling at sales outlets throughout the national territory, on behalf of the main oil companies, by independent monitoring agencies.

In the 2002 survey, a marginal number of petrol and diesel fuel samples analysed data not comply with the specification limits when the margin of tolerance is taken into account. In order to ensure the compliance with the Directive 98/70/EC, the national fuel quality monitoring system, currently and development, defines a double control: in production sites and fuel dispensing sites. Furthermore laboratories and organisations qualified to carry out the analytical work and to draw samples, have been asked to strictly a follow the sampling and the rules set up by EN ISO 4259 for testing margins. A further improvement is expected from the decision taken by the national standardisation body (UNICHIM) to monitor performance of the involved the brooches through the proficiency testing schemes foreseen for laboratories' accreditation purposes

10.2.2 Petrol reporting

Sampling

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

Number of samples: 375

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.)

1. Petrol

Detail: Individual samples exceeded the variety of different parameter limit values: RON (min. 95), MON (min. 85), summer vapour pressure (max. 60 kPa), evaporation at 100C , olefins (18.0 % v/v), sulphur content (150 ppm).

Statistical significance: Some of these samples were outside of the zone of tolerance for the test methods and were therefore noncompliant with the Directive: RON (93.4), MON (84.2, 84.3) and, summer vapour pressure (62.9, 62.1, 62.0, 62.0, 61.8).

Member State's notes: See section 10.2.1

10.2.3 Diesel reporting

Sampling

Number of samples: 392

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.)

1. 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 48.0, 369 C and 568 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: Cetane number (48.0), Distillation 95% point (369.0, 368.0) and sulphur content (568, 390).
Member State's notes:	See section 10.2.1

10.3 TEMPORAL TRENDS

The following Figures 10.2 to 10.4 show the 5 year 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 19% between 2001 and 2002, while sales of diesel decreased by 2%. No low sulphur fuels were on sale.

Figure 10.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

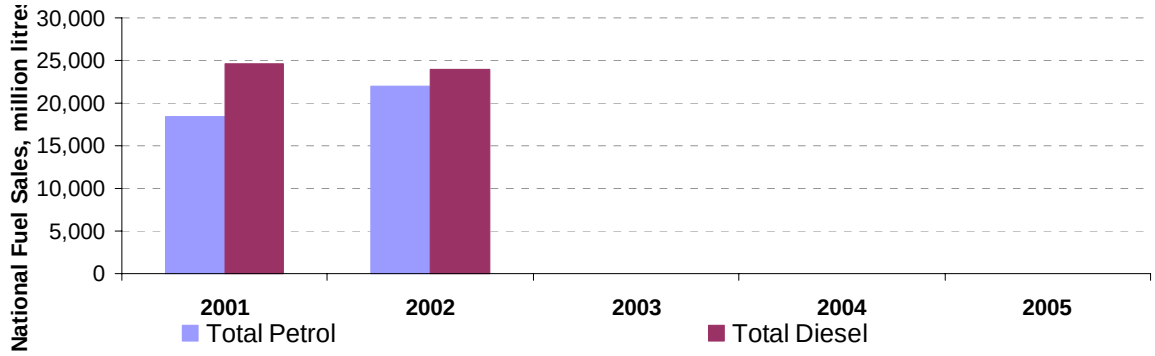


Figure 10.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

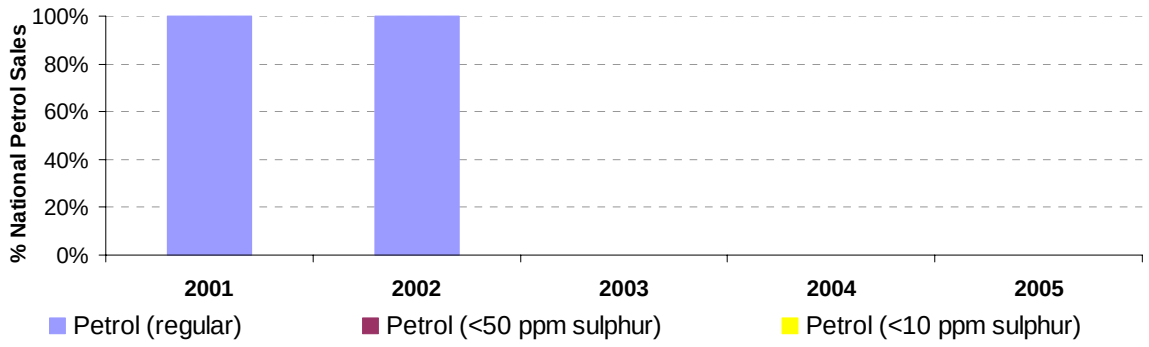
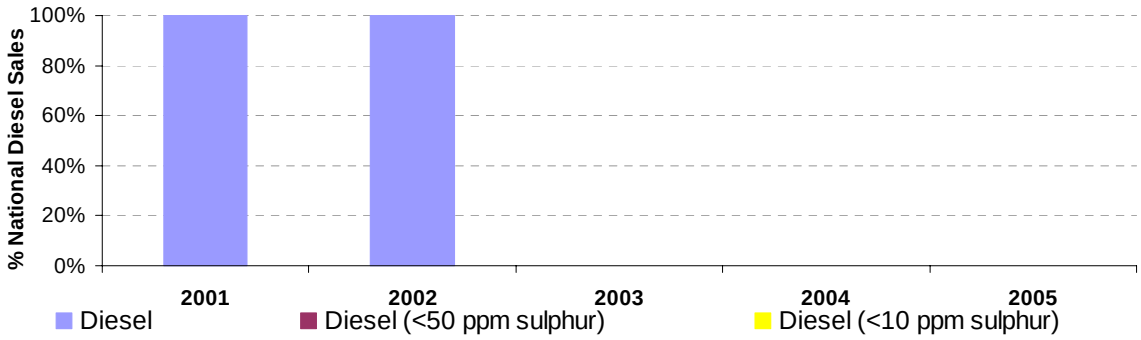


Figure 10.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



11 Luxembourg

11.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	Diesel	Yes	14

11.1.1 Sales

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

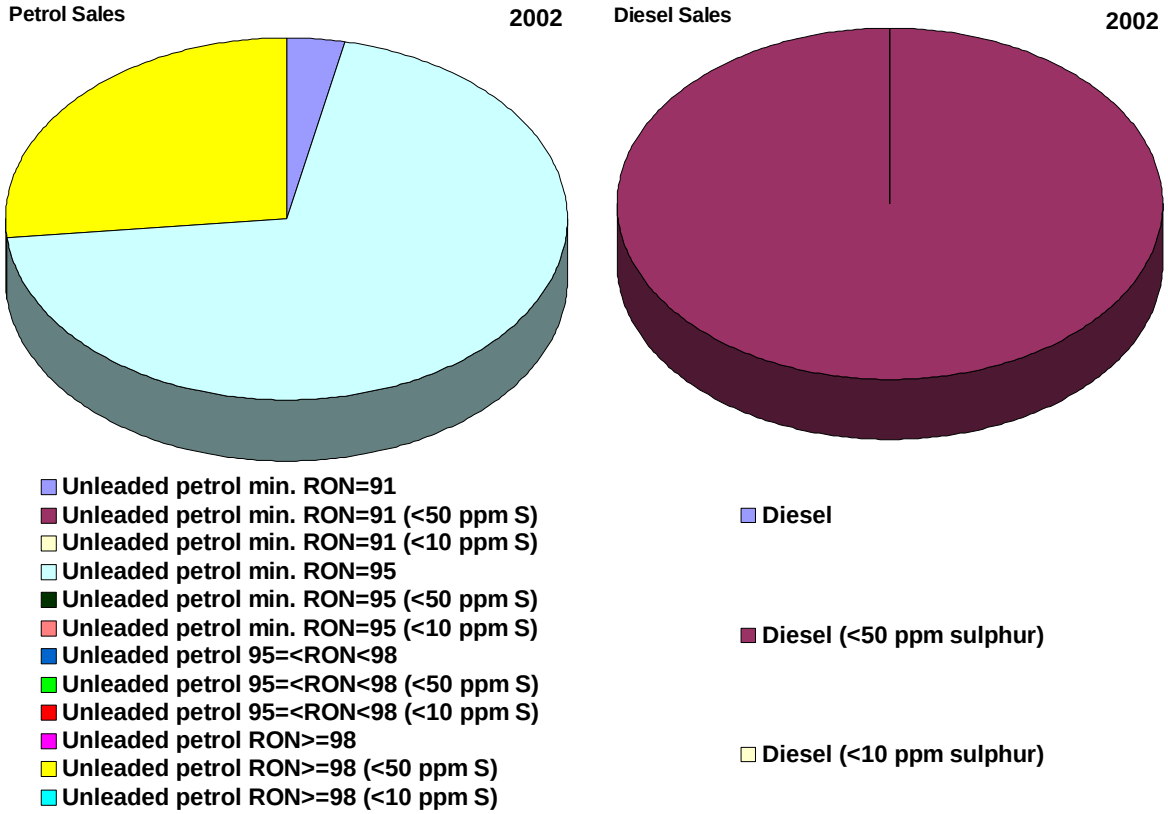


Figure 11.1 shows that the majority (70%) of Luxembourg's petrol sales in 2002 were of RON95 grade (compared to 67% in 2001), with the remainder comprising of RON91 (3%,

compared to 4% in 2001) and RON>98, <50 ppm sulphur (27%, compared to 2% in 2001 and 27% regular sulphur grade). Luxembourg has also completely switched to low sulphur diesel grades in 2002.

11.1.2 Sulphur content

Geographic availability of sulphur-free fuels: none on sale in 2002

Average sulphur content of all petrol sold: 38 ppm (18 ppm in 2001)

Average sulphur content of all diesel sold: 33 ppm (252 ppm in 2001)

[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].

11.2 FUEL QUALITY MONITORING 2002

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: 16 Petrol and 7 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 2002, RON 91 data was again absent.

11.2.2 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	16
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:	Olefins, aromatics, oxygen content and all oxygenates 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.)

None.

11.2.3 Diesel reporting

Sampling

Number of samples: 7

Frequency of sampling: Quarterly

Reporting

Fuel grades: 1 fuel grade available

Parameters: All parameters except PAH 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.)

None.

11.3 TEMPORAL TRENDS

The following Figures 11.2 to 11.4 show the 5 year 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 2002, total petrol sales fell 1% and diesel sales rose by 11%. There was significant transfer of sales standard petrol (down 25%) to low-sulphur petrol (< 50 ppm) and complete transfer to low-sulphur diesel.

Figure 11.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

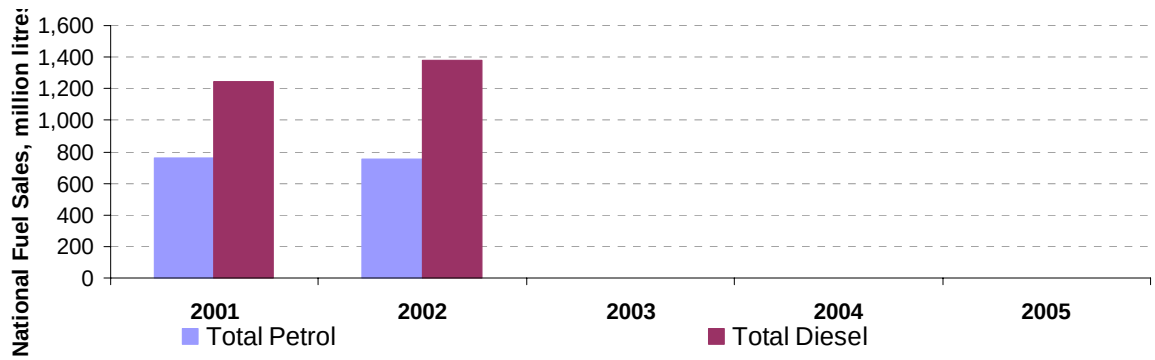


Figure 11.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

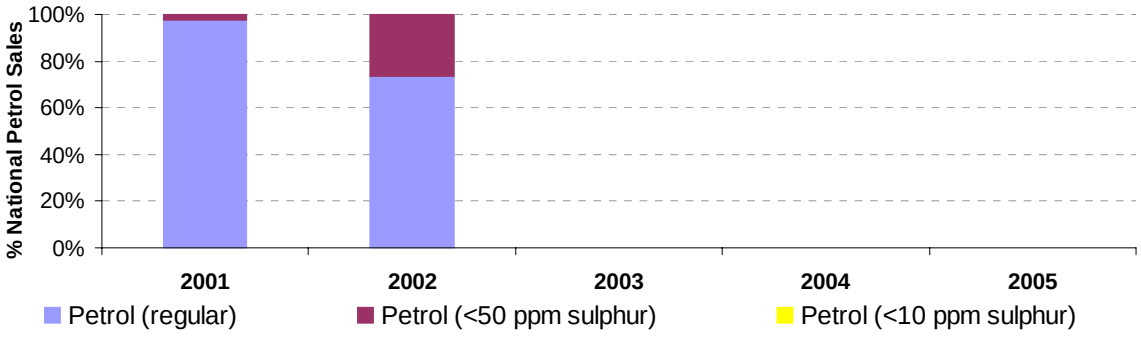
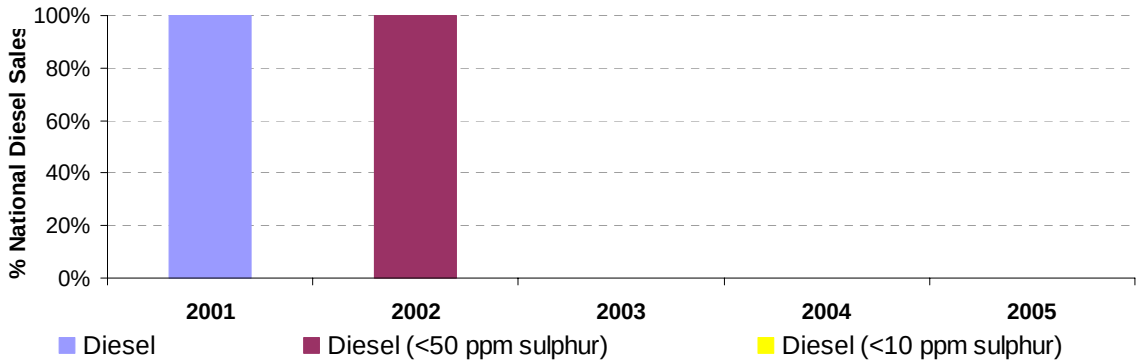


Figure 11.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



12 Netherlands

12.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	4
13	Diesel Fuel	Regular	-	Yes	13
14	Diesel Fuel	< 50 ppm	-	Yes	13

12.1.1 Sales

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

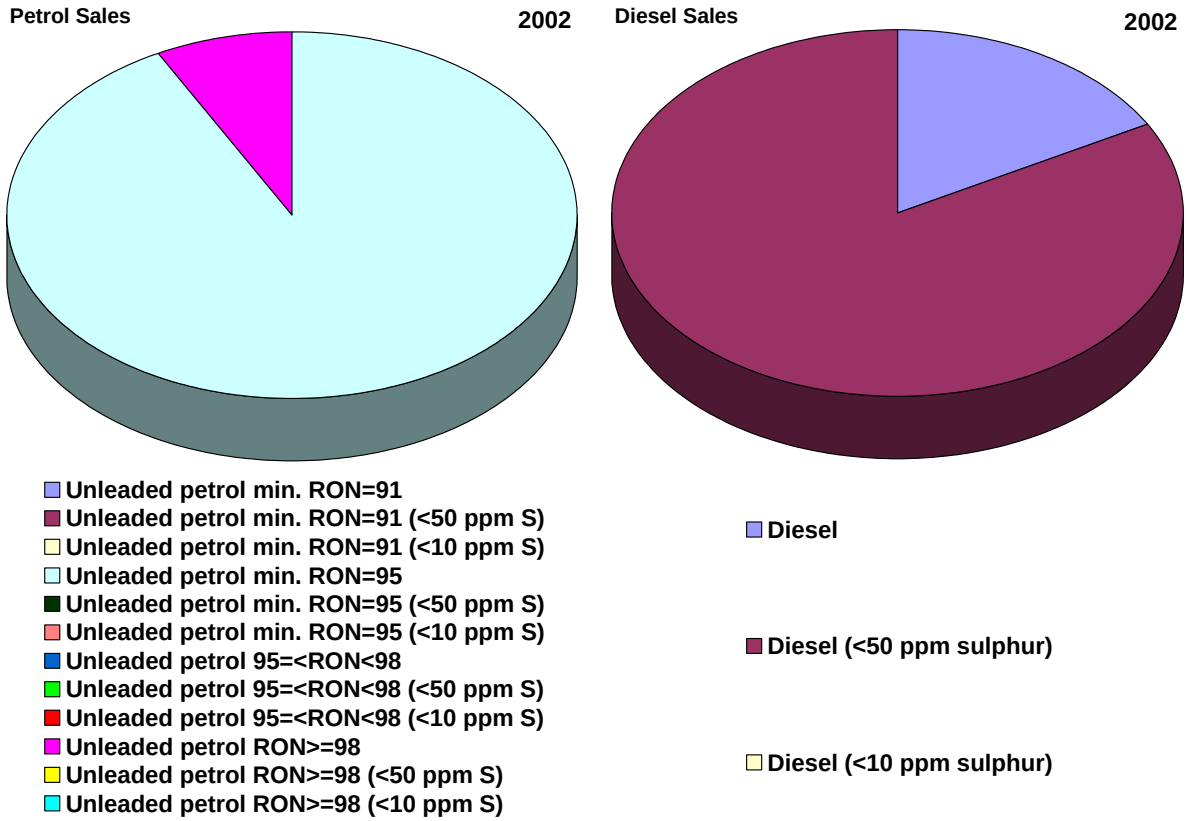


Figure 12.1 shows that 92% of petrol sold in The Netherlands in 2002 (up from 91% in 2001) was of regular RON95 grade, with the remainder being RON>98. Although no low sulphur (<50 ppm) petrol was marketed in 2002, 81% of diesel sales were of low sulphur grades.

12.1.2 Sulphur content

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

Average sulphur content of all petrol sold: 59.5 ppm (51 ppm in 2001)

Average sulphur content of all diesel sold: 42.3 ppm (34.1 ppm in 2001)

[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].

12.2 FUEL QUALITY MONITORING 2002

12.2.1 Description of system

Responsible organisation(s): Inspectorate for Environmental Health

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

Time/frequency of sampling: sampling was carried out monthly from August to September 2002

Number of samples taken: 81 petrol and 81 diesel

Specification of test methods: no information provided

Collection of sales data: no information provided

Other details:

12.2.2 Petrol reporting

Sampling

Summer Period:	Normal: 1st May to 30th September
Number of samples:	81
Frequency of sampling:	Monthly between August and September 2002

Reporting

Fuel grades:	Two petrol grades reported in the combined table
Parameters:	All parameters except oxygen content were measured in 2002.
Other:	The Netherlands provided information last year on 2002 measurements oxygen content (range: 0 to 1.3 %m/m, against a limit of 2.7).

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

Detail:	In 5 samples the distillation at 100 C exceeded the minimum limit (46.0 %(v/v)), with 44.1 %(v/v) the lowest value. 1 sample also exceeded the RON limit (min. 95) with 94.8.
Statistical significance:	The RON sample was within the zone of tolerance and therefore compliant with the Directive. The distillation at 100 C samples were inside of the zone of tolerance for this parameter test method (44.0 %(v/v)) and were therefore also compliant with the Directive.
Member State's notes:	No action was taken, as all the results were within the tolerance limits for the test methods.

12.2.3 Diesel reporting

Sampling

Number of samples:	81
Frequency of sampling:	Monthly between August and September 2002

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.)

Detail:	In 13 samples the Cetane no. was below the minimum limit (51.0 %), with 47.3 minimum. 1 sample also exceeded the distillation 95% point limit (max. 360) with 360.5.
Statistical significance:	The distillation 95% point sample was within the zone of tolerance and therefore compliant with the Directive. 1 Cetane no. sample was outside of the zone of tolerance for this parameter test method (min. 48.5) and was therefore noncompliant with the Directive.
Member State's notes:	No action was taken, where the results were within the tolerance limits for the test methods.

12.3 TEMPORAL TRENDS

The following Figures 12.2 to 12.4 show the 5 year 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 2002 petrol sales increased by 4% and diesel sales by 1%. The only low sulphur fuel on sale was low-sulphur diesel, of which the sales increased by 3%.

Figure 12.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

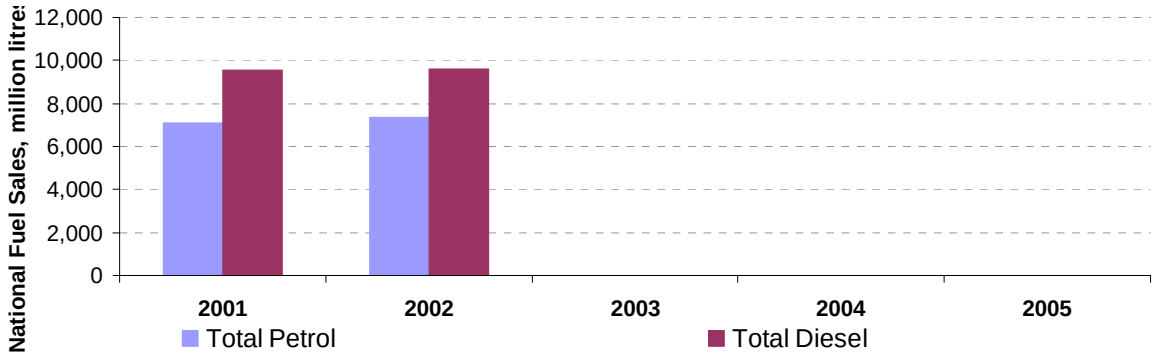


Figure 12.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

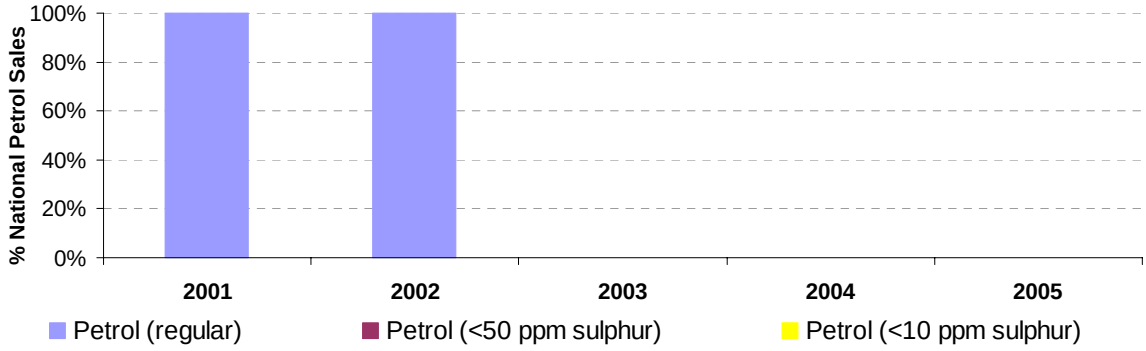
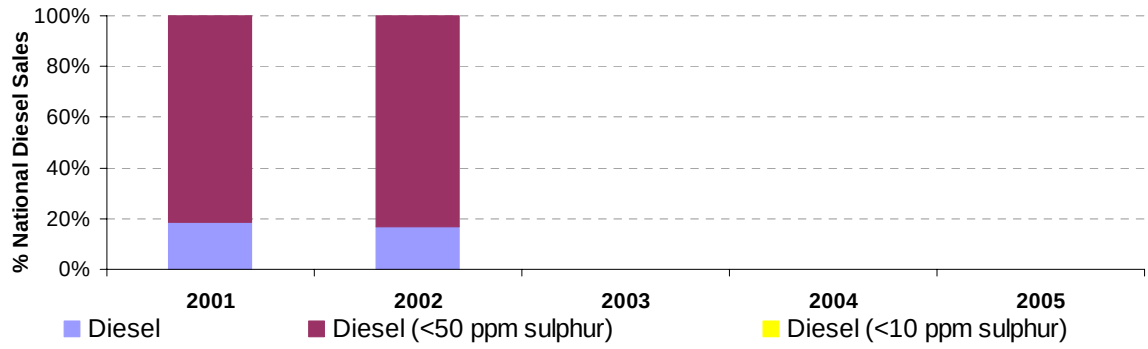


Figure 12.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



13 Portugal

13.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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 (%)

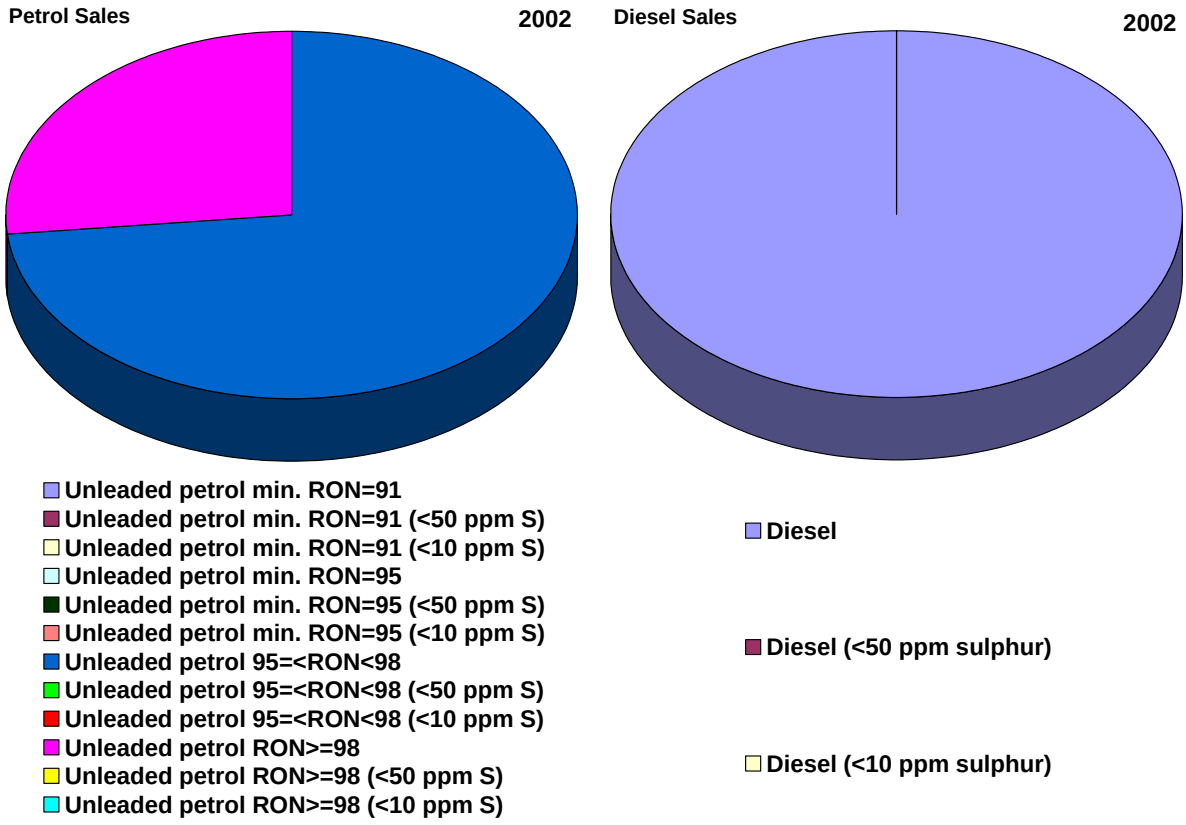


Figure 13.1 shows that of the fuel marketed in 2002 in Portugal, none was of low sulphur (<50 ppm) grade. The majority (73%) of petrol grades were RON95-98 (up from 65% in 2001), with the remainder being at RON>98.

13.1.2 Sulphur content

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

Average sulphur content of all petrol sold: 57 ppm (447 ppm in 2001)

Average sulphur content of all diesel sold: 296 ppm (272 ppm in 2001)

[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].

13.2 FUEL QUALITY MONITORING 2002

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: 90 petrol and 19 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:	90
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.)

1. Petrol

None.

13.2.3 Diesel reporting

Sampling

Number of samples: 19

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.)

None.

13.3 TEMPORAL TRENDS

The following Figures 13.2 to 13.4 show the 5 year 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 2002, the sales of petrol increased by 7%, while sales of diesel decreased by 7%. No low sulphur fuels were available.

Figure 13.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

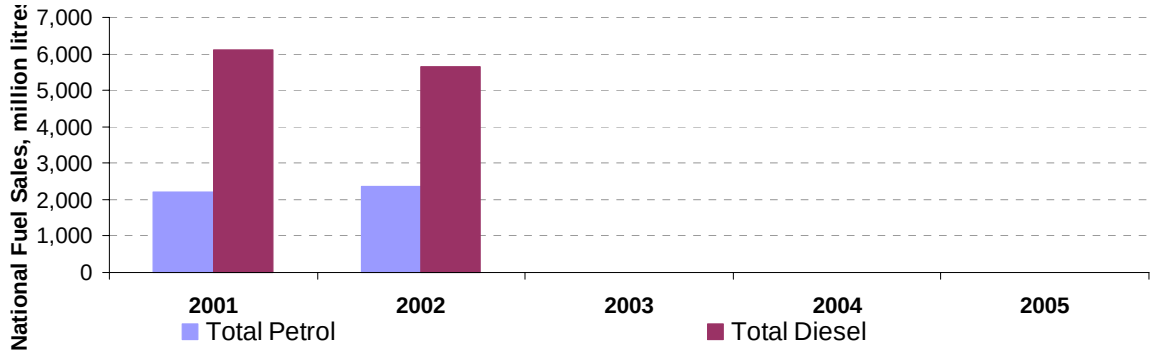


Figure 13.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

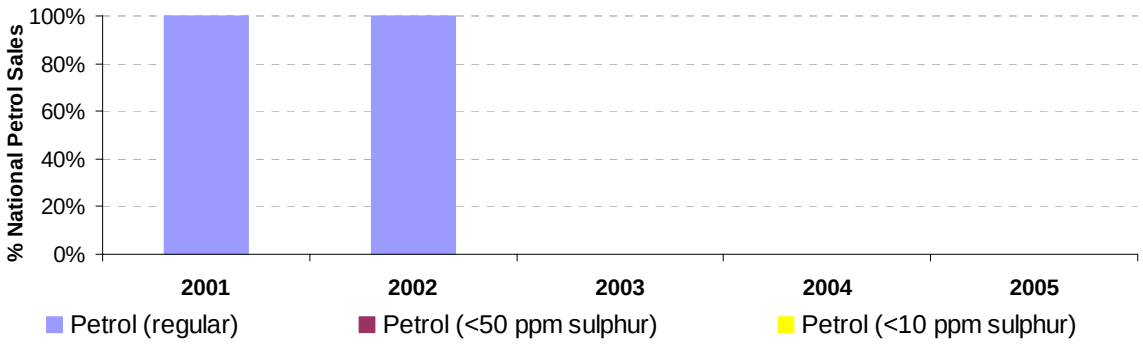
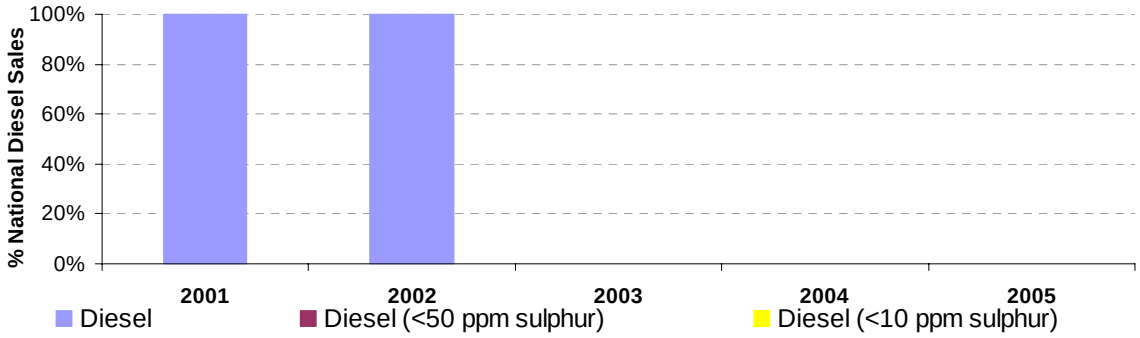


Figure 13.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



14 Spain

14.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	-	Yes	7
10	Petrol RON > = 98	Regular	-	Yes	10
13	Diesel Fuel	Regular	-	Yes	13

14.1.1 Sales

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

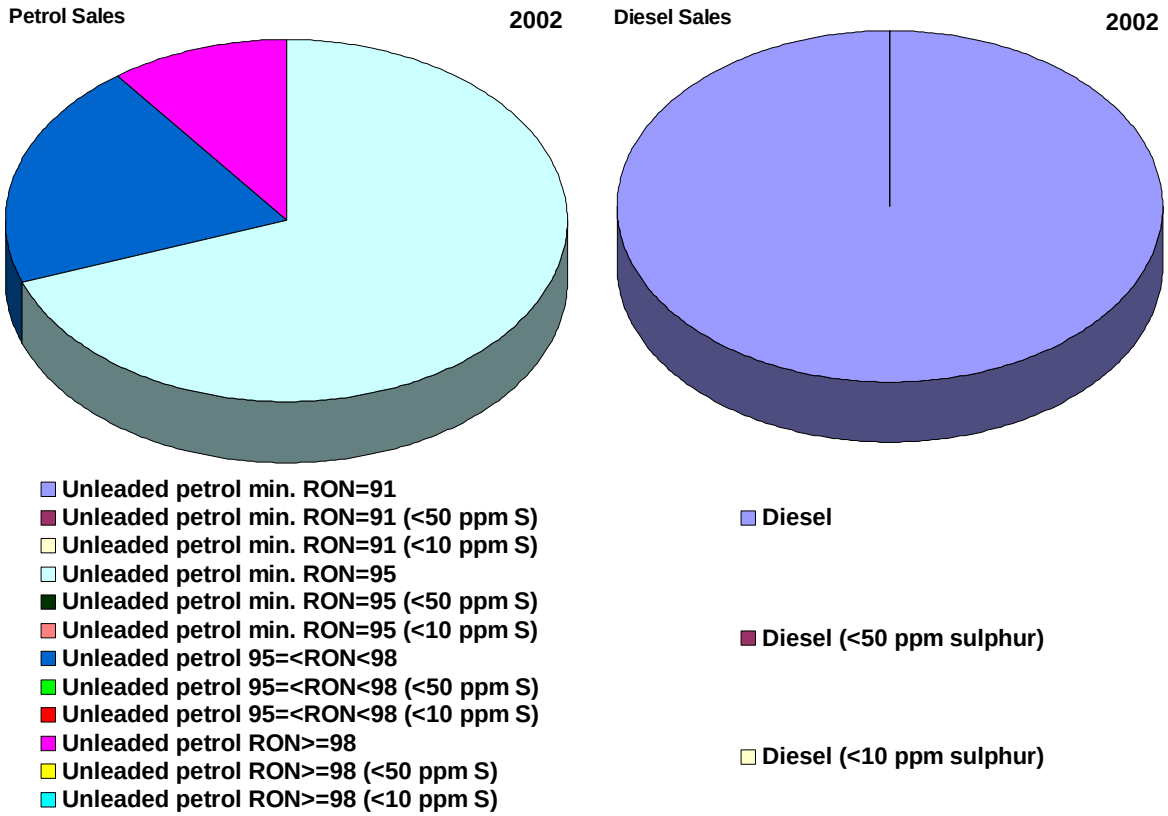


Figure 14.1 shows that the majority of fuel sold in Spain in 2002 was RON95 grade (69%, compared to 64% in 2001), with the rest comprising of RON95-98 (20%, down from 26% in 2001) and RON>98 (10%, up from 9% in 2001). No low sulphur (<50 ppm) grades of fuel were available in Spain in 2002.

14.1.2 Sulphur content

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

Average sulphur content of all petrol sold: 103 ppm (96 ppm in 2001)

Average sulphur content of all diesel sold: 276 ppm (278 ppm in 2001)

[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].

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: 773 petrol and 281 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. Estimated imports of petrol and diesel for 2002 were 967 and 5,600 KTm respectively. Exports of petrol and diesel in 2002 were 2,174 and 350 KTm respectively.

14.2.2 Petrol reporting

Sampling

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

Number of samples: 773

Frequency of sampling: 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.)

None.

14.2.3 Diesel reporting

Sampling

Number of samples: 281

Frequency of sampling: 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.)

None.

14.3 TEMPORAL TRENDS

The following Figures 14.2 to 14.4 show the 5 year 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 de creased by 4% between 2001 and 2002, with diesel sales increasing by 6%. There were no low sulphur fuels on sale in Spain in 2002.

Figure 14.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

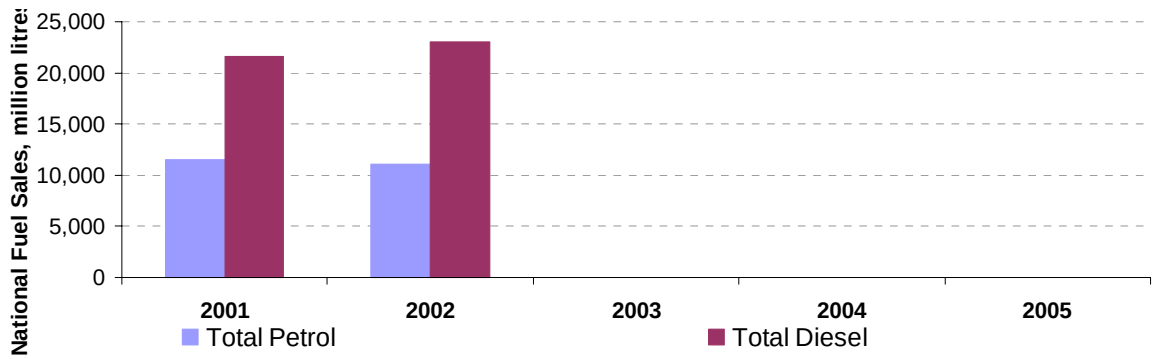


Figure 14.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

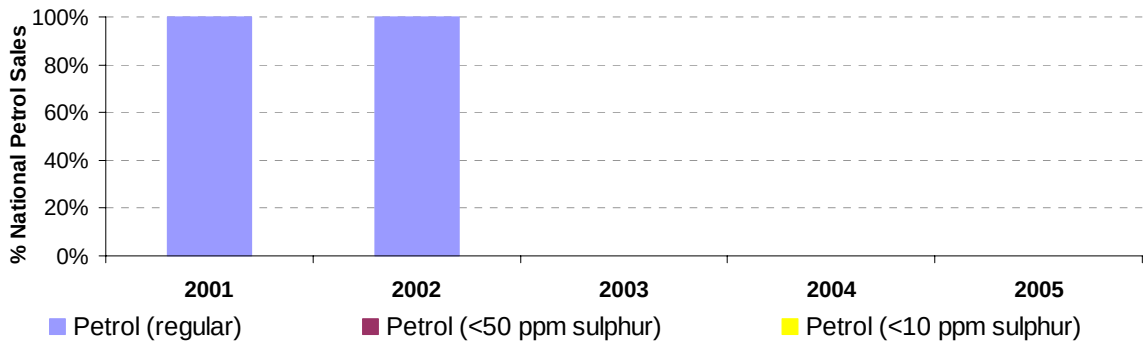
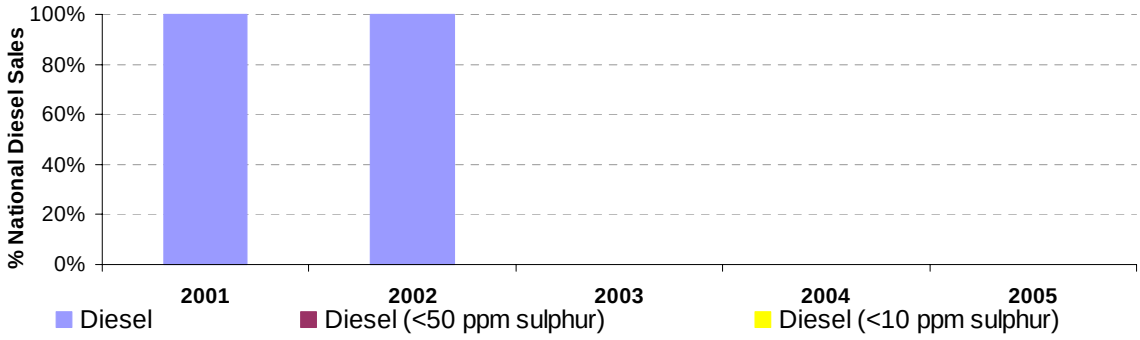


Figure 14.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



15 Sweden

15.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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
10	Petrol RON > = 98	Regular	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 (%)

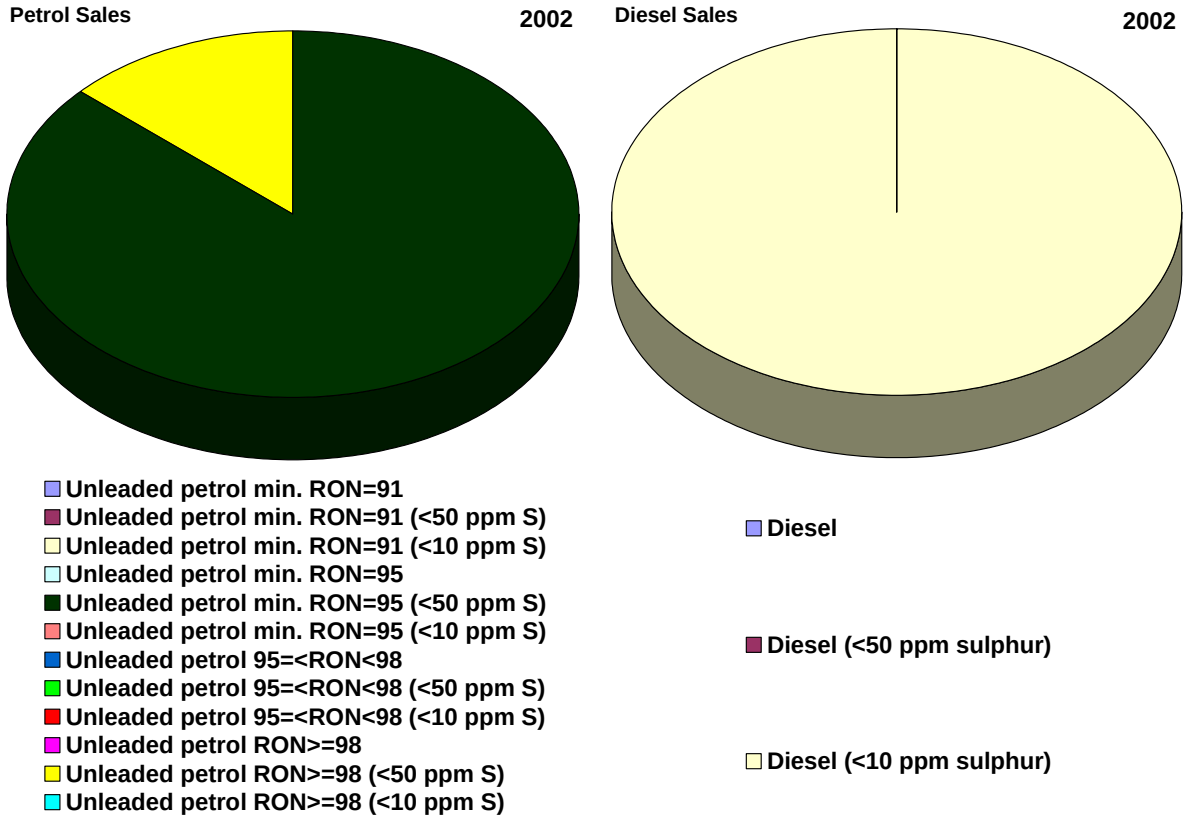


Figure 15.1 shows that the all petrol sold in Sweden in 2002 (as in 2001) was low sulphur (<50 ppm), with 87% being RON95 and 13% being RON98. All diesel sold was zero sulphur grade (<10 ppm) as in 2001.

15.1.2 Sulphur content

Geographic availability of sulphur-free fuels: Sulphur-free diesel fuel is 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.

Average sulphur content of all petrol sold: 17 ppm (21 ppm in 2001)

Average sulphur content of all diesel sold: 2 ppm (1 ppm in 2001)

[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].

15.2 FUEL QUALITY MONITORING 2002

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.

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

Number of samples taken: 948 petrol and 582 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: no information provided.

Other details:

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:	948
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.)

1. Petrol

None.

15.2.3 Diesel reporting

Sampling

Number of samples: 582

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.)

1. Diesel

None.

15.3 TEMPORAL TRENDS

The following Figures 15.2 to 15.4 show the 5 year 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 2002, with diesel sales increasing by 5%. All petrol sold in 2001 & 2002 was low sulphur (< 50 ppm), and all diesel was sulphur free (< 10ppm).

Figure 15.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

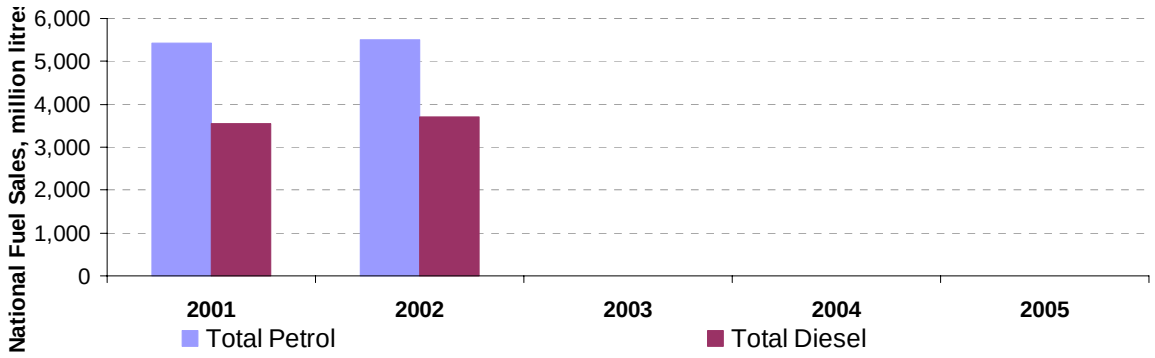


Figure 15.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

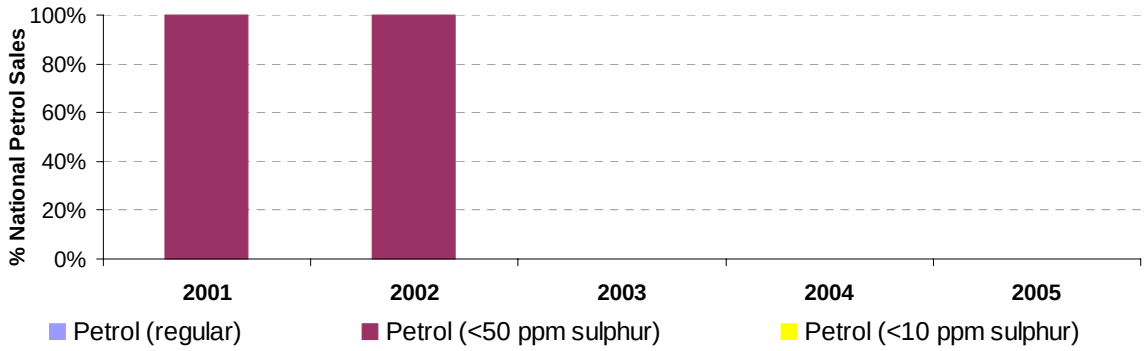
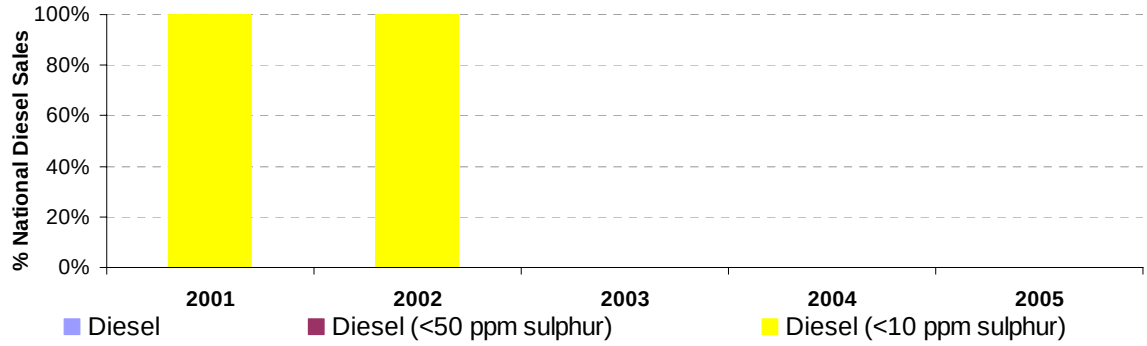


Figure 15.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)



16 United Kingdom

16.1 FUEL AVAILABILITY 2002

The following table lists the fuels that were reported to be available nationally in 2002, whether full sales data was 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	No	4
7	Petrol 95 = < RON < 98	Regular	Super Unleaded & LRP	Yes	7
14	Diesel	< 50 ppm	ULS Diesel	Yes	14

16.1.1 Sales

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

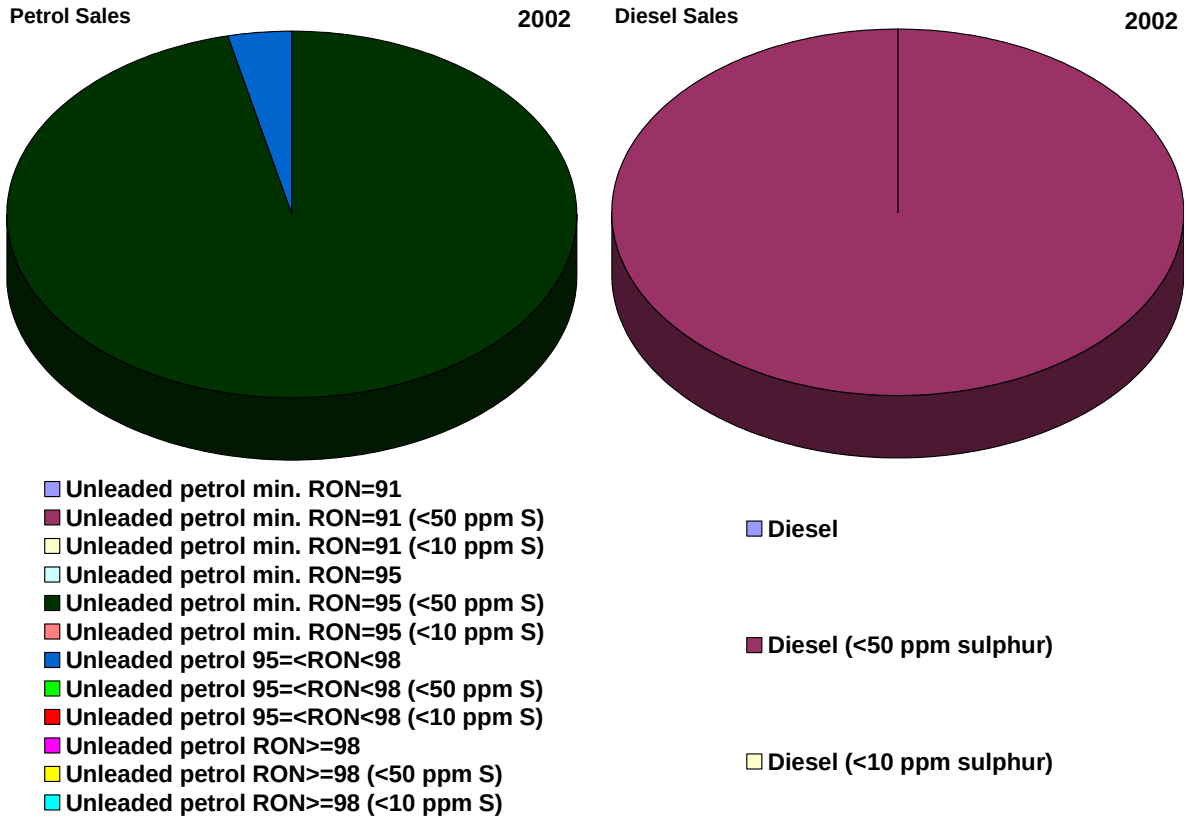


Figure 16.1 above shows the wide availability of low sulphur (<50 ppm) fuels on the UK market in 2002, with 100% of all diesel fuel sold being low sulphur. For petrol, there was a change from 33% of RON95 fuel sold being low sulphur (<50ppm), to 96% of fuel being RON95 low sulphur fuel. The remaining 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 was very limited supplies of petrol or diesel containing less than 10ppm sulphur marketed in the UK during 2002 (only sold in Edinburgh). Actual volume sales are 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 sold: 41 ppm (49 ppm in 2001)

Average sulphur content of all diesel sold: 40 ppm (40 ppm in 2001)

[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].

16.2 FUEL QUALITY MONITORING 2002

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: 2893 petrol and 1915 diesel

Specification of test methods: Testing carried out in NAMAS/ISO 9000 accredited laboratories.

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 the UK criminal elements sometimes remove the die from red diesel and market it as road diesel to avoid tax. Other samples taken for the purpose of checking this behaviour are not suitable for fuel quality monitoring. It has been estimated that around 4% of diesel consumed on UK roads is heating gas oil, which has been laundered to remove the fiscal markers and dye. During 2002 Customs and Excise investigations discovered and shutdown 32 laundering plants. The operators were prosecuted and either imprisoned or received severe fines. To further improve detection and prosecution of these criminal activities Customs and Excise are introducing new countermeasures due to come into force during 2003.

16.2.2 Petrol reporting

Sampling

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

Number of samples: 2893

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, olefins and benzene (limits min. 95, min 85, max. 70 kPa, 18.0 % v/v and 1.0 % v/v respectively) with values reaching 94.3, 84.5, 71.0, 18.9 and 1.1 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 98

Detail: 1 sample exceeded the limit value for summer vapour pressure (70 kPa) with a value of 76.0.

Statistical significance: This value is beyond the tolerance limit (71.7) and is noncompliant with the Directive.

Member State's notes: The result appears to be caused by the very low throughput of the grade at the site, which resulted in a small quantity of winter grade remaining in the storage tank.

16.2.3 Diesel reporting

Sampling

Number of samples: 1915

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.)

1. Diesel

Detail: Some samples exceeded the limit value for Cetane number (min. 51.0) with values as low as 50.2.

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

Member State's notes:

16.3 TEMPORAL TRENDS

The following Figures 16.2 to 16.4 show the 5 year 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 2002, total petrol sales fell by 6% and diesel sales rose by 8%. Here was also significant transfer from standard petrol to low-sulphur petrol (< 50 ppm), with a 95% decrease in the use of regular petrol due to complete transfer of RON 95 grade to low-sulphur petrol.

Figure 16.2: Temporal Trends in National Sales of Petrol and Diesel (million litres)

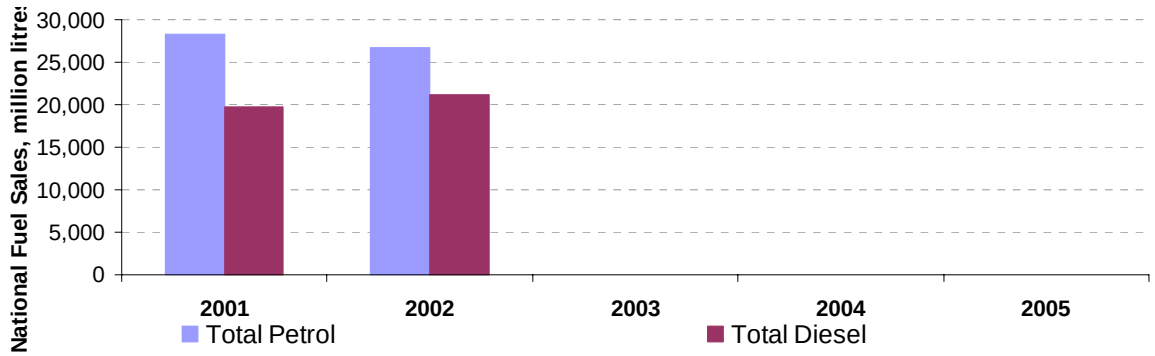


Figure 16.3: Temporal Trends in National Sales of Low Sulphur Petrol (%)

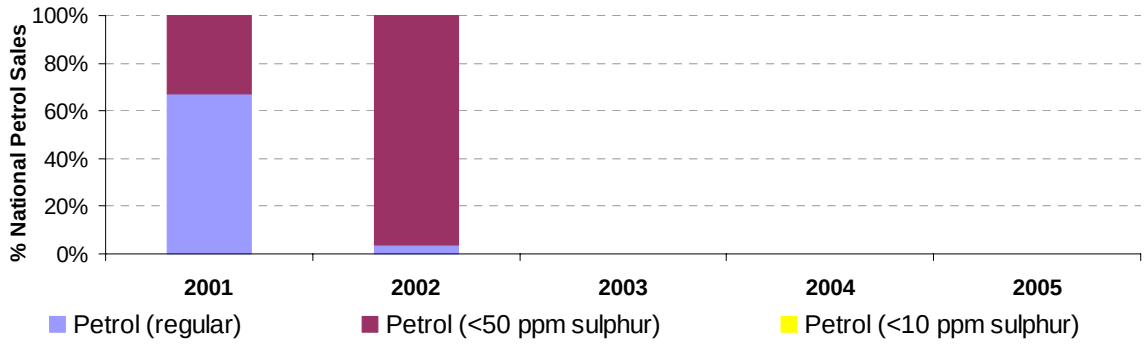
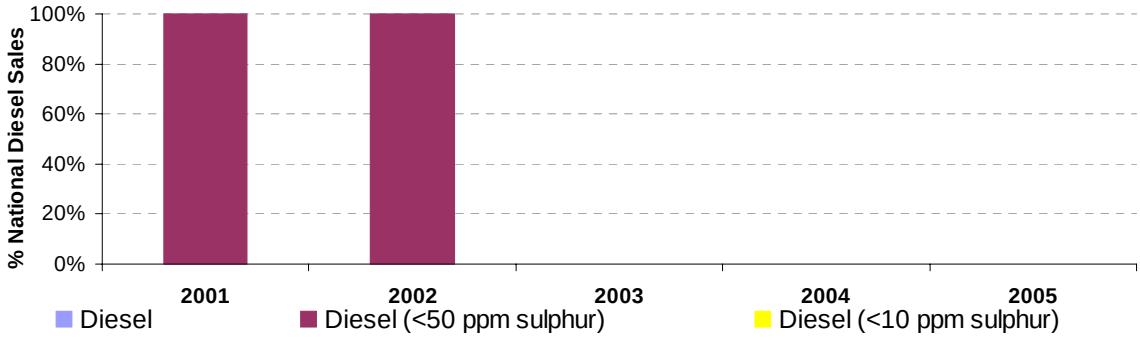


Figure 16.4: Temporal Trends in National Sales of Low Sulphur Diesel (%)

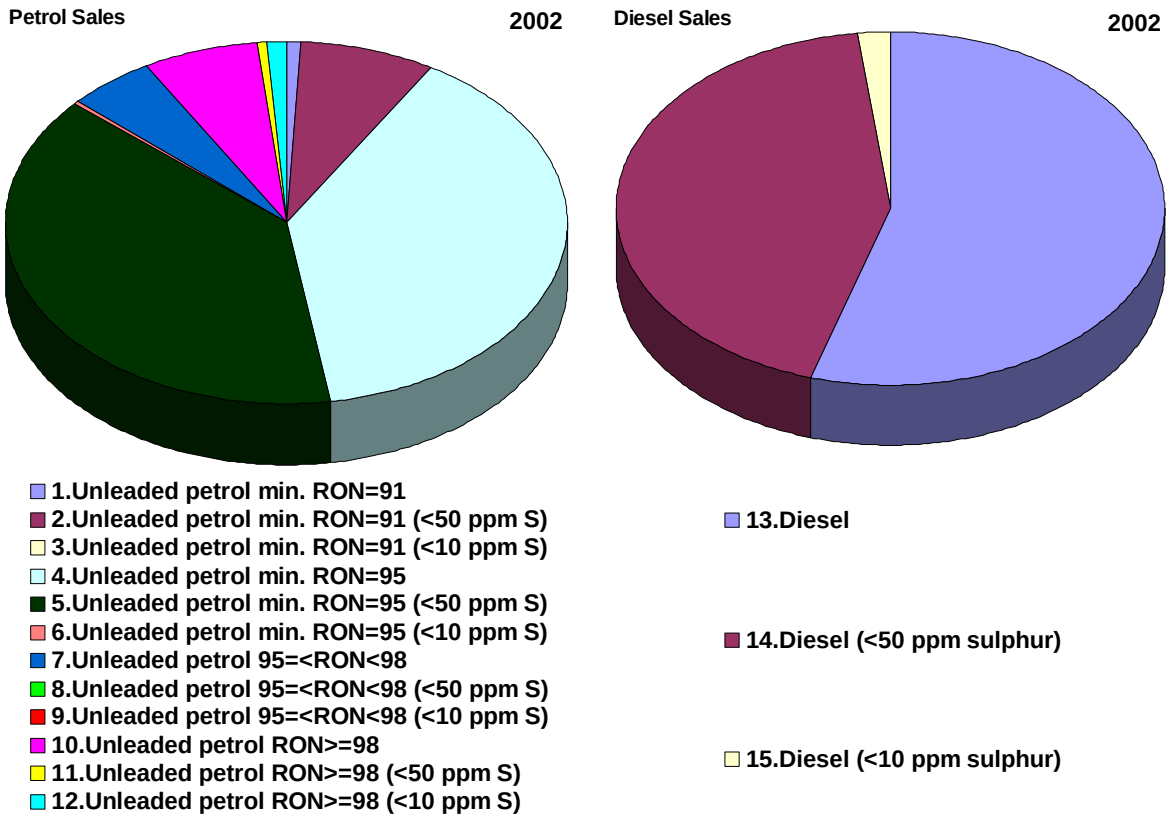


17 EU Summary

17.1 FUEL AVAILABILITY 2002

17.1.1 Sales

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



Legend: EU fuel sales by fuel type (%)

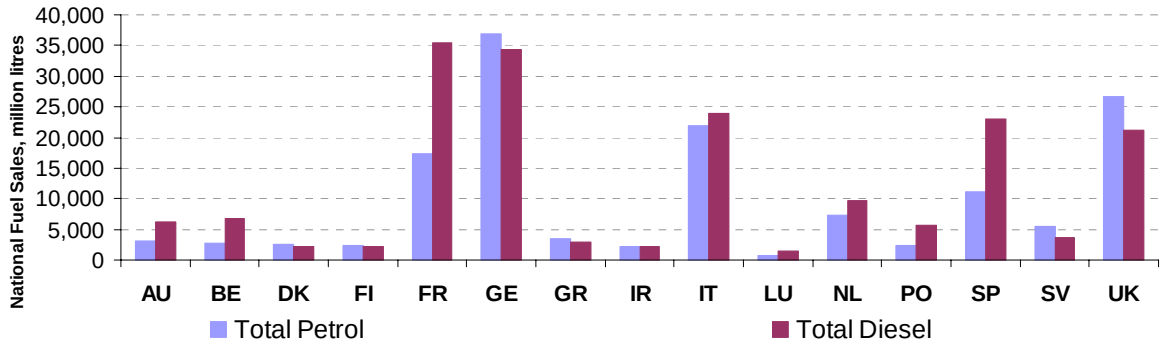
	Petrol												Diesel		
Fuel ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
% EU Sales	0.9%	7.8%	0.0%	38.9%	38.7%	0.5%	4.8%	0.0%	0.0%	6.7%	0.6%	1.0%	54.6%	43.3%	2.1%

Figure 17.1 (see also Table 17.1) show that in 2002, whilst a wide variety of RON and sulphur grade fuels were available across the EU, the majority of sales still comprised of RON95 (78 %, with 38.9 % regular, 38.7 % low sulphur and 0.5% sulphur free). Of all petrol sold, 51% was regular sulphur grade, 47% low sulphur (<50 ppm) and 2% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 55%, 43% and 2%. Compared to 2001 the quantities of <50 ppm fuels increased significantly, while the quantities of <10 ppm fuels remained nearly constant.

Table 17.1: 2002 EU fuel sales by fuel type (million litres)

ID	Million litres	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	UK	EU15	EU15
No.	**Fuel grade**	**AU**	**BE**	**DK**	**FI**	**FR**	**GE**	**GR**	**IR**	**IT**	**LU**	**NL**	**PO**	**SP**	**SV**	**UK**	**EU**	**% Total**
1	Unleaded petrol min. RON=91	818	0	492	0	0	0	0	0	0	26	0	0	0	0	0	1,335	0.9%
2	Unleaded petrol min. RON=91 (<50 ppm S)	0	0	0	0	0	11,386	0	0	0	0	0	0	0	0	0	11,386	7.8%
3	Unleaded petrol min. RON=91 (<10 ppm S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
4	Unleaded petrol min. RON=95	0	1,878	2,062	2,100	9,265	0	3,259	1,413	21,969	529	6,783	0	7,665	0	0	56,921	38.9%
5	Unleaded petrol min. RON=95 (<50 ppm S)	2,082	0	0	0	0	24,029	0	12	0	0	0	0	0	4,774	25,795	56,692	38.7%
6	Unleaded petrol min. RON=95 (<10 ppm S)	0	0	0	0	0	0	0	718	0	0	0	0	0	0	0	718	0.5%
7	Unleaded petrol 95=<RON<98	0	0	0	0	2,099	0	0	11	0	0	0	1,725	2,250	0	953	7,038	4.8%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
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	0.0%
10	Unleaded petrol RON>=98	0	852	40	356	5,984	0	277	0	0	0	565	630	1,136	0	0	9,840	6.7%
11	Unleaded petrol RON>=98 (<50 ppm S)	0	0	0	0	0	0	0	0	0	200	0	0	0	738	0	938	0.6%
12	Unleaded petrol RON>=98 (<10 ppm S)	127	0	0	0	0	1,406	0	0	0	0	0	0	0	0	0	1,533	1.0%
	Petrol (regular)	**818**	**2,730**	**2,594**	**2,455**	**17,348**	**0**	**3,537**	**1,423**	**21,969**	**554**	**7,348**	**2,355**	**11,051**	**0**	**953**	**75,135**	**51.3%**
	Petrol (<50 ppm sulphur)	**2,082**	**0**	**0**	**0**	**0**	**35,415**	**0**	**12**	**0**	**200**	**0**	**0**	**0**	**5,512**	**25,795**	**69,017**	**47.1%**
	Petrol (<10 ppm sulphur)	**127**	**0**	**0**	**0**	**0**	**1,406**	**0**	**718**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2,251**	**1.5%**
	Total Petrol	**3,026**	**2,730**	**2,594**	**2,455**	**17,348**	**36,822**	**3,537**	**2,154**	**21,969**	**755**	**7,348**	**2,355**	**11,051**	**5,512**	**26,748**	**146,403**	**100.0%**
13	**Diesel**	**6,195**	**0**	**0**	**1**	**35,412**	**0**	**2,910**	**0**	**24,005**	0	1,630	5,650	22,975	0	0	98,776	54.6%
14	**Diesel (<50 ppm sulphur)**	**0**	**6,750**	**2,264**	**2,205**	**0**	**34,371**	**0**	**2,209**	**0**	1,380	7,972	0	0	0	21,219	78,370	43.3%
15	**Diesel (<10 ppm sulphur)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	0	0	0	3,717	0	3,717	2.1%
	Total Diesel	**6,195**	**6,750**	**2,264**	**2,206**	**35,412**	**34,371**	**2,910**	**2,209**	**24,005**	**1,380**	**9,602**	**5,650**	**22,975**	**3,717**	**21,219**	**180,863**	**100.0%**

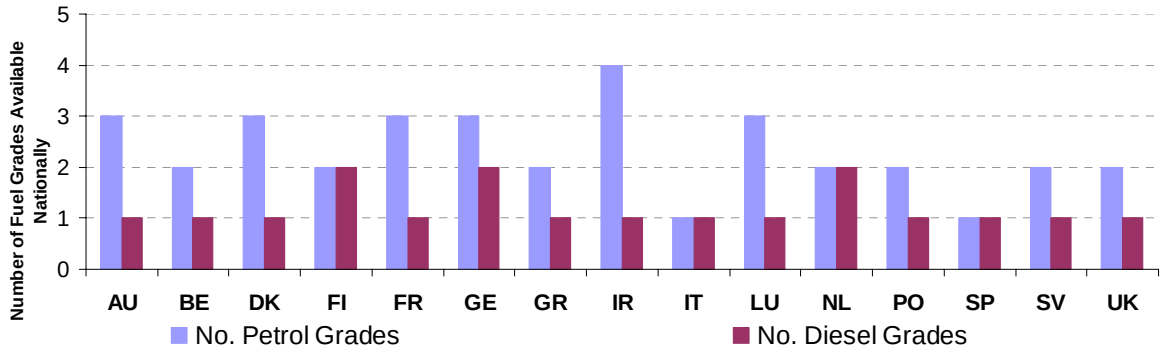
Figure 17.2: National Fuel sales by fuel type across the EU (million litres)



Similarly to 2001, the largest total sales of fuels (of submissions received to date) in 2002 were made in France, 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, there is also still a variation in the number of grades of fuel reported to be available across the EU (Figure 17.3) in 2002, 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, have actually defined *national fuel grades* for low (<50 ppm) or sulphur free (<10 ppm) fuels. 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 low sulphur fuels were available in many countries across the EU (see Figures 17.4 and 17.5). However, in 2002 there were still five countries that still had not introduced separately marketed low (<50 ppm) or sulphur free (<10 ppm) fuels at all (France, Greece, Italy, Portugal and Spain). Compared to 2001, Belgium now disappeared from this list since all diesel marketed is of the <50 ppm quality

As in 2001, sulphur free petrol was only available in Austria, Germany and Ireland, and sulphur free diesel was only available in Sweden. Also, in 2002 seven countries (only three in 2001) had fully moved over to low or sulphur free diesel fuel; Sweden had moved completely over to low sulphur petrol, but no countries had fully switched to sulphur free petrol.

Figure 17.4: National Sales of Low Sulphur Petrol Grades across the EU (%)

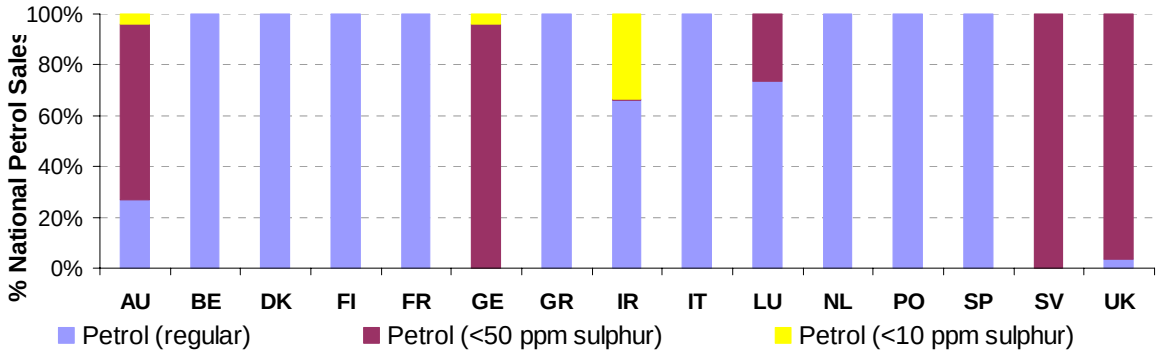
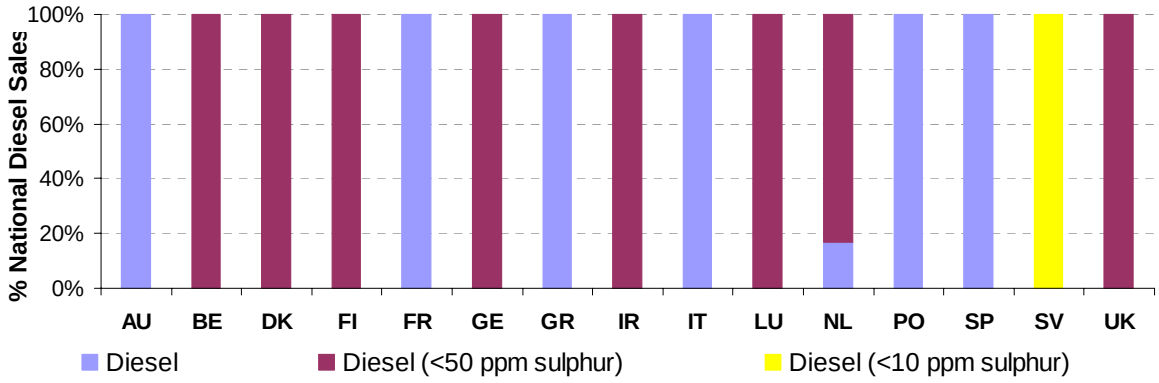


Figure 17.5: National Sales of Low Sulphur Diesel Grades across the EU (%)



17.2 FUEL QUALITY MONITORING 2002

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). It appears that few amendments or changes have been made to the Monitoring Systems since the 2001 reporting round. Presumably 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"* (the Recently Adopted EN 14274[5] & 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 it is not appear that 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.

A rough appreciation for the existing degree/rate of sampling carried out may be obtained from Figure 17.6, which plots the total number of samples of petrol and diesel against the respective sales in billion litres. It is clear from this plot that there was still a wide range of sampling intensities across the EU in 2002. As in 2001, of particular interest is the very high sampling rate of Belgium (from refuelling stations across the Belgium territory) in relation to the other Member States, even when compared to Sweden and the UK who incorporated sampling and analysis into a mandatory requirement for fuel distribution in their territories. This anomaly is due to the fact that the Belgium system in operation in 2002 was designed and introduced in 1996 for the purposes of detecting fraud at retail stations. Similarly, the systems active in some other Member States were also designed for other purposes – explaining some of the variations in coverage and application across the EU. As discussed earlier, 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. Discussions at the 2nd Expert Meeting on the Implementation of Directive 98/74/EC indicated that about half of the 15 existing EU Member States and half the 10 Acceding Countries plan to use the new standard for their Fuel Quality Monitoring Systems. Of the remainder, half intend to use their own standards and the other half have not decided yet.

Whilst there are currently no requirements on MS on the numbers and locations of samples taken in their FQMS, it is worth noting that the degree of sampling that might have been useful in statistically demonstrating compliance with Directive 98/70/EC could have included a measure of 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, however, 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

[5] EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).
[6] EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel fuel quality -Sampling from retail site station pumps and commercial site fuel dispensers.

statistical model and the size of the country (i.e. 100, 200 or 400 samples per year per fuel grade).

The countries that are defined as "large" include France, Germany, Italy, Spain and the UK according to the definition contained in the European Standard (>15million tonnes automotive fuel sales per year). The Netherlands falls just underneath this criteria. Using these criteria it can be seen (Figure 17.7) that only Belgium, Italy, Spain, Sweden and the UK already would already satisfy 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).

Figure 17.6:FQM Sampling Rate Across the EU
(Total Number of Samples per Billion Litres Fuel Sold)

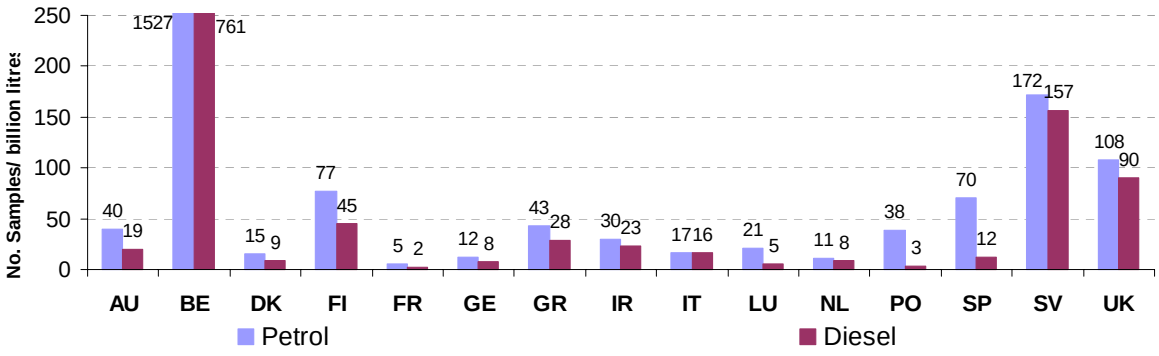
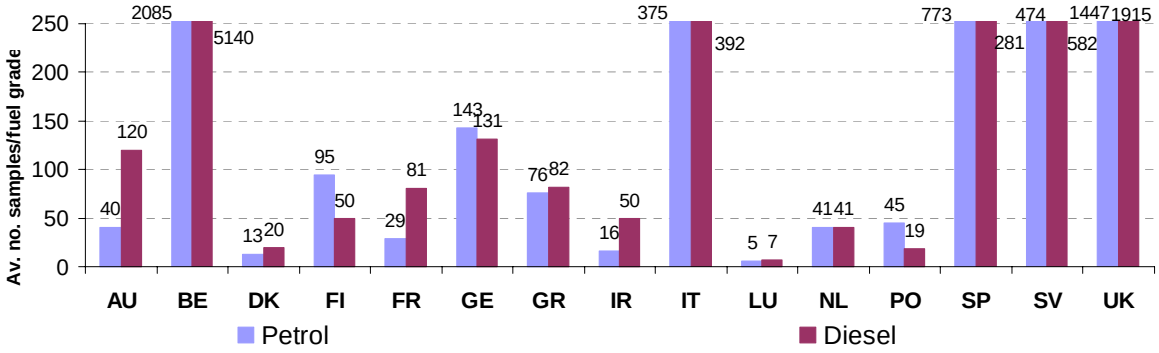


Figure 17.7:FQM Sampling Rate Across the EU
(Average Number of Samples per Fuel Grade)



In terms of compliance with Directive 98/70/EC, five Member States (France, Luxembourg, Portugal, Spain and Sweden) are in complete compliance with limit values for both petrol and diesel (compared to five in 2001). However, only Portugal and Spain also provided complete reporting across the range of parameters specified for monitoring in the Directive. 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 2002, nine of the Member States reported at least one petrol sample that was noncompliant with Directive 98/70/EC (compared to ten in 2001). Of these, the main parameters of concern were summer vapour pressure (the most often exceeded, across all fuel grades), research and motor octane number (RON, MON). Distillation (evaporation at 100°C), ethers with 5 or more C atoms per molecule, benzene and aromatics content were also exceeded by some samples for more than one Member State. However for all parameters at least one sample exceeded the limit value (and the limit of tolerance for the test method).
The complete reported submissions for each Member State are included in Appendix 4 and Appendix 3 includes three charts showing the basic and low sulphur petrol RON95 grade reporting of vapour pressure, RON and MON across the EU.

17.2.3 Diesel reporting

For diesel reporting, six of the Member States reported at least one sample that was noncompliant with Directive 98/70/EC (compared to four in 2001). Of these, the main parameters of concern were sulphur content and Distillation 95% point, however for all parameters the Directive's limit values were exceeded by at least one sample.

The complete reported submissions for each Member State are included in Appendix 4 and Appendix 3 includes four charts showing the basic and low sulphur diesel grade reporting of sulphur content and distillation 95% point across the EU.

17.2.4 Summary of Compliance with 98/70/EC

The following table summarises the compliance of Member States with Directive 98/70/EC for the year 2002 reporting in terms of the results of analysis of samples against limit values and the reporting format and content.

As in 2001 the quality of the compliance assessment suffers in some cases due to 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 Commission is concerned about the violations identified. Member States will be asked to explain the reasons as well as the measures taken, or planned to be taken, in order to avoid in future that the fuel quality specifications are not met.

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 17.1: Summary of MS compliance with 98/70/EC for 2002 reporting.

Member State	Limit value non-compliance (1) (95% confidence limits)		Incomplete reporting	
	Petrol	Diesel	Petrol	Diesel
Austria	X	X	X	
Belgium	X	X	X	
Denmark	X	X	X	
Finland	(2)			
France			X	X
Germany	X	X		
Greece		X	(3)	
Ireland	X			
Italy	X	X	(4)	
Luxembourg			X	
Netherlands	X		X	
Portugal			(4)	
Spain				
Sweden			X	
United Kingdom	X			

Notes:

(1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete.

(2) The Finnish Customs Laboratory is of the opinion that all samples comply with the requirements of the Directive on the basis of expanded uncertainty limits of +/- 10% for ethers [i.e. 90% confidence limits].

(3) Although all oxygenates were not measured (other than ethers with more than 5 carbon atoms per molecule), Greece has stated the other oxygenates were not added and the oxygen content can be calculated directly from the oxygenates content, so would also be compliant.

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

17.3 TEMPORAL TRENDS

The following Figures 17.8 to 17.10 show the 5 year 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. Total sales of petrol and diesel have remained approximately constant between 2001 and 2002 (increased 1% for petrol, decreased 0.5% for diesel). Sales of low sulphur (<50 ppm) petrol have increased from 17% in 2001 to 47% of total sales in 2002. Sales of low sulphur diesel have increased from 21% in 2001 to 43% in 2002. Sales of sulphur free petrol and diesel have remained approximately constant.

Figure is 17.8: Temporal Trends in EU Sales of Petrol and Diesel (million litres)

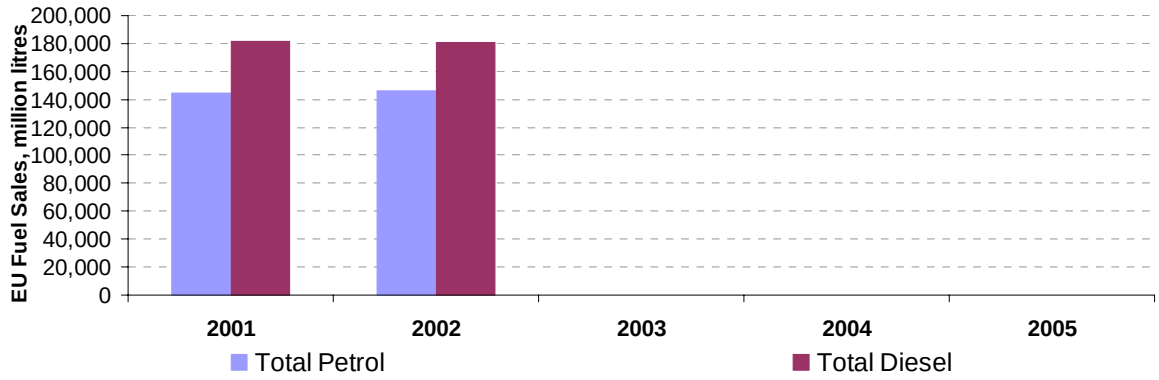


Figure 17.9:Temporal Trends in EU Sales of Low Sulphur Petrol (%)

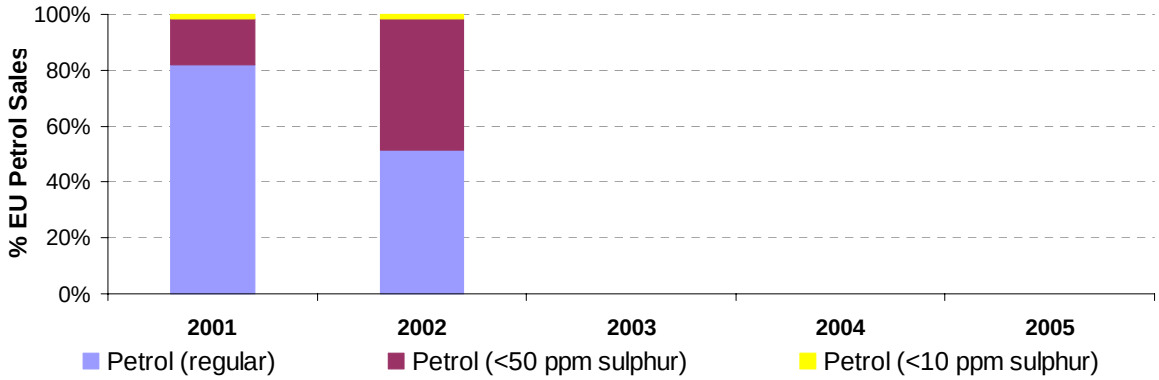
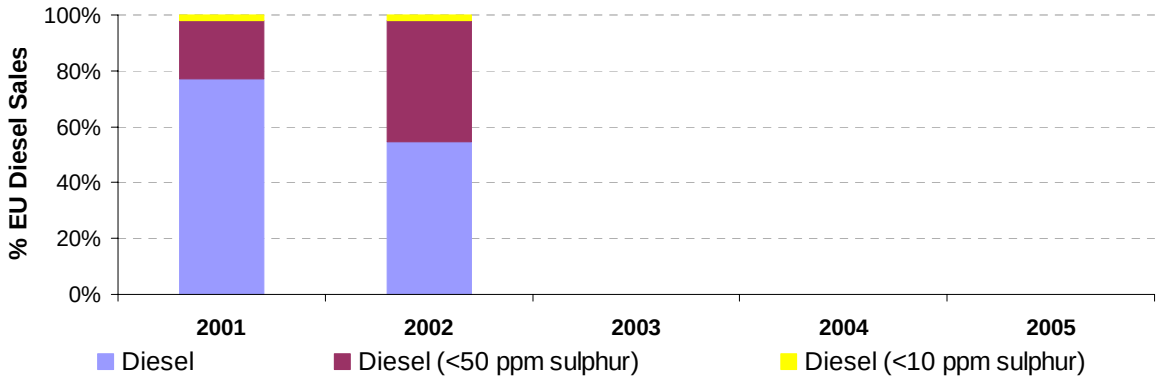


Figure 17.10:Temporal Trends in EU Sales of Low Sulphur Diesel (%)



18 DISCUSSION & RECOMMENDATIONS

18.1 DISCUSSION

18.1.1 2002 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 (2003 submissions) has been on the whole improved, however some Member States (France, Luxembourg and Spain) had still not submitted their reports by the end of September 2003 (three months later than the deadline), again resulting in delay to the production of this summary report.

An extended electronic reporting form (in Microsoft Excel) was recommended in last year's summary report[7] for this 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. As a result of this has 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 2003 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.

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

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

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 2003 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 report 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 become clear 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 as discussed in section 18.1.3.

18.1.2.1 Description of Fuel Quality Monitoring System

The Commission Decision of 18/02/2002 (Appendix 1), only requests that "*Member States should provide a description on the operation of their national fuel quality monitoring systems*".' This has resulted in a wide variance in the degree and type of detail reported by Member States in 2002 and therefore has made comparisons of the different national systems difficult. It would be useful if there were a standard format or series of headings under which information should be provided. Ideally this would tie in with the criteria outlined in the new European Standard. Other suggestions for information that would enable more meaningful analysis are provided in section 18.2.

18.1.2.2 Total Sales of Petrol and Diesel

The table presented in the Commission Decision for reporting of sales of petrol and diesel by Member States (Table 18.1) continued to result in some confusion for the 2003 submissions (on 2002 monitoring) as to which category certain fuel sales should be reported under (especially where particular grades could be reported under more than one of the categories). This was especially true where there are sales of low-sulphur or zero sulphur fuels at more than one octane grade (petrol). In some cases Member States reported aggregated totals for low-sulphur or zero sulphur fuels as well as reporting the same fuels under the different octane grades. In other cases Member States expanded the table themselves in order to more accurately report sales of particular combinations of octane and sulphur content. In some cases discrepancies were only realised after comparison with the grades that were reported as result of sampling and analysis. An expanded table reflecting all the combinations and providing additional clarification on filling out the table was deemed to be beneficial, and was provided in the Excel template sent to Member States for the year 2002 monitoring submissions (due in 2003, Table

18.2). This reduced the need to return to Member States for clarification at a later stage where it was not obvious what was meant. Additional comments on the completeness and availability of sales data were also beneficial where provided.

Table 18.1: Format of the reporting table for total sales of petrol and diesel (Commission Decision 18/02/2002)

Fuel Grade	National sales total (litres/tonnes)
Regular unleaded petrol (minimum RON = 91)	
Unleaded petrol (minimum RON = 95)	
Unleaded petrol (minimum RON = 95 & < 50 ppm sulphur)	
Sulphur free unleaded petrol (< 10 ppm sulphur)	
Unleaded petrol (95 =< RON < 98)	
Unleaded petrol (RON >= 98)	
Diesel fuel	
Diesel fuel (< 50 ppm sulphur)	
Diesel fuel (< 10 ppm sulphur)	

Table 18.2: Recommended format for the reporting table for total sales of petrol and diesel

Fuel Grade	National sales total (litres or tonnes)	
	Litres	Tonnes
Regular unleaded petrol (min. RON = 91)		
Regular unleaded petrol (min. RON = 91 & < 50 ppm sulphur)		
Regular unleaded petrol (min. RON = 91 & < 10 ppm sulphur)		
Unleaded petrol (min. RON = 95)		
Unleaded petrol (min. RON = 95 & < 50 ppm sulphur)		
Unleaded petrol (min. RON = 95 & < 10 ppm sulphur)		
Unleaded petrol (95 =< RON < 98)		
Unleaded petrol (95 =< RON < 98 & < 50 ppm sulphur)		
Unleaded petrol (95 =< RON < 98 & < 10 ppm sulphur)		
Unleaded petrol (RON >= 98)		
Unleaded petrol (RON >= 98 & < 50 ppm sulphur)		
Unleaded petrol (RON >= 98 & < 10 ppm sulphur)		
Diesel fuel		
Diesel fuel (< 50 ppm sulphur)		
Diesel fuel (< 10 ppm sulphur)		

18.1.2.3 Geographical Availability of Sulphur Free Fuels

This is another area in which the format and detail of information provision is not specified in the Commission Decision. Whilst this is not critical at this time, as few Member States have introduced zero sulphur fuels, compliance with the Directive (following revisions agreed between the Council of Ministers and European Parliament in December 2002) in future years would require specific detail. The Directive amendment currently specifies that zero sulphur

fuel should be available "on an appropriately balanced geographical basis" from January 2005 in Member States, however how this is to be measured has not been addressed as yet.

Further thought needs to be given to this issue and the reporting format updated to reflect more clearly the information that Member States should provide in order to demonstrate compliance. To this end the European Commission has commissioned a piece of work which will address this issue and ensure the relevant guidance is in place before the end of 2004.

18.1.2.4 Petrol and Diesel Reporting Formats

Whilst the Commission Decision clearly outlines the format for reporting and the data that is required, it does not specifically request supporting information to explain any omissions, variances in test methods used or exceedances and their significance. Although it could be argued that Member States should naturally provide this information, in practice this has not been the case in many instances and further clarifications have still needed to be sought from some Member States for the 2003 submission.

A further complication for the 2002 submissions was that, although the limit value for the vapour pressure of petrol only applies to the summer period, in some cases it has been difficult to tell whether this has been exceeded or not. Where Member States have not presented separate information on summer and winter analysis (though not required), or specified the data applies to the summer only, it is not possible to see from the existing reporting format whether exceedances of this limit actually occurred within the summer period or not. In these cases it was necessary to seek clarification from Member States as to whether any of the summer period samples analysed exceeded the limit value. Cases where Member States have presented separate reporting tables for summer and winter periods in order to demonstrate compliance complicated analysis in 2002, however all Member States have provided combined tables in 2003 following recommendations from the last report.

In addition to this the Commission Decision does not stipulate that the reporting format for analysis is split into the same categories as those presented in the sales table. Some Member States have therefore presented aggregated sampling analysis data for all petrol or all diesel fuels. This has reduced the capacity for meaningful analysis of trends in different parameter values for different fuel grades, and for comparison of degrees of sampling across different grades. Separate reporting by fuel grade would be preferable.

Recommendations on revisions to the Reporting Format are presented in 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;
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 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;

However the new standard *does not:*

- Define what the appropriate geographical availability of sulphur free fuels should be, or how to measure this;
- Require that details are provided on any exceedances to limit values and/or tolerance limits, or action taken by the Member State in response to them;
- Require the need for detail on the different sulphur grades available (for petrol or diesel);
- Specify a requirement for receipt of submissions in a defined common electronic format.

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. We made a number of suggestions as to what these could ideally be in the 2001 Summary Report. These have been revisited and revised recommendations are as follows:

1) Description of Fuel Quality Monitoring System: more structured information needed on:
   a) Responsible organisations (sampling, analysis and overall reporting);
   b) Type of locations of sampling, e.g. refineries and terminals, distribution centres, refuelling stations, etc. (sampling at public and private refuelling stations is specified in the new European Standard);
   c) Time/frequency/occasion of sampling;
   d) Number of samples taken by sales category;
   e) Number of refineries serving the market, and number of sources of imported fuels;
   f) Test method specification in relation to those specified in Directive 98/70/EC (some matters may be measured by a number of different tests, with different tolerance limits), with any reasons for variation;
   g) Method of collection of sales data;
   h) Any other pertinent details (such as planned future revisions);

2) Total Sales of Petrol and Diesel:
   a) Further split the table so that all sulphur level and RON grade combinations are available (still not specified in the new European Standard);

b) Comments on availability and completeness of sales data (particularly with regards to how low sulphur fuel is marketed) and its relation to "national fuel grades";

3) *Geographic Availability of Zero Sulphur Fuels*: this area needs defining more clearly, more detail is needed on things such as, the percentage of fuel stations with the fuels available, regional spread or availability in cities vs rural areas (this is currently being investigated in another piece of work commissioned by the EC);
4) *Summer Period:* full description of national coverage and limits in addition to the mandatory period, i.e. 1st May to 30th September (vapour pressure limit 60.0 kPa), or 1st June to 31st August ("Arctic conditions", 70.0 kPa);
5) *Petrol & Diesel Reporting:*
   a) Report measurements of summer and winter vapour pressure separately for petrol (the new European Standard already specifies separate reporting periods for summer and winter);
   b) Require separate reporting tables for each marketed fuel type provided in the total sales table (the new European Standard only specifies separate reporting tables for different RON grades of petrol);
   c) Requirement to specify test method used, reasons for its use & the test reproducibility/tolerance limits (if different from that specified in the Directive);
   d) Provide full notes on any exceedances (number of samples exceeding the limit value, individual values for exceedances, statistical significance, action taken);
6) *Sample Sizes:* more information is needed to place the information in context for example number of refineries supplying the market, the number of different grades supplied and the number of different fuels imported (the new European Standard already defines the number of samples needed to ensure statistically significant coverage);
7) *Other*:
   a) Notes on points of significance, e.g. any omissions in the current reporting, revisions or planned revisions to the Fuel Quality Monitoring System;
   b) Submissions presented in a single defined electronic format (such as Microsoft Excel), or via a web input form.

The Excel reporting template recommended in the previous years report was submitted to the European Commission and Member States with a request that this template was used for reporting of 2002 data. The EC indicated they would like to invite Member States to supply this optional additional data in the 2002 round. An Excel template without the additional information sections was also prepared and sent out, for Member States who did not feel they were able to supply the additional information. The response to this request has already been discussed for the 2002 reporting round. This template has been revised (see Appendix 5) and we would suggest that this template would again be useful for the 2003 year's reporting. Revisions include first an introductory page that provides explanation/justification for the request of each type of optional additional information, and second, additional information on tolerance limits for the different test methods.

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 & 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	0.7	94.6	
		91					90.6	
Motor Octane Number (MON)	--	85		EN 25163	1993	0.9	84.5	
		81					80.5	
Vapour Pressure, DVPE								
--summer period (normal)	kPa		60	EN 13016-1	2000	2.9		61.7
--summer period (Arctic)	kPa		70	EN 13016-1	2000	2.9		71.7
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	6.8		22.0
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	1995	6.8		25.1
-- Aromatics	% (v/v)		42.0	ASTM D1319	1995	3.5		44.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.1		1.1
				EN 238	1996			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		7.3
-- 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			161
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998			54
				EN ISO 8754	1995			
				EN 24260	1994			54
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998			12
				EN ISO 8754	1995			
				EN 24260	1994			12
Lead content	g/l		0.005	EN 237	1996	2		1.2

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			845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	1988	Depends on test conditions		
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	0.29		13.3
Sulphur content	mg/kg		350	EN ISO 14596	1998	50		380
				EN ISO 8754	1995			
				EN 24260	1994			375
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998			54
				EN ISO 8754	1995			
				EN 24260	1994			54
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998			12
				EN ISO 8754	1995			
				EN 24260	1994			12

Appendix 3: 2002 Fuel Parameter Charts by Member State

CONTENTS

Introduction to Appendix 3 Figures

Included in this appendix are examples of measurements by Member State for parameters with the most common exceedances of the Directive 98/70/EC limit values for petrol and diesel.

Petrol Charts

The petrol charts are for the minimum RON 95 grade of petrol regular and low sulphur (< 50 ppm) only. The low sulphur petrol was available in Austria, Germany, Sweden and the UK, with regular petrol available in the remaining Member States.

Zero values:

- ***RON95 Petrol:*** Belgium and France did not carry out analysis for RON and MON at all.

Diesel Charts

The diesel charts are for the regular grade fuel (on sale in Austria, France, Greece, Italy, the Netherlands, Portugal and Spain) and low sulphur (< 50 ppm) fuel (Belgium, Denmark, Finland, Germany, Ireland, Luxembourg, the Netherlands and the UK). Sulphur free diesel (< 10 ppm) was only available in Sweden.

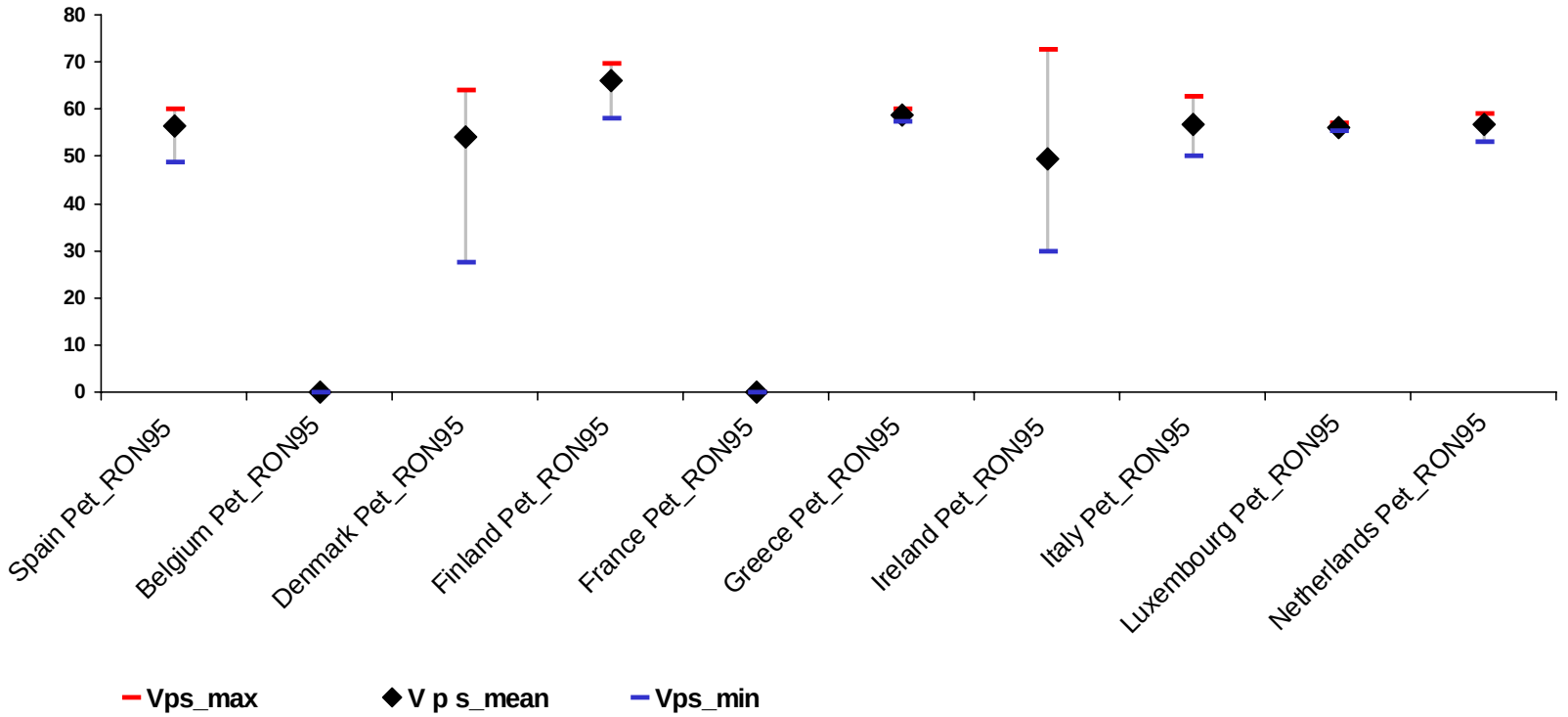
Zero values:

- ***Diesel:*** France did not carry out analysis for Distillation 95% point at all.

Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95

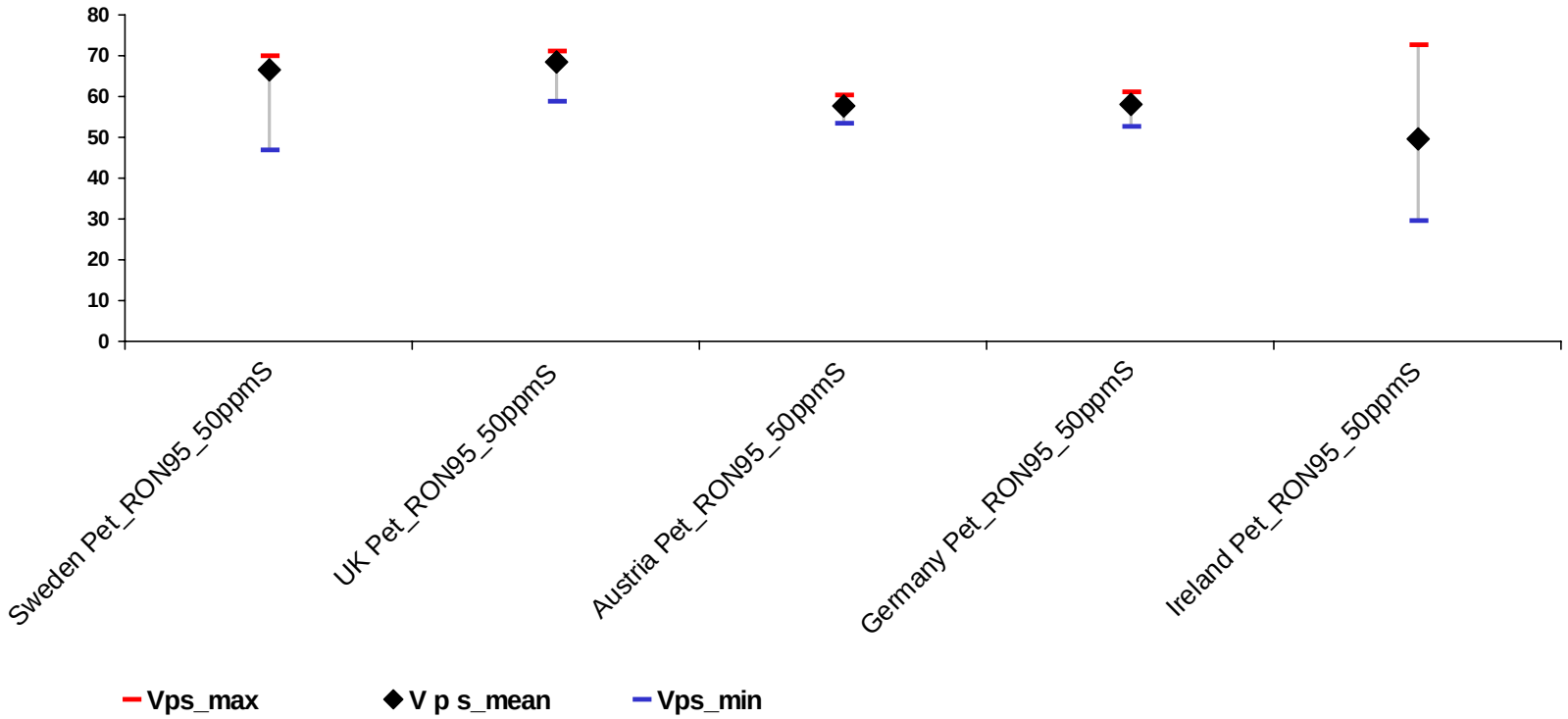
Vapour pressure Summer (max. limit = 60 kPa; exception: 70 kPa max for Fi, Ir, Se and UK)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95 (<50 ppm sulphur)

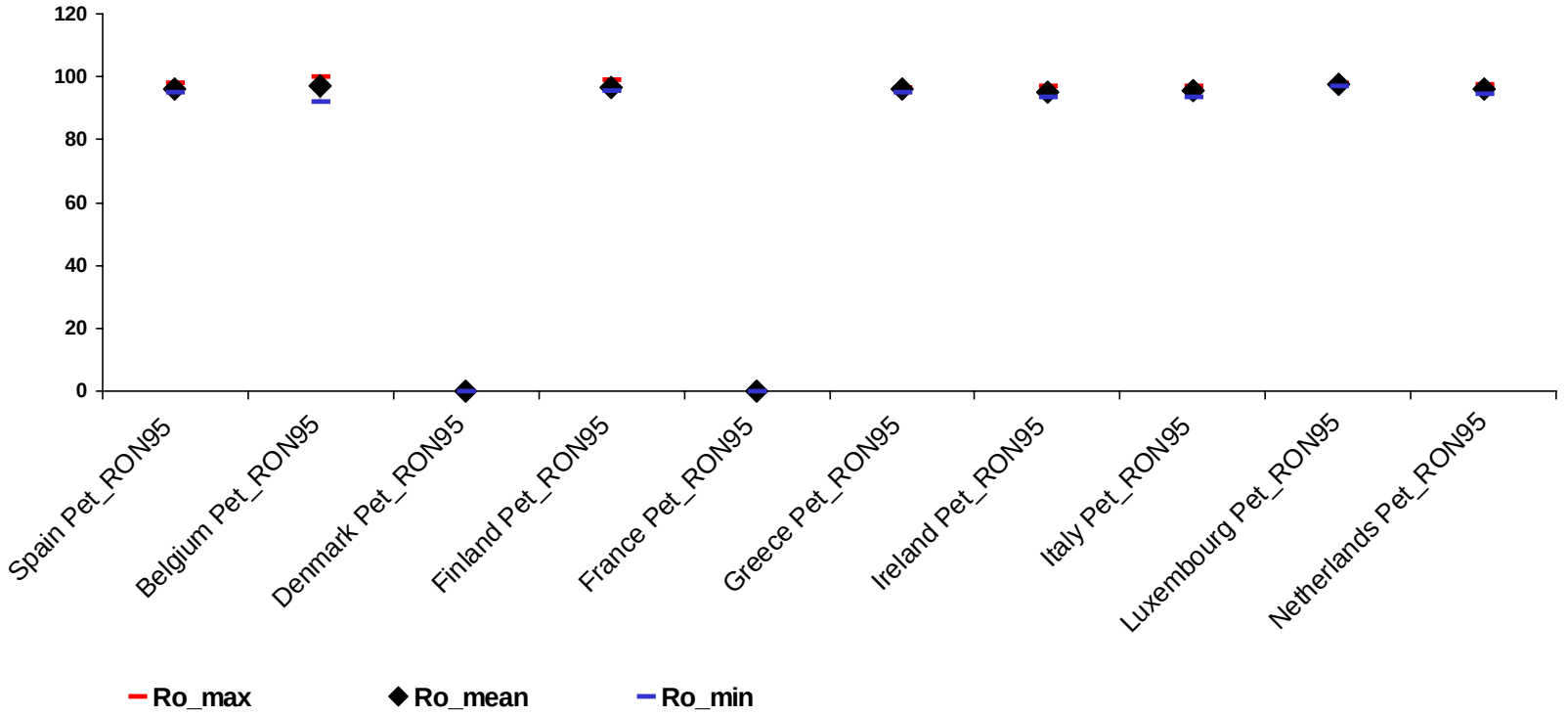
Vapour pressure Summer (max. limit = 60 kPa; exception: 70 kPa max for Fi, Ir, Se and UK)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95

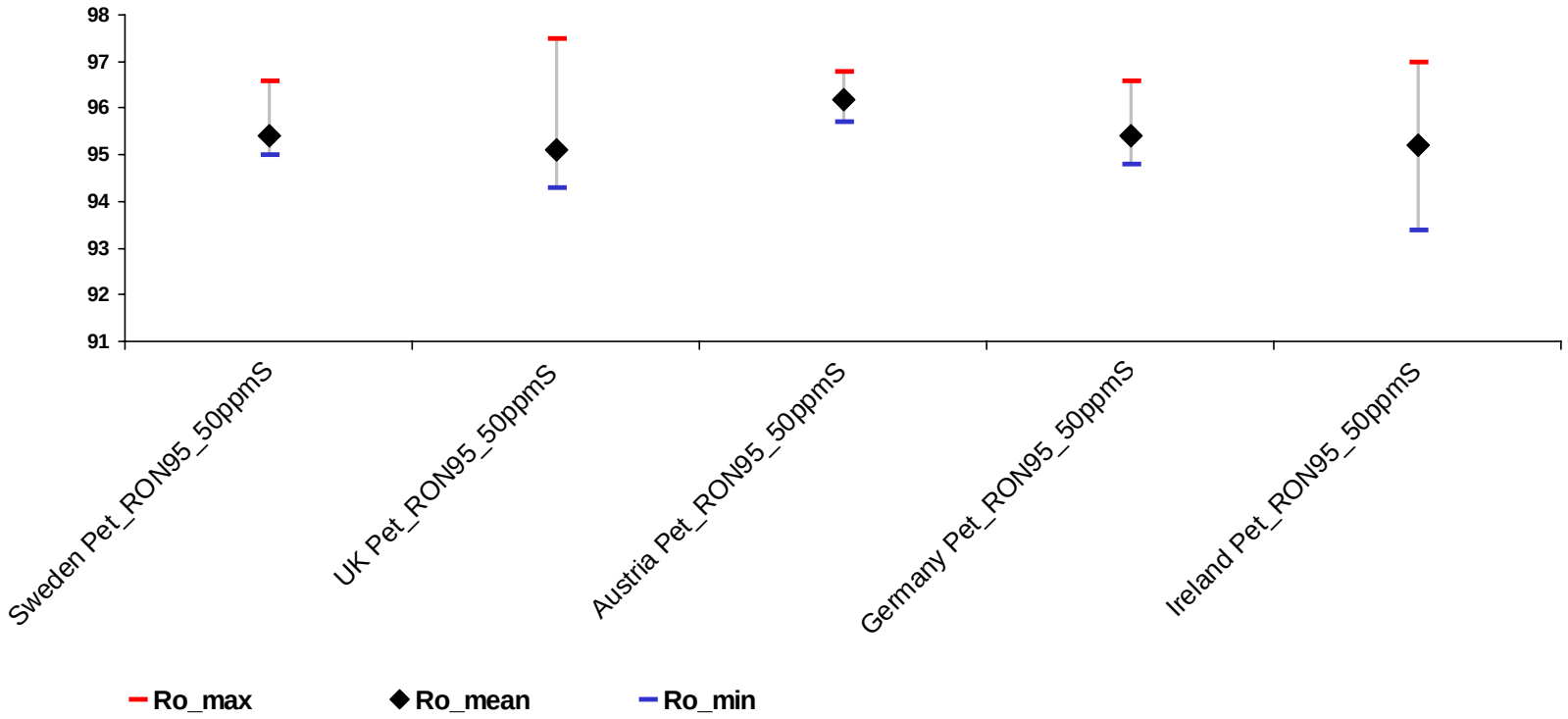
Research octane number (min. limit = 95)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95 (<50 ppm sulphur)

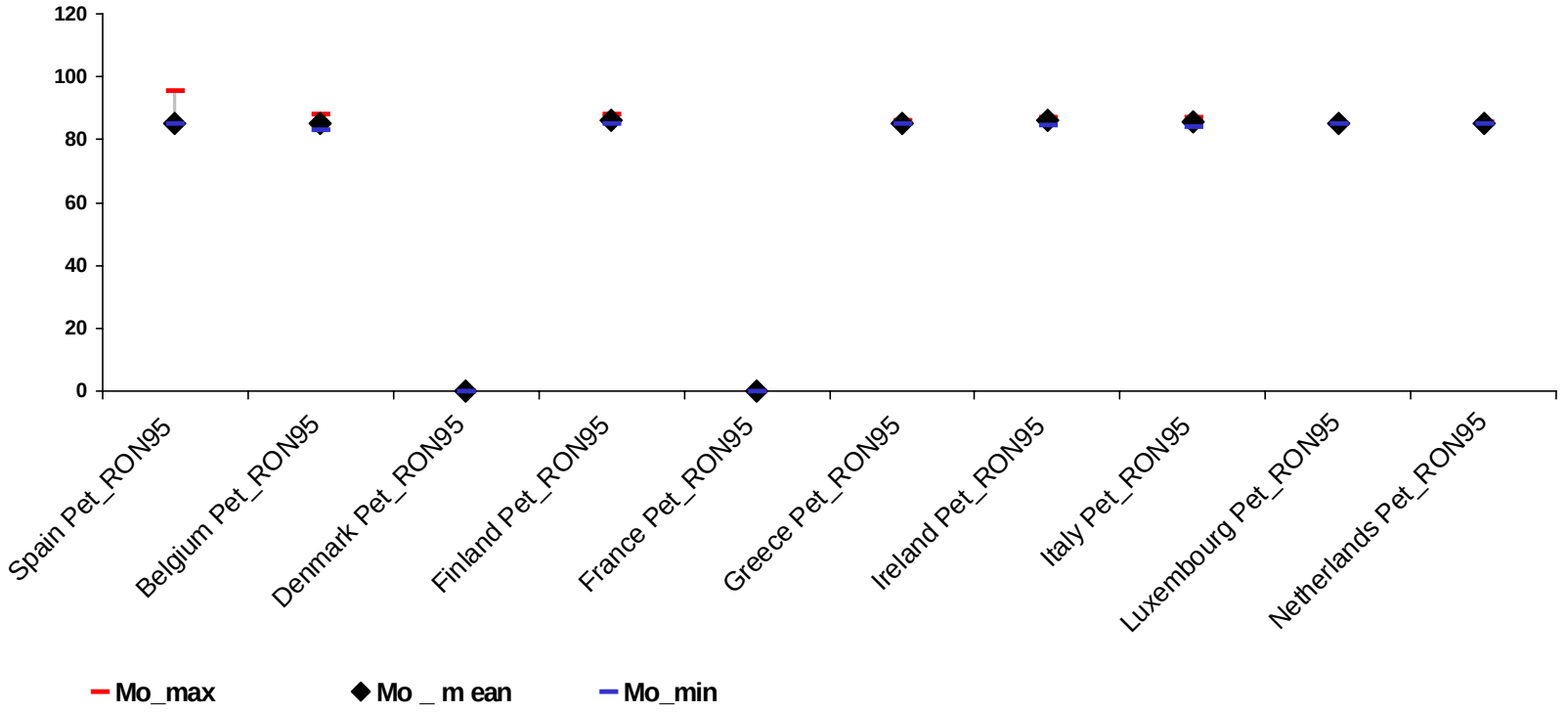
Research octane number (min. limit = 95)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95

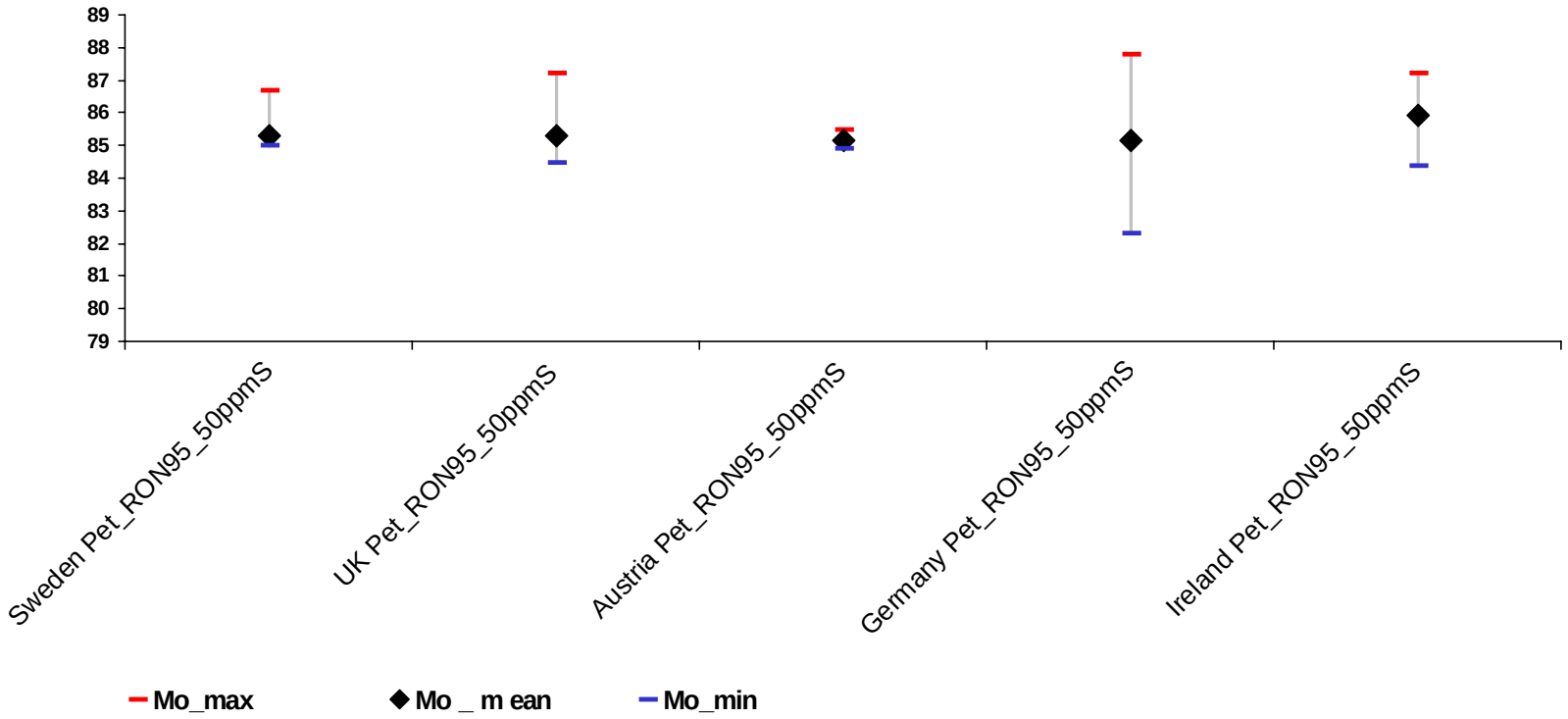
Motor octane number (min. limit = 85)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Unleaded petrol min. RON=95 (<50 ppm sulphur)

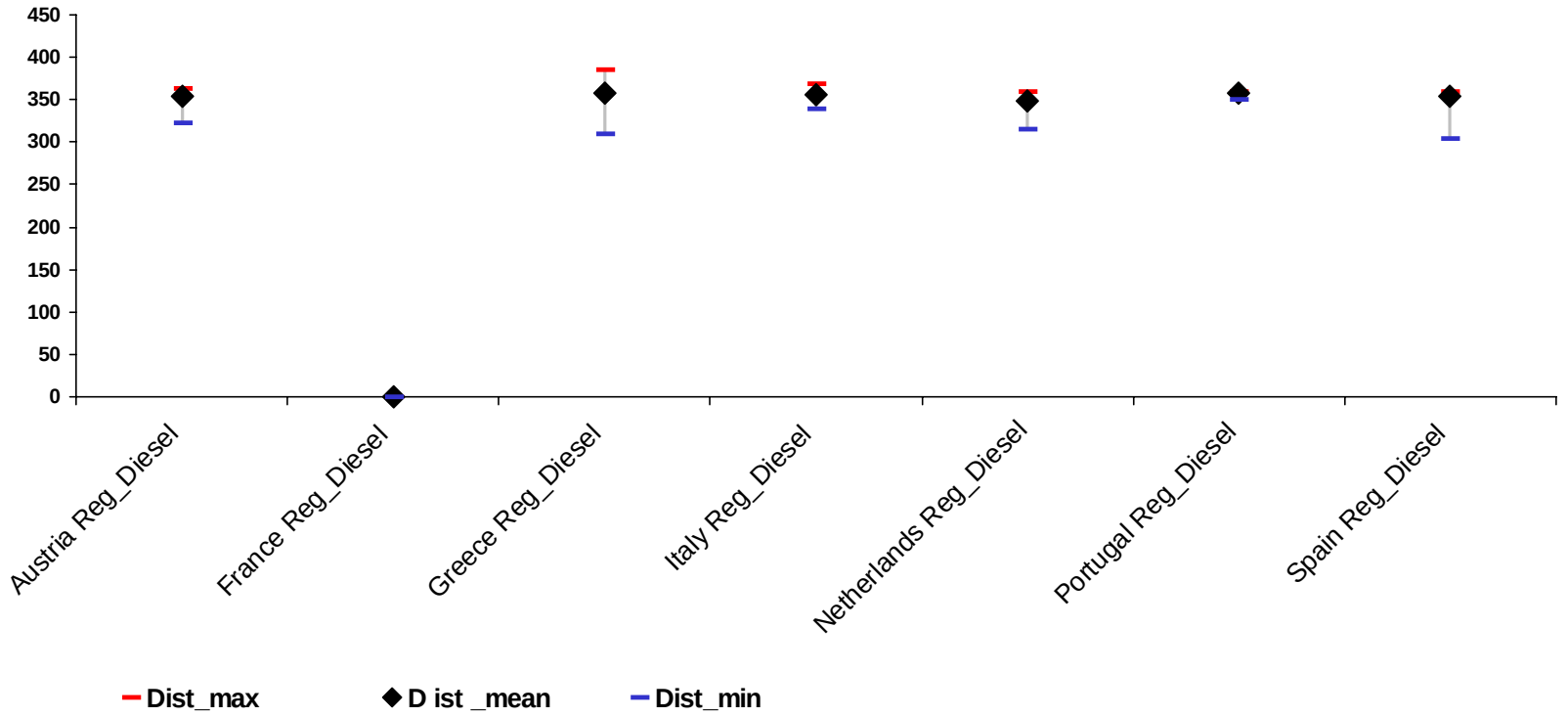
Motor octane number (min. limit = 85)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Diesel fuel

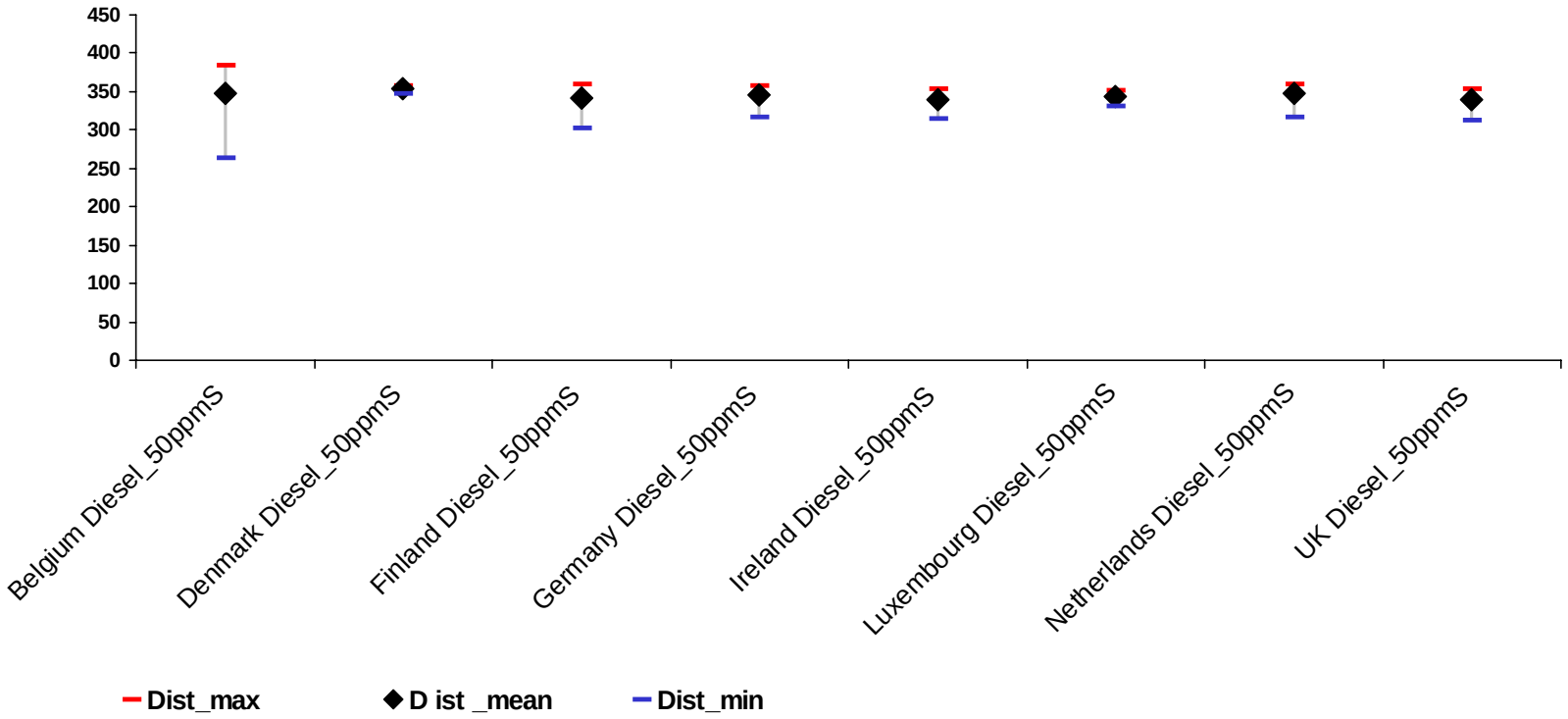
Distillation-95% point (max. limit = 360 C)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Diesel fuel (<50 ppm sulphur)

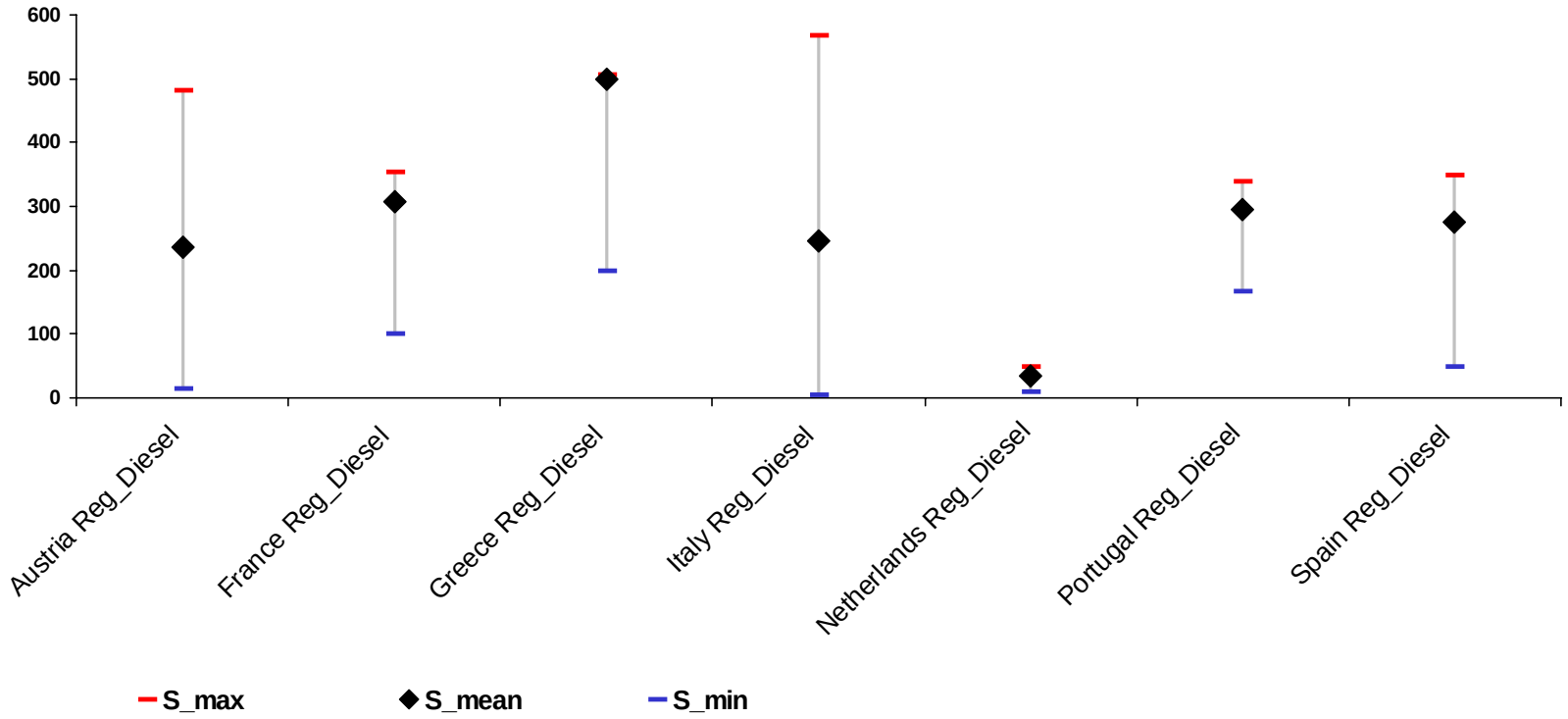
Distillation-95% point (max. limit = 360 C)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Diesel fuel

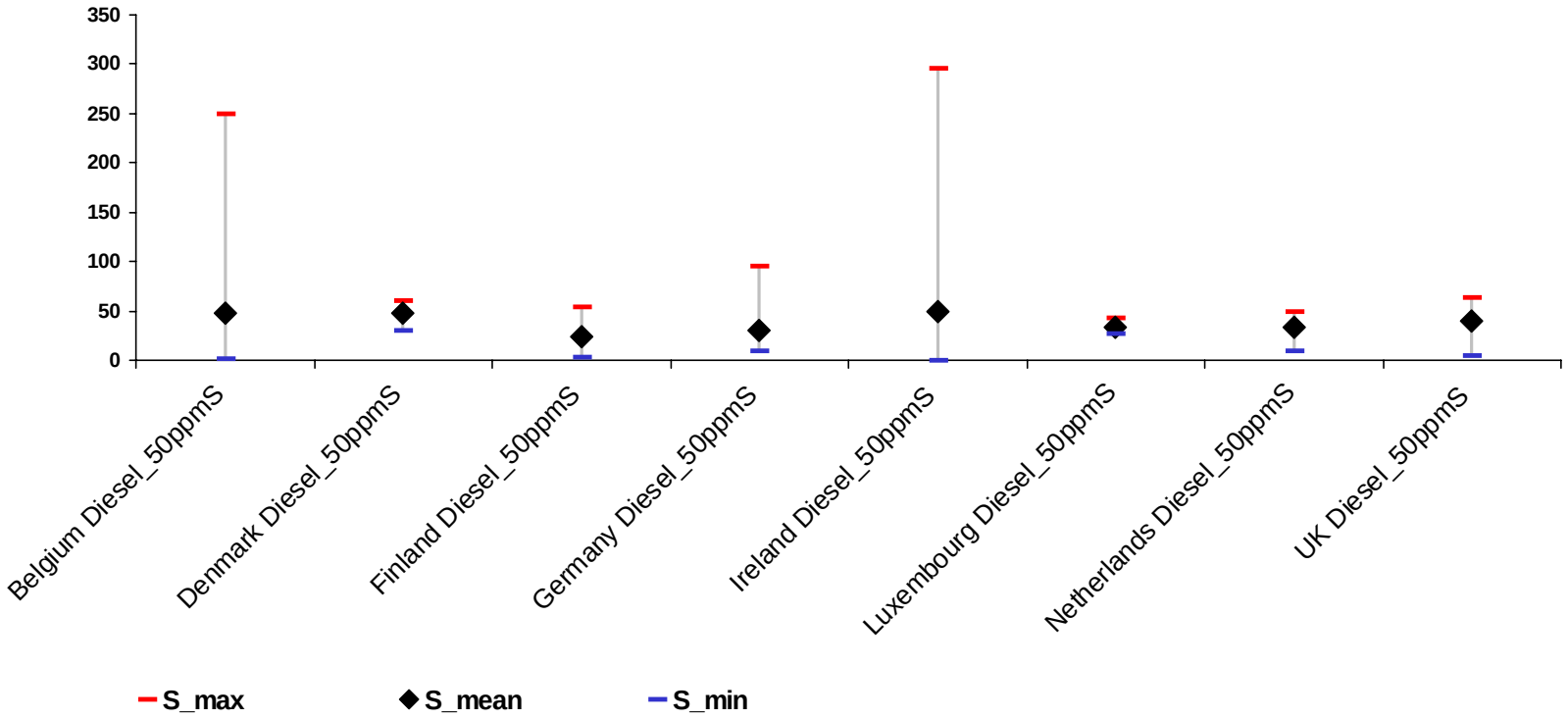
Sulphur content (max. limit = 350 ppm)



Variation in Fuel Parameter by Country and Fuel Grade

2002 Diesel fuel (<50 ppm sulphur)

Sulphur content (max. limit = 350 ppm)



Appendix 4: 2002 Member State Fuel Quality Submission Tables

CONTENTS

Introduction to Appendix 4 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:

Spain provided only separate reporting tables for summer and winter period sampling. In this cases 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 = $((m_1 \star n_1) + (m_2 \star n_2)) / N$

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

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: 2002

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade ON EN 228 "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.	--	40	91.8	93.2	92.5225	0.379937579	91	0	95	--
MOTOR OCTANE NO.	--	40	82.3	83	82.6925	0.150873525	82.5	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	20	56	59	57.12	0.897129927	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	40	52.2	66.6	56.5225	4.096933656	46	71	46.0	--
evaporated at 150	%(v/v)	40	80.2	93.1	85.2825	3.428529437	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	40	0.58	0.95	0.74975	0.07412697	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	40	0	0.2	0.115	0.042667468	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	10	40	22.85754041	7.300914654	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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

Country: Austria

Year: 2002

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

National Fuel Grade ON EN 228 "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.	--	40	95.7	96.8	96.195	0.296085573	95	0	95	--
MOTOR OCTANE NO.	--	40	84.9	85.5	85.16	0.117233057	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	20	53.3	60.2	57.68	1.64751807	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	40	49.2	62.7	53.55675	2.971756269	46	71	46.0	--
evaporated at 150	%(v/v)	40	79.7	91.5	85.38	2.347087666	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	40	0.48	0.85	0.76625	0.089834249	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	40	0.1	1	0.56075	0.231631754	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	5	41	14.79508279	8.323244783	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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

Country: Austria

Year: 2002

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

National Fuel Grade ON EN 228 "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	98.2	99.4	98.7425	0.296031443	98	0	95	--
MOTOR OCTANE NO.	--	40	87	88.4	88.0625	0.250831949	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	20	57.2	73.7	63.225	5.626055457	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	40	50.1	61	54.0225	2.603891319	46	71	46.0	--
evaporated at 150	%(v/v)	40	79.5	89.9	86.89	1.715509941	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	40	0.43	0.76	0.66725	0.073134491	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	40	1.2	2.6	2.326	0.277394471	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	1	15	3.648992078	2.434888016	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

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

Country: Belgium

Year: 2002

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.	--	1824	92.3	99.9	96.86	0.5694	95	0	95	--
MOTOR OCTANE NO.	--	65	83	88.3	85.21	0.9627	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	1832	40.9	67.8	51.81	3.48	46	0	46.0	--
evaporated at 150	%(v/v)	1498	72.3	97.8	86.91	2.655	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	823	1.2	25.5	10.42	3.877	0	18	--	18.0
aromatics	%(v/v)	823	19.7	50.9	36.65	3.934	0	42	--	42.0
benzene	%(v/v)	126	0.3	1.2	0.7	0.024	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	824	0	0.5	0	0	0	3	--	3
Ethanol	%(v/v)	824	0	0.3	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	824	0	0.6	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	824	0	3.4	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	824	0	0.4	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	824	0.05	13.8	2.25	2.3145	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	139	8	150	49.4	3.664	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Belgium

Year: 2002

FuelID: Unleaded petrol RON > 98

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.	--	2442	94.3	101.2	99.1	0.5866	98	0	95	--
MOTOR OCTANE NO.	--	130	81.7	88.8	87.6	0.9745	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	1013	48.7	75	58.6	0.109	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	2454	34.4	64.7	51.7	3.57	46	0	46.0	--
evaporated at 150	%(v/v)	1997	51.1	97.9	87.1	8.7348	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	1083	0.7	17.1	6.89	2.6916	0	18	--	18.0
aromatics	%(v/v)	1086	13.6	48.8	31.9	2.9364	0	35	--	42.0
benzene	%(v/v)	198	0.2	1	0.53	0.009	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	1099	0	0.5	0	3	0	0	--	3
Ethanol	%(v/v)	1099	0	0.5	0	5	0	0	--	5
Iso-propyl alcohol	%(v/v)	1099	0	3.6	0	10	0	0	--	10
Tetro-butyl alcohol	%(v/v)	1099	0	0.5	0	7	0	0	--	7
Iso-butyl alcohol	%(v/v)	1099	0	0.5	0	10	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	1095	0.1	16.2	9	15	0	0	--	15
Other oxygenate	%(v/v)	1099	0	3.7	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	192	2.6	80	33.5	1.527	0	50	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Denmark

Year: 2002

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	31.5	59	47.6	14.6	0	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	9	0.3	7.7	3.5	2.6	0	0	--	18.0
aromatics	%(v/v)	9	24.6	41.6	35.9	5.4	0	0	--	42.0
benzene	%(v/v)	9	0.62	0.96	0.84	0.11	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)	9	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	9	3	110	52	43	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for ether content is 0.1 %v/v (values reported as 0 therefore fall in the range 0-0.1 %v/v).

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

Country: Denmark

Year: 2002

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	11	27.6	64.1	54.1	10.5	0	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	21	0.3	5.4	2.2	1.4	0	0	--	18.0
aromatics	%(v/v)	21	33	42.5	38.3	2.7	0	0	--	42.0
benzene	%(v/v)	21	0.24	0.99	0.78	0.21	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)	21	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	21	1	153	37	34	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for ether content is 0.1 %v/v (values reported as 0 therefore fall in the range 0-0.1 %v/v).

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

Country: Denmark

Year: 2002

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	40.1	50.9	45	5.5	0	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	9	0.6	2.5	1.3	0.7	0	0	--	18.0
aromatics	%(v/v)	9	38.4	47.2	42.3	2.7	0	0	--	42.0
benzene	%(v/v)	9	0.22	0.94	0.79	0.22	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)	9	0.04	8.9	5.5	3	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	9	14	49	28	11	0	0	--	150
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Finland

Year: 2002

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.	--	94	95.4	99.2	96.4	0.7	0	0	95	--
MOTOR OCTANE NO.	--	94	85	88.1	86	0.5	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	50	58.1	69.7	65.9	2	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	98	47.8	67.9	54.7	3.6	0	0	46.0	--
evaporated at 150	%(v/v)	98	80.3	91.5	87.2	2.7	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	98	4.4	12.5	8.1	1.7	0	0	--	18.0
aromatics	%(v/v)	98	22.6	34.9	29.3	2.6	0	0	--	42.0
benzene	%(v/v)	98	0.5	1.1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	98	1.8	2.4	2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	98	0	2	0	0.3	0	0	--	3
Ethanol	%(v/v)	98	0	1.3	0.5	0.1	0	0	--	5
Iso-propyl alcohol	%(v/v)	98	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	98	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	98	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	98	5.7	14.4	11.5	1.1	0	0	--	15
Other oxygenate	%(v/v)	98	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	98	12	137.4	57.2	30.2	0	0	--	150
LEAD CONTENT	g/l	98	0	0.0007	0.0004	0.0002	0	0	--	0.005

Notes:

The limit of detection for oxygenate measurements is 0.5 %v/v (values reported as 0 therefore fall in the range 0-0.5 %v/v).
The limit of detection for lead measurements is 0.0002 g/l

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

Country: Finland

Year: 2002

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.	--	87	96.5	100.5	98.9	0.5	0	0	95	--
MOTOR OCTANE NO.	--	87	86.3	88.3	87.8	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	47	57.8	69.9	64.4	3	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	92	45.2	62	52.1	4	0	0	46.0	--
evaporated at 150	%(v/v)	92	77.7	92.8	87.8	3.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	92	4.1	17.5	7.9	2	0	0	--	18.0
aromatics	%(v/v)	92	26.9	38.3	31.2	1.8	0	0	--	42.0
benzene	%(v/v)	92	0.5	1.1	0.8	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	92	1.8	2.9	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	92	0	1.5	0	0.1	0	0	--	3
Ethanol	%(v/v)	92	0	3.8	0	1.2	0	0	--	5
Iso-propyl alcohol	%(v/v)	92	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	92	0	4	0	0.8	0	0	--	7
Iso-butyl alcohol	%(v/v)	92	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	92	4.6	16.5	11.6	2.5	0	0	--	15
Other oxygenate	%(v/v)	92	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	92	5	72.4	25.8	16.6	0	0	--	150
LEAD CONTENT	g/l	92	0	0.0008	0.0004	0.0002	0	0	--	0.005

Notes:

The limit of detection for oxygenate measurements is 0.5 %(v/v)
The limit of detection for lead measurements is 0.0002 g/l

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

Country: France

Year: 2002

FuelID: Unleaded petrol min. RON=95

National Fuel Grade SP 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	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	30	51	60	54.12	0	0	71	46.0	--
evaporated at 150	%(v/v)	30	81	91	88.97	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	30	0.3	0.8	0.62	0	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	30	50	150	109.33	0	0	0	--	150
LEAD CONTENT	g/l	30	0	0.005	0.012	0	0	0	--	0.005

Notes:

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

Country: France

Year: 2002

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Supercarburant ARS

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	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	25	48	60	52.9	0	0	71	46.0	--
evaporated at 150	%(v/v)	25	86.3	91.5	88.8	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	25	0.3	0.8	0.57	0	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	25	60	150	108	0	0	0	--	150
LEAD CONTENT	g/l	25	0	0.005	0	0	0	0	--	0.005

Notes:

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

Country: France

Year: 2002

FuelID: Unleaded petrol RON > 98

National Fuel Grade SP98

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	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	33	48	60	52.81	0	0	71	46.0	--
evaporated at 150	%(v/v)	33	86	91	88.71	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	33	0.3	0.8	0.54	0	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	33	10	150	91.94	0	0	0	--	150
LEAD CONTENT	g/l	33	0	0.005	0.0015	0	0	0	--	0.005

Notes:

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

Country: Germany

Year: 2002

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

National Fuel Grade Normal, schwefelarm

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.	--	54	91.4	95.7	92.72	0.6	91	0	95	--
MOTOR OCTANE NO.	--	92	82.3	85.4	82.87	0.3	82.5	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	44	56.1	61.4	58.2	1.4	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	82	46.2	67.2	57.2	4.6	0	0	46.0	--
evaporated at 150	%(v/v)	82	79.9	93.9	85.5	3.2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	83	3.5	19.9	12.28	2	0	21	--	18.0
aromatics	%(v/v)	94	21.8	38.9	30	3.6	0	0	--	42.0
benzene	%(v/v)	101	0.2	1	0.77	0.12	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	81	0.1	0.5	0.1	0.06	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	81	0.1	0.2	0.1	0	0	0	--	3
Ethanol	%(v/v)	81	0.1	0.5	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	81	0.1	0.5	0.1	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	81	0.1	0.5	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	81	0.1	0.5	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	82	0.1	2	0.22	0	0	0	--	15
Other oxygenate	%(v/v)	81	0	0.1	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	129	10	49	24.9	9.2	0	50	--	150
LEAD CONTENT	g/l	23	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Germany

Year: 2002

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

National Fuel Grade Super, schwefelarm

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.	--	49	94.8	96.6	95.4	0.5	0	0	95	--
MOTOR OCTANE NO.	--	156	82.3	87.8	85.15	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	50	52.7	61	58	1.2	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	129	47	62.3	54.3	3.8	0	0	46.0	--
evaporated at 150	%(v/v)	129	76.3	94	86.8	1.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	123	1	19.5	9.5	2.4	0	0	--	18.0
aromatics	%(v/v)	139	22.8	41.8	32.8	3.9	0	0	--	42.0
benzene	%(v/v)	170	0.2	1	0.65	0.15	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	115	0.1	2	0.54	0.21	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	122	0.1	0.3	0.1	0	0	0	--	3
Ethanol	%(v/v)	122	0.1	0.7	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	122	0.1	0.2	0.1	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	122	0.1	0.7	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	122	0.1	0.7	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	130	0.1	11.1	2.48	0	0	0	--	15
Other oxygenate	%(v/v)	122	0.1	1	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	185	10	50	22.1	7	0	50	--	150
LEAD CONTENT	g/l	30	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Germany

Year: 2002

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.	--	32	92.2	99.4	98.2	2.6	98	0	95	--
MOTOR OCTANE NO.	--	106	87.5	89.1	88.2	0.2	88	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	31	53.6	71.4	58.5	2.8	45	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	80	46.2	61	52.8	2.1	0	0	46.0	--
evaporated at 150	%(v/v)	80	75.4	90.8	86.5	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	77	1	11.6	2.9	3	0	0	--	18.0
aromatics	%(v/v)	83	23.6	42	35.4	4.5	0	0	--	42.0
benzene	%(v/v)	111	0.1	1	0.55	0.22	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	69	0.85	2.6	1.77	0.4	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	72	0.1	0.3	0.1	0	0	0	--	3
Ethanol	%(v/v)	72	0.1	0.1	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	72	0.1	0.1	0.1	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	72	0.1	0.1	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	72	0.1	0.1	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	72	4.7	14.1	10.1	2.1	0	0	--	15
Other oxygenate	%(v/v)	72	0	0.1	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	104	10	48	10	3.2	0	10	--	150
LEAD CONTENT	g/l	12	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Greece

Year: 2002

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.	--	82	95	96.6	95.9	0.61	0	0	95	--
MOTOR OCTANE NO.	--	82	85	86.1	85.1	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	48	57.4	60	58.9	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	82	49	66	60.1	3.7	0	0	46.0	--
evaporated at 150	%(v/v)	82	82	92	89.1	2.4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	82	2.1	14	11	2.8	0	0	--	18.0
aromatics	%(v/v)	82	15	39	28.6	3.1	0	0	--	42.0
benzene	%(v/v)	82	0.6	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	82	0	1.4	0.8	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	82	0	8.5	4.5	2.6	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	82	10	150	70	40	0	0	--	150
LEAD CONTENT	g/l	82	0.001	0.005	0.002	0.001	0	0	--	0.005

Notes:

0

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

Country: Greece

Year: 2002

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.	--	69	96	99.1	98.2	0.5	0	0	95	--
MOTOR OCTANE NO.	--	69	85.5	86.5	86.1	0.1	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	69	48	77.5	59.8	5.7	0	0	46.0	--
evaporated at 150	%(v/v)	69	78	92	88.1	3.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	68	6.5	17.9	10	2.3	0	0	--	18.0
aromatics	%(v/v)	68	26.5	40	32.3	3.3	0	0	--	42.0
benzene	%(v/v)	68	0.6	0.99	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	56	0	2.2	1.7	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	56	0	13.4	9.8	2.9	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	668	20	150	94	34	0	0	--	150
LEAD CONTENT	g/l	69	0	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: 2002

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Unleaded 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.	--	63	93.4	97	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	63	84.4	87.2	85.9	0.48	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	14	29.8	72.6	49.6	12.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	64	38.2	63.7	51.4	6.6	0	0	46.0	--
evaporated at 150	%(v/v)	64	77.3	96.9	90	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	64	1.8	21.2	12.6	4.9	0	0	--	18.0
aromatics	%(v/v)	64	23.6	42.6	31.8	5.2	0	0	--	42.0
benzene	%(v/v)	64	0.1	1.2	0.65	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	64	0	0.82	0.06	0.14	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	64	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	64	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	64	0	4.6	0.35	0.79	0	0	--	15
Other oxygenate	%(v/v)	64	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	64	0	141	57.1	45.8	0	0	--	150
LEAD CONTENT	g/l	64	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Ireland

Year: 2002

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

National Fuel Grade Unleaded Petrol

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification Min.	National Specification Max.	EC Limit values Min.	EC Limit values Max.
RESEARCH OCTANE NO.	--	63	93.4	97	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	63	84.4	87.2	85.9	0.48	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	14	29.8	72.6	49.6	12.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	64	38.2	63.7	51.4	6.6	0	0	46.0	--
evaporated at 150	%(v/v)	64	77.3	96.9	90	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	64	1.8	21.2	12.6	4.9	0	0	--	18.0
aromatics	%(v/v)	64	23.6	42.6	31.8	5.2	0	0	--	42.0
benzene	%(v/v)	64	0.1	1.2	0.65	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	64	0	0.82	0.06	0.14	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	64	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	64	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	64	0	4.6	0.35	0.79	0	0	--	15
Other oxygenate	%(v/v)	64	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	64	0	141	57.1	45.8	0	0	--	150
LEAD CONTENT	g/l	64	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Ireland

Year: 2002

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

National Fuel Grade Unleaded 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.	--	63	93.4	97	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	63	84.4	87.2	85.9	0.48	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	14	29.8	72.6	49.6	12.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	64	38.2	63.7	51.4	6.6	0	0	46.0	--
evaporated at 150	%(v/v)	64	77.3	96.9	90	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	64	1.8	21.2	12.6	4.9	0	0	--	18.0
aromatics	%(v/v)	64	23.6	42.6	31.8	5.2	0	0	--	42.0
benzene	%(v/v)	64	0.1	1.2	0.65	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	64	0	0.82	0.06	0.14	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	64	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	64	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	64	0	4.6	0.35	0.79	0	0	--	15
Other oxygenate	%(v/v)	64	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	64	0	141	57.1	45.8	0	0	--	150
LEAD CONTENT	g/l	64	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Ireland

Year: 2002

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Unleaded 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.	--	63	93.4	97	95.2	0.63	0	0	95	--
MOTOR OCTANE NO.	--	63	84.4	87.2	85.9	0.48	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	14	29.8	72.6	49.6	12.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	64	38.2	63.7	51.4	6.6	0	0	46.0	--
evaporated at 150	%(v/v)	64	77.3	96.9	90	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	64	1.8	21.2	12.6	4.9	0	0	--	18.0
aromatics	%(v/v)	64	23.6	42.6	31.8	5.2	0	0	--	42.0
benzene	%(v/v)	64	0.1	1.2	0.65	0.23	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	64	0	0.82	0.06	0.14	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	64	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	64	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	64	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	64	0	4.6	0.35	0.79	0	0	--	15
Other oxygenate	%(v/v)	64	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	64	0	141	57.1	45.8	0	0	--	150
LEAD CONTENT	g/l	64	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Italy

Year: 2002

FuelID: Unleaded petrol min. RON=95

National Fuel Grade -

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.	--	375	93.4	97.3	95.5	0.55	95	0	95	--
MOTOR OCTANE NO.	--	184	84.2	87	85.4	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	180	50	62.9	56.7	2.39	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	185	44	70	53.1	5.88	46	71	46.0	--
evaporated at 150	%(v/v)	130	80	94	87	3.04	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	345	0.4	19.4	8.3	4.85	0	18	--	18.0
aromatics	%(v/v)	345	15.3	41.5	32.6	4.06	0	40	--	42.0
benzene	%(v/v)	375	0.2	1	0.8	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	373	0	2.5	0.5	0.51	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)	373	0	13.5	3	2.85	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	325	1	152	51	32.1	0	150	--	150
LEAD CONTENT	g/l	15	0	<0.005	0	0	0	0.005	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: Luxembourg

Year: 2002

FuelID: Regular unleaded petrol min. RON=91

National Fuel Grade Essence normale non plombée (IOR minimal = 91)

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	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	0	0	0	0	0	0	46.0	--
evaporated at 150	%(v/v)	0	0	0	0	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	0	0	0	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0	0	0	0	0	0	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Luxembourg

Year: 2002

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Essence sans plomb (IOR minimal = 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.	--	6	96.9	98	97.6	0	0	0	95	--
MOTOR OCTANE NO.	--	6	85	85.3	85.1	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	4	55.4	57	56.2	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	8	47.3	56	50.3	0	0	0	46.0	--
evaporated at 150	%(v/v)	8	83.8	86.8	85	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	42.0
benzene	%(v/v)	6	0.6	0.7	0.6	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	30	61	45	0	0	0	--	150
LEAD CONTENT	g/l	4	3	3	3	0	0	0	--	0.005

Notes:

0

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

Country: Luxembourg

Year: 2002

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

National Fuel Grade Essence sans plomb (IOR >= 98, teneur en soufre < 50 ppm)

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.	--	6	99	99.7	99.4	0	0	0	95	--
MOTOR OCTANE NO.	--	6	87.9	88.2	88.1	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	4	55.8	59.8	57.5	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	8	46.1	53.2	50.25	0	0	0	46.0	--
evaporated at 150	%(v/v)	8	83.9	87.8	86.25	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0	0	0	0	0	0	--	18.0
aromatics	%(v/v)	7	26.9	35	32.2	0	0	0	--	42.0
benzene	%(v/v)	6	0.3	0.6	0.41	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	19	40	26.3	0	0	0	--	150
LEAD CONTENT	g/l	4	3	3	3	0	0	0	--	0.005

Notes:

0

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

Country: Netherlands

Year: 2002

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.	--	81	94.8	97.5	96.2	0	0	0	95	--
MOTOR OCTANE NO.	--	81	85	85.8	85.2	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	50	53.1	59.1	56.84	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	81	44.1	82.1	50.8	0	0	0	46.0	--
evaporated at 150	%(v/v)	81	75.9	94.7	87.6	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	81	0.4	12.1	6.9	0	0	0	--	18.0
aromatics	%(v/v)	81	29.5	41.9	37	0	0	0	--	42.0
benzene	%(v/v)	81	0.2	1	0.7	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	81	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	81	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	81	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	81	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	81	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	81	0.1	7	3.5	0	0	0	--	15
Other oxygenate	%(v/v)	81	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	81	5	114	59.5	0	0	0	--	150
LEAD CONTENT	g/l	81	0	0	0	0	0	0	--	0.005

Notes:

The limit of detection for test method for oxygenates content is 0.1 %v/v (values reported as 0 therefore fall in the range 0-0.1 %v/v).
The limit of detection for test method for lead content is 0.002 g/l (values reported as 0 therefore fall in the range 0-0.002 g/l).

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

Country: Netherlands

Year: 2002

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.	--	81	94.8	97.5	96.2	0	0	0	95	--
MOTOR OCTANE NO.	--	81	85	85.8	85.2	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	50	53.1	59.1	56.84	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	81	44.1	82.1	50.8	0	0	0	46.0	--
evaporated at 150	%(v/v)	81	75.9	94.7	87.6	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	81	0.4	12.1	6.9	0	0	0	--	18.0
aromatics	%(v/v)	81	29.5	41.9	37	0	0	0	--	42.0
benzene	%(v/v)	81	0.2	1	0.7	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	81	0	0	0.1	0	0	0	--	3
Ethanol	%(v/v)	81	0	0	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	81	0	0	0.1	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	81	0	0	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	81	0	0	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	81	0.1	7	3.5	0	0	0	--	15
Other oxygenate	%(v/v)	81	0	0	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	81	5	114	59.5	0	0	0	--	150
LEAD CONTENT	g/l	81	0	0	0.002	0	0	0	--	0.005

Notes:

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

Country: Portugal

Year: 2002

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.	--	12	95	97	95.6	0.65	95	0	95	--
MOTOR OCTANE NO.	--	12	85	85	85	0	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	8	54.6	60	58.1	1.92	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	12	46	52.8	48.9	2.12	46	71	46.0	--
evaporated at 150	%(v/v)	12	78.5	88.7	83.2	3.46	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	6.2	15.9	10.1	2.98	0	18	--	18.0
aromatics	%(v/v)	12	28.4	39.6	35.9	3.46	0	42	--	42.0
benzene	%(v/v)	12	0.7	1	0.9	0.09	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	0.04	1.5	0.4	0.4	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	5	--	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)	0	0	0	0	0	0	15	--	15
Other oxygenate	%(v/v)	12	1	8.3	2.37	2.23	0	10	--	10
SULPHUR CONTENT	mg/kg	47	26	144	56.5	34.3	0	150	--	150
LEAD CONTENT	g/l	3	0.005	0.005	0.005	0	0	0.005	--	0.005

Notes:

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

Country: Portugal

Year: 2002

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.	--	12	95	97	95.6	0.65	95	0	95	--
MOTOR OCTANE NO.	--	12	85	85	85	0	85	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	8	54.6	60	58.1	1.92	45	60	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	12	46	52.8	48.9	2.12	46	71	46.0	--
evaporated at 150	%(v/v)	12	78.5	88.7	83.2	3.46	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	6.2	15.9	10.1	2.98	0	18	--	18.0
aromatics	%(v/v)	12	28.4	39.6	35.9	3.46	0	42	--	42.0
benzene	%(v/v)	12	0.7		0.9	0.09	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	12	0.04	1.5	0.4	0.4	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	0	--	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	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	15	--	15
Other oxygenate	%(v/v)	12	1	8.3	2.37	2.23	0	10	--	10
SULPHUR CONTENT	mg/kg	47	26	144	56.5	34.3	0	150	--	150
LEAD CONTENT	g/l	3	0.005	0.005	0.005	0	0	0.005	--	0.005

Notes:

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

Country: Portugal

Year: 2002

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.	--	7	98	99	98.4	0.53	98	0	95	--
MOTOR OCTANE NO.	--	7	87	87.1	87	0.03	87	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	3	53.2	59.1	55.4	3.24	45	65	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	7	46.6	55.4	51.9	2.98	46	71	46.0	--
evaporated at 150	%(v/v)	7	76.1	89.5	82	4.51	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	4.4	10.6	7.5	2.33	0	18	--	18.0
aromatics	%(v/v)	7	27.7	39.6	36.7	4.23	0	42	--	42.0
benzene	%(v/v)	7	0.6	1	0.9	0.16	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	7	1.4	2.7	1.9	0.43	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
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)	7	9	15	11.6	2.4	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	35	25	150	58.3	30.1	0	150	--	150
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes:

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

Country: Spain

Year: 2002

FuelID: Unleaded petrol min. RON=95

National Fuel Grade Gasolina I.O. 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.	--	267	95	98.2	96.1	0.598871118	0	0	95	--
MOTOR OCTANE NO.	--	267	85	95.5	85.3	0.723374507	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	99	48.9	60	56.4	3	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	267	46	66.2	54.2505618	5.090404507	0	71	46.0	--
evaporated at 150	%(v/v)	267	78.6	98.3	90.23258427	3.550627393	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	267	0	18	12.84831461	3.620498242	0	0	--	18.0
aromatics	%(v/v)	267	18.2	42	33.8191	6.208077445	0	0	--	42.0
benzene	%(v/v)	267	0.4	1	0.8	0.199623706	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	267	0.1	2.2	0.474157303	0.339781	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	267	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	267	0	0.3	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	267	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	267	0	0.1	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	267	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	267	0	12.3	2.633707865	1.92749204	0	0	--	15
Other oxygenate	%(v/v)	267	0	0.2	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	267	50	150	104.8876404	36.93038564	0	0	--	150
LEAD CONTENT	g/l	267	0	0.003	0.001	0	0	0	--	0.005

Notes:

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

Country: Spain

Year: 2002

FuelID: Unleaded petrol 95 =< RON < 98

National Fuel Grade Gasolina I.O. 97

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.	--	257	97	98.8	97.3	0.299413489	0	0	95	--
MOTOR OCTANE NO.	--	257	85	87.3	85.7	0.464354391	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	96	46.1	60	57.1	3.3	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	257	46	70.9	54.47937743	4.491202338	0	71	46.0	--
evaporated at 150	%(v/v)	257	77.6	95.4	90.12762646	3.449071433	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	257	5.5	18	13.72645914	3.130838296	0	0	--	18.0
aromatics	%(v/v)	257	21.8	42	34.08327	5.902594768	0	0	--	42.0
benzene	%(v/v)	257	0.4	1	0.8	0.199608993	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	257	0.1	2.2	0.937354086	0.365237508	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	257	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	257	0	0.4	0	0.099804496	0	0	--	5
Iso-propyl alcohol	%(v/v)	257	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	257	0	0.3	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	257	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	257	0.2	13.4	5.086770428	2.329666017	0	0	--	15
Other oxygenate	%(v/v)	257	0	0.7	0	0.079056942	0	0	--	10
SULPHUR CONTENT	mg/kg	257	50	150	105.5058366	35.47336148	0	0	--	150
LEAD CONTENT	g/l	257	0	0.003	0.001	0	0	0	--	0.005

Notes:

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

Country: Spain

Year: 2002

FuelID: Unleaded petrol RON > 98

National Fuel Grade Gasolina I.O. 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.	--	249	98	99.8	99	0.399192734	0	0	95	--
MOTOR OCTANE NO.	--	249	85	88	87.14779116	0.436213546	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	60
Summer period	kPa	92	50	60	57.8	2.7	0	0	--	60
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	249	46.1	66.2	54.3502008	4.283252269	0	71	46.0	--
evaporated at 150	%(v/v)	249	77.4	95.7	89.80441767	3.695938268	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	249	5.5	18	12.01967871	3.346158124	0	0	--	18.0
aromatics	%(v/v)	249	22	42	34.72169	6.207913134	0	0	--	42.0
benzene	%(v/v)	249	0.3	1	0.736947791	0.199596367	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	249	0.6	2.7	1.736947791	0.399192734	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	249	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	249	0	0.7	0.1	0.144802424	0	0	--	5
Iso-propyl alcohol	%(v/v)	249	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	249	0	0.4	0	0.099798183	0	0	--	7
Iso-butyl alcohol	%(v/v)	249	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	249	3.3	14.9	9.584738956	2.259103448	0	0	--	15
Other oxygenate	%(v/v)	249	0	0.8	0	0.079311554	0	0	--	10
SULPHUR CONTENT	mg/kg	249	50	150	89.73895582	34.30243808	0	0	--	150
LEAD CONTENT	g/l	249	0	0.002	0.001	0	0	0	--	0.005

Notes:

0

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

Country: Sweden

Year: 2002

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

National Fuel Grade Unleaded petrol 95, environmental 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.	--		95	96.6	95.4	0	0	0	95	--
MOTOR OCTANE NO.	--		85	86.7	85.3	0	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	0	47	70	66.5	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	47	64	52.6	0		0	46.0	--
evaporated at 150	%(v/v)	0	75	94	86.4	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0.1	13	5.4	0	0	13	--	18.0
aromatics	%(v/v)	0	26.2	42	37.5	0	0	0	--	42.0
benzene	%(v/v)	0	0	1	0.76	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	2.7	0.3	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	0.9	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	8.9	0.97	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0.1	50	18	0	0	50	--	150
LEAD CONTENT	g/l	0	0	0.003	0.002	0	0	0.005	--	0.005

Notes:

based on 750 CQs
The limit of detection for test method for lead content is 0.002 g/l (values reported as 0 therefore fall in the range 0-0.002 g/l).

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

Country: Sweden

Year: 2002

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

National Fuel Grade Unleaded petrol 98, environmental 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.	--		98	99.2	98.4	0	98	0	95	--
MOTOR OCTANE NO.	--		87.5	88.6	87.7	0	87	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	0	59	70	68	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	0	48	65	52.3	0		0	46.0	--
evaporated at 150	%(v/v)	0	75	95	85.4	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	0	0.7	13	5.6	0	0	13	--	18.0
aromatics	%(v/v)	0	29.8	42	38.6	0	0	0	--	42.0
benzene	%(v/v)	0	0.4	1	0.73	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	2.6	1.2	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	14.5	6.4	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	0	0.1	47	9.6	0	0	50	--	150
LEAD CONTENT	g/l	0	0	0.003	0.002	0	0	0	--	0.005

Notes:

The limit of detection for test method for lead content is 0.005 g/l (values reported as 0 therefore fall in the range 0-0.005 g/l).

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

Country: UK

Year: 2002

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.	--	2506	94.3	97.5	95.1	0.369	0	0	95	--
MOTOR OCTANE NO.	--	2474	84.5	87.2	85.3	0.29	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	647	59	71	68.4	1.4	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	2572	46	69.9	56.6	3.12	0	0	46.0	--
evaporated at 150	%(v/v)	1974	76.7	98.8	89.1	1.92	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	1880	0	18.9	10.9	2.15	0	0	--	18.0
aromatics	%(v/v)	2353	15.9	38.3	29.5	2.32	0	0	--	42.0
benzene	%(v/v)	2386	0.2	1.1	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	73	0	1.5	1.3	0.55	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	817	0	11.3	3.2	0.91	0	0	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	2536	4	69	40.5	6.35	0	0	--	150
LEAD CONTENT	g/l	1132	0	0.005	0	0.462	0	0	--	0.005

Notes:

The limit of detection for test method for oxygenates content is 0.01 %v/v (values reported as 0 therefore fall in the range 0-0.01 %v/v).

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

Country: UK

Year: 2002

FuelID: Unleaded petrol 95 =< RON < 98

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.	--	433	96.3	98.7	97.3	0.308	0	0	95	--
MOTOR OCTANE NO.	--	434	85.3	89.4	86.6	0.507	0	0	85	--
VAPOUR PRESSURE, DVPE	kPa								--	70
Summer period	kPa	124	49.7	76.2	67.7	3.75	0	0	--	70
Winter period	kPa								--	--
DISTILLATTION:										
evaporated at 100	%(v/v)	434	46	67.5	54.3	4.46	0	0	46.0	--
evaporated at 150	%(v/v)	389	78.5	96.5	91.5	2.33	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	335	1.2	18	13.8	2.71	0	0	--	18.0
aromatics	%(v/v)	390	19.6	39.4	31.4	3.05	0	0	--	42.0
benzene	%(v/v)	366	0.2	1	0.7	0.131	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	63	0	1.5	1.3	0.55	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)	144	0	8.3	3.8	1.59	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	384	7	96	42.5	8.79	0	0	--	150
LEAD CONTENT	g/l	198	0	0.003	0.001	1.19	0	0	--	0.005

Notes:

The limit of detection for test method for oxygenates content is 0.01 %v/v (values reported as 0 therefore fall in the range 0-0.01 %v/v).

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

Country: Austria

Year: 2002

FuelID: Diesel fuel

National Fuel Grade: ON EN 590

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	--	120	49.3	54.6	51.88333333	0.735228008	51	0	51	--
DENSITY AT 15 C	kg/m3	120	826.2	841.75	835.3790833	3.57153193	820	845	--	845
DISTILLATION-95 C POINT	C	120	322.2	363.6	353.7458333	4.697914714	0	360	--	360
PAHs	%(m/m)	120	2.0658	4.9894	3.553829167	0.535154656	0	11	--	11
SULPHUR CONTENT	mg/kg	120	15.16022237	481.0547239	235.5395572	98.97786219	0	350	--	350

Notes: 0

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

Country: Belgium

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel 50S

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	--	5483	43.5	72.5	52.34	1.9345	46	0	51	--
DENSITY AT 15 C	kg/m3	5484	809.6	855	834.4	0.059	820	845	--	845
DISTILLATION-95 C POINT	C	5476	264.6	384.8	347.4	8.8513	0	360	--	360
PAHs	%(m/m)	2609	0.05	9.2	2.21	1.5371	0	11	--	11
SULPHUR CONTENT	mg/kg	5448	2	250	47.2	0.785	0	50	--	350

Notes: 0

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

Country: Denmark

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: 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	--	20	51.1	53.5	52	0.6	0	0	51	--
DENSITY AT 15 C	kg/m3	20	828.4	844.7	839.9	5.8	0	0	--	845
DISTILLATION-95 C POINT	C	20	348.7	358.5	354.2	3.1	0	0	--	360
PAHs	%(m/m)	20	1.2	6	2.7	1.5	0	0	--	11
SULPHUR CONTENT	mg/kg	19	30	61	48	8	0	0	--	350

Notes: 0

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

Country: Finland

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Low sulphur diesel fuel (max. 50 ppm
\ samples for the whole year 2002

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	--	99	50.7	59.8	53.3	1.5	0	0	51	--
DENSITY AT 15 C	kg/m3	99	820	840	830	10	0	0	--	845
DISTILLATION-95 C POINT	C	99	303.1	360.3	340.7	19.8	0	0	--	360
PAHs	%(m/m)	99	0.5	3.9	1.7	0.6	0	0	--	11
SULPHUR CONTENT	mg/kg	99	3.7	54.7	23.6	9.6	0	0	--	350

Notes: See comments on a separate file (Footnotes 3, 7, 8 and 9).

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

Country: France

Year: 2002

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	--	81	464	545	503	0	0	0	51	--
DENSITY AT 15 C	kg/m3	81	824.3	842.5	833.4	0	820	0	--	845
DISTILLATION-95 C POINT	C	0	0	0	0	0	0	0	--	360
PAHs	%(m/m)	0	0	0	0	0	0	0	--	11
SULPHUR CONTENT	mg/kg	81	100	355	308.2	0	0	0	--	350

Notes: 0

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

Country: Germany

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Dieselkraftstoff , schwefelarm

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	--	209	49.3	62	54.1	2.3	0	0	51	--
DENSITY AT 15 C	kg/m3	210	821.2	844	833	2.7	0	0	--	845
DISTILLATION-95 C POINT	C	180	316.3	357.6	346.4	4.7	0	0	--	360
PAHs	%(m/m)	170	0.1	6	2.81	0.66	0	0	--	11
SULPHUR CONTENT	mg/kg	202	10	96	30.6	10.4	0	50	--	350

Notes: 36 samples taken where month is not allocated

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

Country: Germany

Year: 2002

FuelID: Diesel fuel (<10 ppm sulphur)

National Fuel Grade: Dieselkraftstoff , schwefelfrei

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	--	22	52.7	61.3	55.2	1.6	0	0	51	--
DENSITY AT 15 C	kg/m3	22	827.5	835.4	831.8	1.63	0	0	--	845
DISTILLATION-95 C POINT	C	22	343.4	355.8	348.7	3.95	0	0	--	360
PAHs	%(m/m)	3	0.5	3.2	2.1	1.8	0	0	--	11
SULPHUR CONTENT	mg/kg	22	10	13	10	1.6	0	10	--	350

Notes: 3 samples taken where month is not allocated

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

Country: Greece

Year: 2002

FuelID:

National Fuel Grade: Diesel fuel

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	--	72	52.3	59	56.4	1.6	0	0	51	--
DENSITY AT 15 C	kg/m3	82	820	888	833.4	9.4	0	0	--	845
DISTILLATION-95 C POINT	C	82	310	385	357.3	7.9	0	0	--	360
PAHs	%(m/m)	72	0.5	9	6.3	3.9	0	0	--	11
SULPHUR CONTENT	mg/kg	82	200	507.1	500.3	665.4	0	0	--	350

Notes: See comments on a separate file (Footnotes 3, 7, 8 and 9).

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

Country: Ireland

Year: 2002

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	--	11	51	53	52.18	0.75	0	0	51	--
DENSITY AT 15 C	kg/m3	50	820	844	836.18	4.51	0	0	--	845
DISTILLATION-95 C POINT	C	50	315.4	354.5	338.67	9.99	0	0	--	360
PAHs	%(m/m)	50	1.32	6.4	3.26	1.38	0	0	--	11
SULPHUR CONTENT	mg/kg	50	0	296	48.6	44.35	0	0	--	350

Notes: 0

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

Country: Italy

Year: 2002

FuelID: Diesel fuel

National Fuel Grade: -

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	--	184	48	58.5	52.4	1.58	51	0	51	--
DENSITY AT 15 C	kg/m3	392	821.3	845	837.5	4.77	0	845	--	845
DISTILLATION-95 C POINT	C	392	340	369	356.8	3.74	0	360	--	360
PAHs	%(m/m)	274	1.4	10	5	1.48	0	11	--	11
SULPHUR CONTENT	mg/kg	364	4	568	246	71.75	0	350	--	350

Notes: 0

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

Country: Luxembourg

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Carburant Diesel (teneur en soufre inférieure à 50 ppm)

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	--	6	51	52	51.6	0	0	0	51	--
DENSITY AT 15 C	kg/m3	6	835	838	837	0	0	0	--	845
DISTILLATION-95 C POINT	C	4	331	351	344	0	0	0	--	360
PAHs	%(m/m)	2	3.5	5.6	4.6	0	0	0	--	11
SULPHUR CONTENT	mg/kg	7	27	43	33	0	0	0	--	350

Notes: 0

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

Country: Netherlands

Year: 2002

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	--	81	47.3	54.3	51.9	0	0	0	51	--
DENSITY AT 15 C	kg/m3	81	734.3	842.1	89.2	0	0	0	--	845
DISTILLATION-95 C POINT	C	81	316.2	360.5	347.8	0	0	0	--	360
PAHs	%(m/m)	81	0.2	7.5	2.5	0	0	0	--	11
SULPHUR CONTENT	mg/kg	81	10	49	34.1	0	0	0	--	350

Notes: 0

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

Country: Netherlands

Year: 2002

FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade: Diesel <50ppm 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	--	81	47.3	54.3	51.9	0	0	0	51	--
DENSITY AT 15 C	kg/m3	81	734.3	842.1	89.2	0	0	0	--	845
DISTILLATION-95 C POINT	C	81	316.2	360.5	347.8	0	0	0	--	360
PAHs	%(m/m)	81	0.2	7.5	2.5	0	0	0	--	11
SULPHUR CONTENT	mg/kg	81	10	49	34.1	0	0	0	--	350

Notes: 0

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

Country: Portugal

Year: 2002

FuelID:

National Fuel Grade: Diesel fuel

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	--	19	51	52.9	51.7	0.65	51	0	51	--
DENSITY AT 15 C	kg/m3	19	826.7	845	839	5.26	820	845	--	845
DISTILLATION-95 C POINT	C	15	350	360	358.6	3.52	0	360	--	360
PAHs	%(m/m)	9	3.8	7.1	4.4	1.05	0	11	--	11
SULPHUR CONTENT	mg/kg	19	167	340	295.5	62.6	0	350	--	350

Notes: See comments on a separate file (Footnotes 3, 7, 8 and 9).

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

Country: Spain

Year: 2002

FuelID: Diesel fuel

National Fuel Grade: Gasoleo A

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	--	281	51	59	52.56156584	1.641417071	0	0	51	--
DENSITY AT 15 C	kg/m3	281	82.8	844.9	837.1857651	4.447133908	820	0	--	845
DISTILLATION-95 C POINT	C	281	305.1	360	354.8209964	5.348801601	0	0	--	360
PAHs	%(m/m)	281	2.7	7.2	4.937366548	1.036546464	0	0	--	11
SULPHUR CONTENT	mg/kg	281	50	350	275.8683274	73.86773895	0	0	--	350

Notes: 0

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

Country: Sweden

Year: 2002

FuelID: Diesel fuel (<10 ppm sulphur)

National Fuel Grade: Diesel environmental 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	--	582	51	56.5	52.8	0	0	0	51	--
DENSITY AT 15 C	kg/m3	582	809.1	819.9	814.4	0	800	820	--	845
DISTILLATION-95 C POINT	C	582	238	285	280.5	0	0	285	--	360
PAHs	%(m/m)	582	2	2	2	0	0	2	--	11
SULPHUR CONTENT	mg/kg	582	0.1	10	2.1	0	0	10	--	350

Notes: 0

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

Country: UK

Year: 2002

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	--	1254	50.2	58.6	53	1.05	0	0	51	--
DENSITY AT 15 C	kg/m3	1898	0.82	0.835	0.832	0.948	0	0	--	845
DISTILLATION-95 C POINT	C	1726	313.5	353.5	340	4.567	0	0	--	360
PAHs	%(m/m)	674	0.1	7.4	2.003	0.875	0	0	--	11
SULPHUR CONTENT	mg/kg	1917	5	64	40.1	6.125	0	0	--	350

Notes: 0

Appendix 5: Proposed 2003 Excel Reporting Template

CONTENTS

EU Fuel Quality Monitoring Submissions – Extended Reporting Template

Introduction, purpose & format

Member States are required to report on the quality of petrol and diesel fuels sold in their territory under Directive 98/70/EC. The reporting format for submissions is specified under Commission Decision of 18 February 2002 (2002/159/EC). 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 purpose of this extended Excel template 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 Commission Decision 2002/159/EC, with some optional additional clarifying information also requested. The light blue fields denote information that is specifically requested in the Commission Decision, and orange fields indicate the additional optional information requested.

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 & 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	0.7	94.6	
(RON 91 fuel only)	--	91				0.7	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	2.9		61.7
--summer period (Arctic)	kPa		70	EN 13016-1	2000	2.9		71.7
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	6.8		22.0
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	1995	6.8		25.1
-- Aromatics	% (v/v)		42.0	ASTM D1319	1995	3.5		44.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.1		1.1
				EN 238	1996			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		7.3
-- 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	18.5		161
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	6.7		54
				EN ISO 8754	1995			
				EN 24260	1994	6.7		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
Lead content	g/l		0.005	EN 237	1996	2		1.2

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/m³		845	EN-ISO 3675	1998	1.2		845.7
				EN ISO 12185	1996			845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	1988	Depends on test conditions		
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	0.29		13.3
Sulphur content	mg/kg		350	EN ISO 14596	1998	50		380
				EN ISO 8754	1995			
				EN 24260	1994	42.1		375
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	6.7		54
				EN ISO 8754	1995			
				EN 24260	1994	6.7		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

Contacts & Fuel Quality Monitoring System

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	
Person responsible for Report	
Telephone number:	
Email	

Description of Fuel Quality Monitoring System

Member States should provide a description on the operation of their national fuel quality monitoring systems.

Description of FQM system	

OPTIONAL INFORMATION

Please supply the following information below (as far as possible), or alternatively contained in a word document containing similar information.

Responsible organisations (for sampling, analysis & reporting)	
The statistical significance of the results of the national monitoring system (e.g. 95% confidence)	
Types of Sampling Locations (e.g. refinery, terminal, retail site)	
Time/frequency/occasion of sampling	
Number of samples taken at fuel dispensing sites (i.e. retail or commercial)	
Number of refineries serving the market	
Number of sources of imported fuels --Petrol --Diesel	
Method of collection of sales data	
Other relevant details:	

Total Sales & Availability of Sulphur-Free Fuels

TOTAL SALES OF PETROL AND DIESEL

Year:

Member states are requested to complete the following table detailing the quantities of each grade of petrol and diesel marketed in their territory
*NB: Please do not report national fuel grade sales under more than one category.

OPTIONAL INFORMATION SHOWN IN RED TEXT

Fuel Grade	National sales total		National Fuel Grades included in totals*	No. Samples Taken	
	Litres	Tonnes		dispensing sites	Total
Regular unleaded petrol (minimum RON = 91)[1]					
Unleaded petrol (minimum RON = 95)[1]					
Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)[2]					
Sulphur free unleaded petrol (< 10 ppm Sulphur)[3]					
Unleaded petrol (minimum 95 =< RON < 98)					
Unleaded petrol (minimum RON >= 98)					
Regular unleaded petrol (minimum RON = 91 & < 50 ppm Sulphur)					
Regular unleaded petrol (minimum RON = 91 & < 10 ppm Sulphur)					
Unleaded petrol (minimum RON = 95 & < 10 ppm Sulphur)3					
Unleaded petrol (minimum 95 =< RON < 98 & < 50 ppm Sulphur)					
Unleaded petrol (minimum 95 =< RON < 98 & < 10 ppm Sulphur)					
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

Comments (completeness of data, particular issues, etc.)	

Geographical Availability of Sulphur-Free Fuels

Please provide description of the geographical extent to which sulphur-free petrol and diesel are marketed within the territory of a Member State.
Ideally this should include details such as, the % of fuel stations with the fuels available, regional spread, or availability in cities vs. rural areas:

Petrol:

Diesel:

Definition of Summer Period for Petrol Volatility

Official Summer Period to be applied to monitoring data * Normal = 1st May to 30th September; Arctic = 1st June to 31st Augu	
Details of National Periods Applied:	

Appendix I: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol)

Country		
Reporting Year		
Parent fuel grade		
National fuel grade		
Summer Period*		1st May to 30th September (normal)

* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

Reporting results

Parameter	Unit	Analytical and statistical results					Limiting Value (1)			
							National Specification, if any		According to 98/70 EC	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum
Research Octane Number	--								95.0	
Motor Octane Number	--								85.0	
Vapour Pressure, DVPE	kPa									
--summer period only										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 5 or more carbon atoms per molecule	% (v/v)									15
-- other oxygenates	% (v/v)									10
Sulphur content	mg/kg									150
Lead content	g/l									

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4529:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4529:1995

Other notes (optional):

Sampling frequency

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

OPTIONAL INFORMATION

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	0.7	94.6		Yes			
(RON 91 fuel only)	--			0.7	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	2.9		61.7				
--summer period (Arctic)	kPa	EN 13016-1	2000	2.9		71.7				
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	6.8		22.0				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	1995	6.8		25.0				
-- Aromatics	% (v/v)	ASTM D1319	1995	3.5		44.1				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996			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		167.8				
		EN ISO 8754	1995							
		EN 24260	1994	18.5		161.0				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	6.7		54.0				
		EN ISO 8754	1995							
		EN 24260	1994	6.7		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	3.4		12.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				
Lead content	g/l	EN 237	1996	2		1.2				

Appendix I: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol)

Country		
Reporting Year		
Parent fuel grade		
National fuel grade		
Summer Period*		1st May to 30th September (normal)

* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

Reporting results

Parameter	Unit	Analytical and statistical results					Limiting Value (1)			
							National Specification, if any		According to 98/70 EC	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum
Research Octane Number	--								95.0	
Motor Octane Number	--								85.0	
Vapour Pressure, DVPE	kPa									
--summer period only										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 5 or more carbon atoms per molecule	% (v/v)									15
-- other oxygenates	% (v/v)									10
Sulphur content	mg/kg									150
Lead content	g/l									

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4529:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4529:1995

Other notes (optional):

Sampling frequency

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

OPTIONAL INFORMATION

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	0.7	94.6		Yes			
(RON 91 fuel only)	--			0.7	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	2.9		61.7				
--summer period (Arctic)	kPa	EN 13016-1	2000	2.9		71.7				
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	6.8		22.0				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	1995	6.8		25.0				
-- Aromatics	% (v/v)	ASTM D1319	1995	3.5		44.1				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996			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		167.8				
		EN ISO 8754	1995							
		EN 24260	1994	18.5		161.0				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	6.7		54.0				
		EN ISO 8754	1995							
		EN 24260	1994	6.7		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	3.4		12.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				
Lead content	g/l	EN 237	1996	2		1.2				

Appendix I: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol)

Country		
Reporting Year		
Parent fuel grade		
National fuel grade		
Summer Period*		1st May to 30th September (normal)

* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

Reporting results

Parameter	Unit	Analytical and statistical results					Limiting Value (1)			
							National Specification, if any		According to 98/70 EC	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum
Research Octane Number	--								95.0	
Motor Octane Number	--								85.0	
Vapour Pressure, DVPE	kPa									
--summer period only										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 5 or more carbon atoms per molecule	% (v/v)									15
-- other oxygenates	% (v/v)									10
Sulphur content	mg/kg									150
Lead content	g/l									

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4529:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4529:1995

Other notes (optional):

Sampling frequency

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

OPTIONAL INFORMATION

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	0.7	94.6		Yes			
(RON 91 fuel only)	--			0.7	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	2.9		61.7				
--summer period (Arctic)	kPa	EN 13016-1	2000	2.9		71.7				
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	6.8		22.0				
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	1995	6.8		25.0				
-- Aromatics	% (v/v)	ASTM D1319	1995	3.5		44.1				
-- Benzene	% (v/v)	EN 12177	1998	0.1		1.1				
		EN 238	1996			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		167.8				
		EN ISO 8754	1995							
		EN 24260	1994	18.5		161.0				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	6.7		54.0				
		EN ISO 8754	1995							
		EN 24260	1994	6.7		54.0				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	3.4		12.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				
Lead content	g/l	EN 237	1996	2		1.2				

Appendix II: Market Fuels used in the Compression Ignition Engines (Diesel)

Country	
Reporting year	
Parent fuel grade	
National fuel grade	

Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value (1)			
							National Specifications		According to 98/70/EC	
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum
Cetane number	--								51.0	--
Density at 15 °C	kg/m^3									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 IASO 4259 :1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4529 : 1995.

Other notes (optional):

Sampling Frequency

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

OPTIONAL INFORMATION

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							
Distillation -- 95% Point	oC	EN-ISO 3405	1988			360.0				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	0.29		11.2				
Sulphur content	mg/kg	EN ISO 14596	1998	50		379.7				
		EN ISO 8754	1995			350.0				
		EN 24260	1994	42.1		375.0				
Sulphur content (low sulphur, from 2	mg/kg	EN ISO 14596	1998	6.7		54.0				
		EN ISO 8754	1995							
		EN 24260	1994	6.7		54.0				
Sulphur content (sulphur free, from 1	mg/kg	EN ISO 14596	1998	3.4		12.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				

Appendix II: Market Fuels used in the Compression Ignition Engines (Diesel)

Country	
Reporting year	
Parent fuel grade	
National fuel grade	

Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value (1)			
							National Specifications		According to 98/70/EC	
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum
Cetane number	--								51.0	--
Density at 15 °C	kg/m^3									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 IASO 4259 :1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4529 : 1995.

Other notes (optional):

Sampling Frequency

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

OPTIONAL INFORMATION

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							
Distillation -- 95% Point	oC	EN-ISO 3405	1988			360.0				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	0.29		11.2				
Sulphur content	mg/kg	EN ISO 14596	1998	50		379.7				
		EN ISO 8754	1995			350.0				
		EN 24260	1994	42.1		375.0				
Sulphur content (low sulphur, from 2	mg/kg	EN ISO 14596	1998	6.7		54.0				
		EN ISO 8754	1995							
		EN 24260	1994	6.7		54.0				
Sulphur content (sulphur free, from 1	mg/kg	EN ISO 14596	1998	3.4		12.0				
		EN ISO 8754	1995							
		EN 24260	1994	3.4		12.0				