

# EU Fuel Quality Monitoring – 2005 Summary Report

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

By Nikolas Hill and Eleanor Glenn

Restricted Commercial

ED51182

Final - Issue Number 1



<b>Title</b>	EU Fuel Quality Monitoring - 2005 Summary Report
<b>Customer</b>	European Commission, Directorate-General Environment
<b>Customer reference</b>	B4-3040/2003/369275/MAR/C1
<b>Confidentiality, copyright and reproduction</b>	<p>Copyright AEA Technology plc</p> <p>This document has been prepared by AEA Energy &amp; Environment in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract without the specific permission in writing of the Commercial Manager, AEA Technology plc.</p>
<b>File reference</b>	ED51182
<b>Report number</b>	AEA/ED51182/R3
<b>Report status</b>	Final

AEA Energy & Environment  
The Gemini Building, Fermi Avenue  
Harwell International Business Centre  
Didcot, OX11 0QR  
United Kingdom  
Telephone +44 (0)870 190 6490  
Facsimile +44 (0)870 190 6615

AEA Energy & Environment is a business name of  
AEA Technology plc.

AEA Energy & Environment is certificated to ISO9001 and  
ISO14001

	<b>Name</b>	<b>Signature</b>	<b>Date</b>
<b>Author</b>	Nikolas Hill Eleanor Glenn		26/01/07
<b>Reviewed by</b>	Heather Haydock		26/01/07
<b>Approved by</b>	Heather Haydock		26/01/07



# Executive Summary

This report produced for DG Environment represents a consolidation of the fifth year of Member States' submissions under Directive 98/70/EC<sup>1</sup>, summarising the quality of petrol and diesel in the Community for the year 2005. The specifications for petrol and diesel sold in the European Community are included in the Directive and that Member States are required to report summaries of the quality of fuels sold in their territories. The original reporting format for this was laid out in Commission Decision 2002/159/EC of 18 February 2002<sup>2</sup>. Additional requirements were defined in the European Standard for fuel quality monitoring systems, EN 14274:2003, required from 2004 under Directive 2003/17/EC<sup>3</sup>.

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

In general the quality of Member State's monitoring systems' design, compliance with limit values and information provided in report submissions is continuing to improve. In particular, sulphur-free fuels have been introduced successfully across many Member States this year (where not already available), although not always labelled at the pump. However, there are still problems in timely delivery of reports from some Member States, with 5 complete reports still outstanding at the time of the preparation of the draft report in November 2006. Of particular concern is France's continued failure to submit a report - missing for 2003 - 2005 monitoring now.

As set out in the Excel reporting template, revisions to the reporting format outlined in Commission Decision 2002/159/EC and in the European Standard EN 14274: 2003, have enhanced the usefulness of the information and facilitated analysis of EU trends. However, there are still a few key areas for improvement, summarised as follows:

## Key Areas for Improvement

- 1) A small number of Member States (including Belgium, France, Luxembourg and the UK) are consistently submitting reports very late after the 30 June deadline each year, they are encouraged to report on time to avoid undermining the efforts of others in this regards.
- 2) Regarding monitoring system and reporting consistency with EN 14274 requirements:
  - a) Several Member States that state they are following EN 14274 requirements still are not providing separate reporting tables for Summer and Winter analyses.
  - b) Others do not fulfil sufficient sampling for all fuel grades (e.g. Netherlands) or are not sampling in sufficient numbers at refuelling stations (as opposed to depot/refinery).
  - c) Where Member States use their own National Systems rather than one based upon the European Standard, there needs to be a description of this system. This

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

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

<sup>3</sup> O.J. L76 of 22.3.2003, p. 10

description should also provide an assessment that shows the monitoring system's equivalency in statistical confidence to EN 14274: 2003. This has *still* not been provided in most cases for 2004 or 2005 monitoring and needs to be provided in future.

- d) Where EN 14274 Statistical Model C is used, Member States should present a clear rationale for its use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions. For several Member States using Model C (and not providing this information) there appears to be a good case on the basis of NUTS regional classification for instead using Model's A or B. These include Austria, Czech Republic, Hungary, Ireland and Slovakia.
- 3) In relation to the availability of sulphur free fuels, it is necessary for these fuels to be clearly labelled to ensure that the consumer has the opportunity to choose them. Belgium, Czech Republic, Ireland, Latvia, Luxemburg and Slovenia need to take action to ensure this in 2006 onwards. Reporting on this labelling could help the automotive industry gain confidence in their availability so that vehicles taking full advantage of the fuel are more widely introduced. The UK, Malta and Cyprus also still need to introduce <10ppm fuels.
- 4) It would also be valuable, for the Member States not already doing so, to report separately (to <50ppm fuels) the results of sulphur content analyses that were carried out on fuels sold as sulphur-free to further confirm their quality. These analyses need not be additional to existing sample analyses, but simply a subset of the existing total sampling and analysis requirement as part of their monitoring systems, as provided for in the Excel reporting template.
- 5) Significantly higher numbers /proportions of limit value non-compliances have been reported by a number of the EU10 Member States, indicating that more action is needed to ensure the quality of fuels in these countries. Belgium has provided more detail on the numbers of non-compliances this year, which are higher in proportion (at around 3.5% of all samples) than other Member States. Temporal information also provided indicates that in-roads are being made to reduce non-compliance, however.

Following the success of the Excel reporting templates, a revised template for reporting on 2005 monitoring was produced, taking into account additional standard test methods introduced in EN 228:2004 and EN 590:2004 and providing an additional line to allow for separate reporting on sulphur content analyses of samples from fuel sold as sulphur-free. This template has been updated/functional errors corrected for the next reporting round and the proposed 2006 template (presented in Appendix 6) will be sent to Member States. The use of the template should further assist Member States in their data reporting and again facilitate accurate data collation and analysis for the 2006 summary report.

# Contents

<b>Executive Summary</b>	<b>v</b>
<b>Glossary</b>	<b>xv</b>
<b>1 Introduction</b>	<b>1</b>
1.1 REPORT STRUCTURE	1
1.2 CONTEXT	2
1.2.1 Fuel Consumption and Carbon Dioxide Emissions	2
1.2.2 Air Quality	3
1.2.3 Fuel Quality	4
Reporting on Fuel Quality in 2005	5
<b>2 Member State Summaries: Reporting Format and Requirements</b>	<b>6</b>
2.1 FUEL AVAILABILITY	7
2.1.1 Sales	8
2.1.2 Sulphur content	9
2.2 FUEL QUALITY MONITORING	10
2.2.1 Description of system	10
2.2.2 Sampling and reporting	10
2.2.3 Compliance with fuel quality limit values	12
2.3 TEMPORAL TRENDS	13
2.4 MEMBER STATE SUMMARIES	13
<b>3 Austria</b>	<b>14</b>
3.1 FUEL AVAILABILITY 2005	14
3.1.1 Sales	14
3.1.2 Sulphur content	15
3.2 FUEL QUALITY MONITORING 2005	15
3.2.1 Description of system	15
3.2.2 Sampling and reporting	16
3.2.3 Compliance with fuel quality limit values	16
3.3 TEMPORAL TRENDS	17
3.4 KEY AREAS FOR IMPROVEMENT	18
<b>4 Belgium</b>	<b>19</b>
4.1 FUEL AVAILABILITY 2005	19
4.1.1 Sales	19
4.1.2 Sulphur content	20
4.2 FUEL QUALITY MONITORING 2005	20
4.2.1 Description of system	20
4.2.2 Sampling and reporting	21
4.2.3 Compliance with fuel quality limit values	22

4.3	TEMPORAL TRENDS	23
4.4	KEY AREAS FOR IMPROVEMENT	24
<b>5</b>	<b>Cyprus</b>	<b>25</b>
5.1	FUEL AVAILABILITY 2005	25
5.1.1	Sales	25
5.1.2	Sulphur content	26
5.2	FUEL QUALITY MONITORING 2005	26
5.2.1	Description of system	26
5.2.2	Sampling and reporting	27
5.2.3	Compliance with fuel quality limit values	27
5.3	TEMPORAL TRENDS	28
5.4	KEY AREAS FOR IMPROVEMENT	29
<b>6</b>	<b>Czech Republic</b>	<b>30</b>
6.1	FUEL AVAILABILITY 2005	30
6.1.1	Sales	30
6.1.2	Sulphur content	31
6.2	FUEL QUALITY MONITORING 2005	31
6.2.1	Description of system	31
6.2.2	Sampling and reporting	32
6.2.3	Compliance with fuel quality limit values	32
6.3	TEMPORAL TRENDS	33
6.4	KEY AREAS FOR IMPROVEMENT	35
<b>7</b>	<b>Denmark</b>	<b>36</b>
7.1	FUEL AVAILABILITY 2005	36
7.1.1	Sales	36
7.1.2	Sulphur content	37
7.2	FUEL QUALITY MONITORING 2005	37
7.2.1	Description of system	37
7.2.2	Sampling and reporting	38
7.2.3	Compliance with fuel quality limit values	38
7.3	TEMPORAL TRENDS	39
7.4	KEY AREAS FOR IMPROVEMENT	40
<b>8</b>	<b>Estonia</b>	<b>41</b>
8.1	FUEL AVAILABILITY 2005	41
8.1.1	Sales	41
8.1.2	Sulphur content	42
8.2	FUEL QUALITY MONITORING 2005	42
8.2.1	Description of system	42
8.2.2	Sampling and reporting	43
8.2.3	Compliance with fuel quality limit values	43
8.3	TEMPORAL TRENDS	44
8.4	KEY AREAS FOR IMPROVEMENT	45



<b>9</b>	<b>Finland</b>	<b>46</b>
9.1	FUEL AVAILABILITY 2005	46
9.1.1	Sales	46
9.1.2	Sulphur content	47
9.2	FUEL QUALITY MONITORING 2005	47
9.2.1	Description of system	47
9.2.2	Sampling and reporting	48
9.2.3	Compliance with fuel quality limit values	48
9.3	TEMPORAL TRENDS	49
9.4	KEY AREAS FOR IMPROVEMENT	50
<b>10</b>	<b>France</b>	<b>51</b>
<b>11</b>	<b>Germany</b>	<b>52</b>
11.1	FUEL AVAILABILITY 2005	52
11.1.1	Sales	52
11.1.2	Sulphur content	53
11.2	FUEL QUALITY MONITORING 2005	53
11.2.1	Description of system	53
11.2.2	Sampling and reporting	54
11.2.3	Compliance with fuel quality limit values	54
11.3	TEMPORAL TRENDS	55
11.4	KEY AREAS FOR IMPROVEMENT	56
<b>12</b>	<b>Greece</b>	<b>57</b>
12.1	FUEL AVAILABILITY 2005	57
12.1.1	Sales	57
12.1.2	Sulphur content	58
12.2	FUEL QUALITY MONITORING 2005	58
12.2.1	Description of system	58
12.2.2	Sampling and reporting	59
12.2.3	Compliance with fuel quality limit values	60
12.3	TEMPORAL TRENDS	60
12.4	KEY AREAS FOR IMPROVEMENT	62
<b>13</b>	<b>Hungary</b>	<b>63</b>
13.1	FUEL AVAILABILITY 2005	63
13.1.1	Sales	63
13.1.2	Sulphur content	64
13.2	FUEL QUALITY MONITORING 2005	64
13.2.1	Description of system	64
13.2.2	Sampling and reporting	65
13.2.3	Compliance with fuel quality limit values	65
13.3	TEMPORAL TRENDS	66
13.4	KEY AREAS FOR IMPROVEMENT	67

<b>14</b>	<b>Ireland</b>	<b>68</b>
14.1	FUEL AVAILABILITY 2005	68
14.1.1	Sales	68
14.1.2	Sulphur content	69
14.2	FUEL QUALITY MONITORING 2005	69
14.2.1	Description of system	69
14.2.2	Sampling and reporting	70
14.2.3	Compliance with fuel quality limit values	70
14.3	TEMPORAL TRENDS	71
14.4	KEY AREAS FOR IMPROVEMENT	72
<b>15</b>	<b>Italy</b>	<b>73</b>
15.1	FUEL AVAILABILITY 2005	73
15.1.1	Sales	73
15.1.2	Sulphur content	74
15.2	FUEL QUALITY MONITORING 2005	75
15.2.1	Description of system	75
15.2.2	Sampling and reporting	75
15.2.3	Compliance with fuel quality limit values	76
15.3	TEMPORAL TRENDS	76
15.4	KEY AREAS FOR IMPROVEMENT	78
<b>16</b>	<b>Latvia</b>	<b>79</b>
16.1	FUEL AVAILABILITY 2005	79
16.1.1	Sales	79
16.1.2	Sulphur content	80
16.2	FUEL QUALITY MONITORING 2005	80
16.2.1	Description of system	80
16.2.2	Sampling and reporting	81
16.2.3	Compliance with fuel quality limit values	81
16.3	TEMPORAL TRENDS	82
16.4	KEY AREAS FOR IMPROVEMENT	83
<b>17</b>	<b>Lithuania</b>	<b>84</b>
17.1	FUEL AVAILABILITY 2005	84
17.1.1	Sales	84
17.1.2	Sulphur content	85
17.2	FUEL QUALITY MONITORING 2005	85
17.2.1	Description of system	85
17.2.2	Sampling and reporting	86
17.2.3	Compliance with fuel quality limit values	86
17.3	TEMPORAL TRENDS	87
17.4	KEY AREAS FOR IMPROVEMENT	88
<b>18</b>	<b>Luxembourg</b>	<b>89</b>
18.1	FUEL AVAILABILITY 2005	89
18.1.1	Sales	89
18.1.2	Sulphur content	90

18.2	FUEL QUALITY MONITORING 2005	90
18.2.1	Description of system	90
18.2.2	Sampling and reporting	91
18.2.3	Compliance with fuel quality limit values	91
18.3	TEMPORAL TRENDS	91
18.4	KEY AREAS FOR IMPROVEMENT	93
<b>19</b>	<b>Malta</b>	<b>94</b>
19.1	FUEL AVAILABILITY 2005	94
19.1.1	Sales	94
19.1.2	Sulphur content	95
19.2	FUEL QUALITY MONITORING 2005	95
19.2.1	Description of system	95
19.2.2	Sampling and reporting	96
19.2.3	Compliance with fuel quality limit values	96
19.3	TEMPORAL TRENDS	97
19.4	KEY AREAS FOR IMPROVEMENT	99
<b>20</b>	<b>Netherlands</b>	<b>100</b>
20.1	FUEL AVAILABILITY 2005	100
20.1.1	Sales	100
20.1.2	Sulphur content	101
20.2	FUEL QUALITY MONITORING 2005	101
20.2.1	Description of system	101
20.2.2	Sampling and reporting	102
20.2.3	Compliance with fuel quality limit values	102
20.3	TEMPORAL TRENDS	103
20.4	KEY AREAS FOR IMPROVEMENT	104
<b>21</b>	<b>Poland</b>	<b>105</b>
21.1	FUEL AVAILABILITY 2005	105
21.1.1	Sales	105
21.1.2	Sulphur content	106
21.2	FUEL QUALITY MONITORING 2005	107
21.2.1	Description of system	107
21.2.2	Sampling and reporting	107
21.2.3	Compliance with fuel quality limit values	108
21.3	TEMPORAL TRENDS	109
21.4	KEY AREAS FOR IMPROVEMENT	110
<b>22</b>	<b>Portugal</b>	<b>111</b>
22.1	FUEL AVAILABILITY 2005	111
22.1.1	Sales	111
22.1.2	Sulphur content	112
22.2	FUEL QUALITY MONITORING 2005	112
22.2.1	Description of system	112
22.2.2	Sampling and reporting	113
22.2.3	Compliance with fuel quality limit values	113
22.3	TEMPORAL TRENDS	114

22.4	KEY AREAS FOR IMPROVEMENT	115
<b>23</b>	<b>Slovakia</b>	<b>116</b>
23.1	FUEL AVAILABILITY 2005	116
23.1.1	Sales	116
23.1.2	Sulphur content	117
23.2	FUEL QUALITY MONITORING 2005	117
23.2.1	Description of system	117
23.2.2	Sampling and reporting	118
23.2.3	Compliance with fuel quality limit values	118
23.3	TEMPORAL TRENDS	119
23.4	KEY AREAS FOR IMPROVEMENT	121
<b>24</b>	<b>Slovenia</b>	<b>122</b>
24.1	FUEL AVAILABILITY 2005	122
24.1.1	Sales	122
24.1.2	Sulphur content	123
24.2	FUEL QUALITY MONITORING 2005	123
24.2.1	Description of system	123
24.2.2	Sampling and reporting	124
24.2.3	Compliance with fuel quality limit values	124
24.3	TEMPORAL TRENDS	125
24.4	KEY AREAS FOR IMPROVEMENT	127
<b>25</b>	<b>Spain</b>	<b>128</b>
25.1	FUEL AVAILABILITY 2005	128
25.1.1	Sales	128
25.1.2	Sulphur content	129
25.2	FUEL QUALITY MONITORING 2005	129
25.2.1	Description of system	129
25.2.2	Sampling and reporting	129
25.2.3	Compliance with fuel quality limit values	130
25.3	TEMPORAL TRENDS	130
25.4	KEY AREAS FOR IMPROVEMENT	132
<b>26</b>	<b>Sweden</b>	<b>133</b>
26.1	FUEL AVAILABILITY 2005	133
26.1.1	Sales	133
26.1.2	Sulphur content	134
26.2	FUEL QUALITY MONITORING 2005	134
26.2.1	Description of system	134
26.2.2	Sampling and reporting	135
26.2.3	Compliance with fuel quality limit values	135
26.3	TEMPORAL TRENDS	135
26.4	KEY AREAS FOR IMPROVEMENT	137
<b>27</b>	<b>United Kingdom</b>	<b>138</b>
27.1	FUEL AVAILABILITY 2005	138

27.1.1	Sales	138
27.1.2	Sulphur content	139
27.2	FUEL QUALITY MONITORING 2005	139
27.2.1	Description of system	139
27.2.2	Sampling and reporting	140
27.2.3	Compliance with fuel quality limit values	140
27.3	TEMPORAL TRENDS	141
27.4	KEY AREAS FOR IMPROVEMENT	142
<b>28</b>	<b>EU Summary</b>	<b>143</b>
28.1	FUEL AVAILABILITY 2005	143
28.1.1	Sales	143
28.1.2	Sulphur content	146
28.2	FUEL QUALITY MONITORING 2005	149
28.2.1	Description of systems	149
28.2.2	Sampling and reporting	149
28.2.3	Compliance with 98/70/EC limit values	153
	Petrol reporting	153
	Diesel reporting	153
	Overall Summary	153
28.3	TEMPORAL TRENDS	155
28.3.1	Sampling and reporting	155
28.3.2	Fuel sales and sulphur content	156
28.3.3	Compliance with limit values	158
<b>29</b>	<b>Discussion and Conclusion</b>	<b>160</b>
29.1	DISCUSSION	160
29.1.1	2004 Reporting Submissions	160
	Completeness	160
	Fuel Quality Submission Database	161
29.1.2	Reporting Format	161
	Reporting on distillation test analyses	161
	Reporting on availability and analyses on sulphur-free fuels	161
29.2	CONCLUSION AND RECOMMENDATIONS	162
<b>Appendices</b>		
APPENDIX 1	COMMISSION DECISION 2002/159/EC	
APPENDIX 2	DIRECTIVE 98/70/EC: TEST METHODS, LIMIT VALUES AND TOLERANCE LIMITS	
APPENDIX 3	MEMBER STATE 2005 FUEL QUALITY SUBMISSION TABLES	
APPENDIX 4	FUEL QUALITY MONITORING REPORTING FORMAT FOR 2004 ONWARDS	
APPENDIX 5	COMMISSION RECOMMENDATION 2005/27/EC	
APPENDIX 6	2005 EXCEL REPORTING TEMPLATE	



# Glossary

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





# 1 Introduction

This report produced for DG Environment represents a consolidation of the fifth year of Member States' submissions under Directive 98/70/EC<sup>4</sup>, summarising the quality of petrol and diesel in the Community for the year 2005. The specifications for petrol and diesel sold in the European Community are included in the Directive. Two sets of fuel specifications are included in the Directive, the first entered into force on 1 January 2000 and the second entered into force on 1 January 2005. The Directive also stipulates that Member States are required to report summaries of the quality of fuels sold in their territories. The original reporting format for this was laid out in Commission Decision 2002/159/EC of 18 February 2002<sup>5</sup> (Appendix 1). Additional requirements were defined in the European Standard for fuel quality monitoring systems, EN 14274:2003, required from 2004 under Directive 2003/17/EC.

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

## 1.1 Report Structure

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

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

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

**Sections 3 to 27** summarise the information reported by individual EU Member States, as part of their submissions of summaries of national fuel quality data. This includes information on:

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

**Sections 28 and 29** provide an overall EU summary, discussion of the 2005 reporting and conclusions/recommendations for future reporting.

---

<sup>4</sup> O.J. L 350 of 28.12.1998, p. 58

<sup>5</sup> O.J. L 53 of 23.2.2002, p.30

## 1.2 Context

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

### 1.2.1 Fuel Consumption and Carbon Dioxide Emissions

The Community's strategy<sup>6</sup> to reduce CO<sub>2</sub> emissions from passenger cars and improve fuel economy is aimed at delivering an average CO<sub>2</sub> emission value for new passenger cars equal to 120 g CO<sub>2</sub>/km. It will help the EU meet its commitments under the Kyoto Protocol, and reduce the EU's dependency on imported oil supplies.

The automobile industry has committed itself through voluntary agreements to improving the fuel economy of vehicles produced such that it aims to deliver an average CO<sub>2</sub> emission figure for new passenger cars sold in the EU of 140 g CO<sub>2</sub>/km by 2008/2009. Article 9, paragraph 1 (d) of Directive 98/70/EC requires the Commission to consider "*the outcome of the review of the various commitments by the Japanese (JAMA), Korean (KAMA) and European (ACEA) automobile manufacturers to reduce the fuel consumption and carbon dioxide emissions of new passenger cars in the light of the fuel quality changes introduced by this Directive and progress towards the Community target of 120 g/km CO<sub>2</sub> emissions for the average vehicle*". As part of their reviews mentioned above, ACEA<sup>7</sup>, JAMA<sup>8</sup> and KAMA<sup>9</sup> expressed general satisfaction with the quality of available fuels in the EU 15 (the scope of the commitments is limited to EU15, since they were designed in 1998/99).

As part of the second phase of the European Climate Change Programme<sup>10</sup>, the Commission has reviewed the CO<sub>2</sub> and cars strategy with a view to moving further towards the Community objective of 120 g CO<sub>2</sub>/km. Several pieces of research<sup>11</sup> have been carried out on behalf of the EC recently, looking at the possibilities for further reductions in CO<sub>2</sub> emissions using both supply (technological improvements in vehicles in their component) and demand (e.g. labelling or taxation) measures. There is no indication from the review that fuel specification changes are required to enable further fuel efficiency progress.

The automobile industry has attached a great importance to the availability of low sulphur (<50 ppm) and sulphur-free (<10 ppm) fuel to meet both the mandatory emission limits for nitrogen oxides (and diesel particulates) and the targets for reduced CO<sub>2</sub> emissions. Sulphur free fuels enable the use of improved catalytic technology and reduce particle emissions, facilitating compliance with existing (and future) emissions standards and helping to improve fuel efficiency (in particular for the purpose of implementing direct injection).

---

<sup>6</sup> (COM(95) 689 final, supported by the Council in 1996 and the European Parliament in 1997

<sup>7</sup> See SEC(2005)826 of 22.6.2005, Joint report of ACEA and the Commission services, Annex II

<sup>8</sup> See SEC(2005)826 of 22.6.2005, Joint report of JAMA and the Commission services, Annex II

<sup>9</sup> To be published

<sup>10</sup> See [http://forum.europa.eu.int/Public/irc/env/eccp\\_2/library?l=/light-duty\\_vehicles&vm=detailed&sb=Title](http://forum.europa.eu.int/Public/irc/env/eccp_2/library?l=/light-duty_vehicles&vm=detailed&sb=Title)

<sup>11</sup> See [http://ec.europa.eu/environment/co2/co2\\_studies.htm](http://ec.europa.eu/environment/co2/co2_studies.htm)

## 1.2.2 Air Quality

The framework for the assessment and management of air quality is described in Directive 96/62/EC<sup>12</sup> and the limit values for the air pollutants nitrogen dioxide, sulphur dioxide, lead and particulate matter are set out in the first daughter Directive 1999/30/EC. The limit values for nitrogen dioxide are to be attained by 2010 and those for particulate matter by 2005. There are also indicative values for particles for the year 2010. The Clean Air for Europe (CAFE) programme, launched by the European Commission in 2001, aimed to develop a Thematic Strategy on Air Pollution defining the ambition level for further improvements in some key environmental problem areas related to air pollution in the European Community up to the year 2020. The Thematic Strategy on Air Pollution was adopted by the Commission on 21 September 2005. Along with the strategy, the Commission proposed a new Directive on ambient air quality and cleaner air for Europe (the "CAFE Directive", COM(2005) 447 final). This proposal aims to revise and combine a number of separate instruments into a single legal act<sup>13</sup>, as well as introducing new provisions on PM<sub>2.5</sub><sup>14</sup>. A Common Position was reached in the Council on 23 October 2006.

Releases of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM) from vehicles are covered under the vehicle emission standards (so-called Euro standards). These are all measured separately for petrol and diesel cars as well as light and heavy goods vehicle classes, and contain maximum permitted emissions over a standard drive cycle. There are currently four stages for cars and Light Commercial Vehicles (LCVs) – conventionally labelled with Arabic numerals - that have progressively tighter emissions limits. Euro 4 has been in force for new types of vehicles since 1 January 2005 for new types of vehicles, and since 1 January 2006 for all new vehicles. A proposal for a further Euro 5 stage has been proposed in December 2005 (COM(2005)683 final). During the debate in the Council and European Parliament, a further Euro 6 stage has been inserted into the draft. The Commission's original proposal included the following elements:

- An 80% reduction in PM emissions from diesel cars.
- A 20% reduction in NO<sub>x</sub> emissions from diesel cars.
- Further reductions in emissions of NO<sub>x</sub> and HC from gasoline cars.
- Introduction of a particulate emission limit for lean burn direct injection petrol cars.
- Intention to introduce a particulate number standard.
- Extension of the durability period over which manufacturers must confirm the functioning of emission control devices.
- Removal of an exemption that enabled passenger vehicles with a mass of over 2500kg to be type approved using emission standards of light commercial vehicles.
- Introducing an implementation date of 18 months after the entry into force of the regulation for new type approvals and 36 months for all types.

The possible further Euro 6 stage would reduce especially the NO<sub>x</sub> emissions from diesel vehicles.

There are currently five emission classes (plus EEV) for Heavy Duty Vehicles (HDVs), conventionally labelled with Roman numerals. Euro IV has entered into force on 1 October 2004 for new types of vehicles, while Euro V will enter into force on 1 October 2008. A

<sup>12</sup> Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management; OJ NO. L 296, 21/11/1996 P. 0055.

<sup>13</sup> The Framework Directive 96/62/EC, the first Daughter Directive 1999/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air, the second Daughter Directive 2000/69/EC relating to limit values for benzene and carbon monoxide in ambient air, the third Daughter Directive 2002/3/EC relating to ozone in ambient air, and the Exchange of Information Decision 97/101/EC

<sup>14</sup> A concentration cap of 25µg/m<sup>3</sup> annual average; monitoring of PM<sub>2.5</sub> concentrations; and a target to reduce national average measured urban background concentration by 20% between 2010 and 2020 subject to a later review where differentiated legal objectives in the Member States are to be proposed.

proposal for a further, Euro VI stage has been announced in the Thematic Strategy on air pollution and is contained in the Commission's work programme for 2007.

The stakeholder consultations for these proposed new emission limits have shown only one parameter to be of importance for them to be met, which is the availability of fuel with 10ppm sulphur content.

### 1.2.3 Fuel Quality

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

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

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

A general ban on the marketing of leaded petrol was agreed by EU institutions from 2000. Sulphur is of particular interest as its presence in fuels can harm the effectiveness of several existing and emerging automotive technologies such as three-way catalytic converters, oxidation catalysts, NO<sub>x</sub> adsorber catalysts (NACs) and particulate traps. The mandatory limit for sulphur in 2005 is set at 50 ppm for petrol and diesel. Some EU states already provided fuel in previous years at <50 ppm ahead of this mandatory requirement. Debate as to whether the 2005 limit should be reduced further prompted the EC to launch a consultation with stakeholders in 2000<sup>15</sup>. The decision to amend Directive 98/70/EC resulted in a requirement for introduction of sulphur-free fuel (<10 ppm sulphur) to be made available “*on an appropriately balanced geographical basis*” from January 2005<sup>16</sup> (with annual reporting in availability<sup>17</sup>). Full mandatory conversion to sulphur-free petrol is to be achieved by 2009 (whether to confirm the provisional date of 2009 is being considered for diesel in the current review). These requirements are implemented under the amending Directive 2003/17/EC<sup>18</sup>.

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

<sup>15</sup> The results of this consultation may be found on in the following report available on DG Environment's website: 'Consultation on the Need to Reduce the Sulphur Content of Petrol and Diesel Fuels Below 50 ppm: - A Policy Maker's Summary'. A report produced for the European Commission, DG Environment; George Marsh, Nikolas Hill and Jessica Sully, November 2000; AEA Technology Environment, UK.

<sup>16</sup> Directive 98/70/EC also specifies that Member States shall adopt and publish the laws, regulations and administrative provisions necessary to comply with the Directive by 30 June 2003.

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

<sup>18</sup> O.J. L76 of 22.3.2003, p. 10

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

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

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

### **Reporting on Fuel Quality in 2005**

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

1. Specification of information requirements in order to set up the FQMS, including regional level data (number of refuelling stations, sales, population and number of vehicles);
2. The system is to be run twice a year, for the summer and the winter periods (as summer and winter fuels have different specifications);
3. Specification of the minimum number of sample sites of fuel grades required (in order to make the FQMS as robust and representative as possible), depending on the statistical model being used (chosen depending on the size of the country and how it is split into regions);
4. Specification of a list of all retail (public vehicle) and commercial (private fleet) fuel dispensing sites is required (by region) and that sampling should take place across randomly selected samples of these;
5. Specification of the minimum number of samples/sites for fuel grades with less than 10% of sales.

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

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

## 2 Member State Summaries: Reporting Format and Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

number of fuel grades available and the sales volumes of different types of fuel.

- Summary of sampling requirements:

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

- Builds on and expands the reporting format specified in Commission Decision 2002/159/EC.

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

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

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

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

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

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

## **2.1 FUEL AVAILABILITY**

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

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



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

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

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

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

### 2.1.1 Sales

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

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

- 1) **Parent fuel grades** – defined according to Directive 98/70/EC (i.e. minimum RON 91 unleaded or minimum RON 95 unleaded petrol);



- 2) **National fuel grades** – defined at a national level with additional requirements to the Directive parent grades, for example minimum RON 98 unleaded petrol, or sulphur-free fuels;
- 3) **Marketed fuel grades** – fuels may be marketed and sold by fuel suppliers as distinct grades with additional specifications beyond Directive and national requirements, e.g. higher RON levels or sulphur-free fuel grades;
- 4) **Sulphur content split of fuel grades** – in some cases fuels are available meeting lower (e.g. sulphur-free) sulphur specifications to those required by the Directive or Nationally, but not specifically marketed as a separate grade by fuel suppliers.

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

### 2.1.2 Sulphur content

As outlined in section 1.2.3, according to the Directive, the sulphur content of all petrol and diesel sold in the EU must be less than 50ppm ('low' sulphur) from 1 January 2005. In addition, 'sulphur-free' petrol (<10ppm sulphur) must be made available "on an appropriately balanced geographical basis"<sup>19</sup>.

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

- **Geographical availability of sulphur-free fuels:** Reporting required by Directive 2003/17/EC. Ideally this should be determined by one of the methods in the Commission guidance note (Recommendation 2005/27/EC<sup>20</sup>), except in special cases where there is very high availability (e.g. 60-80%) or a single terminal/island market.
- **Are sulphur-free grades clearly labelled differently / marketed separately? :** Separate labelling and marketing is not strictly required by the Directives, but it is important for consumers to have the opportunity to choose sulphur-free fuels. This is essentially a prerequisite for the introduction of vehicles using technology requiring the fuels before full mandatory introduction in 2009.
- **Average sulphur content of all petrol and diesel sold:** the mean sulphur content of sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold
- **Additional information.**

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

---

<sup>19</sup> Article 3(2) & Article 4 (1) of (amended) Directive 98/70/EC

<sup>20</sup> Commission Recommendation 2005/27/EC of 12 January 2005 on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis.

## 2.2 FUEL QUALITY MONITORING

### 2.2.1 Description of system

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

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

### 2.2.2 Sampling and reporting

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

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

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

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

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

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

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

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

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

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

Model A – Macro regions

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

Model B – Non-macro region

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

Model C – Non-region model

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

### 2.2.3 Compliance with fuel quality limit values

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

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

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

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

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

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

## 2.3 Temporal trends

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

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

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

## 2.4 Member State Summaries

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

### Key Areas for Improvement

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

### 3 Austria

#### 3.1 Fuel Availability 2005

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

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

##### 3.1.1 Sales

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

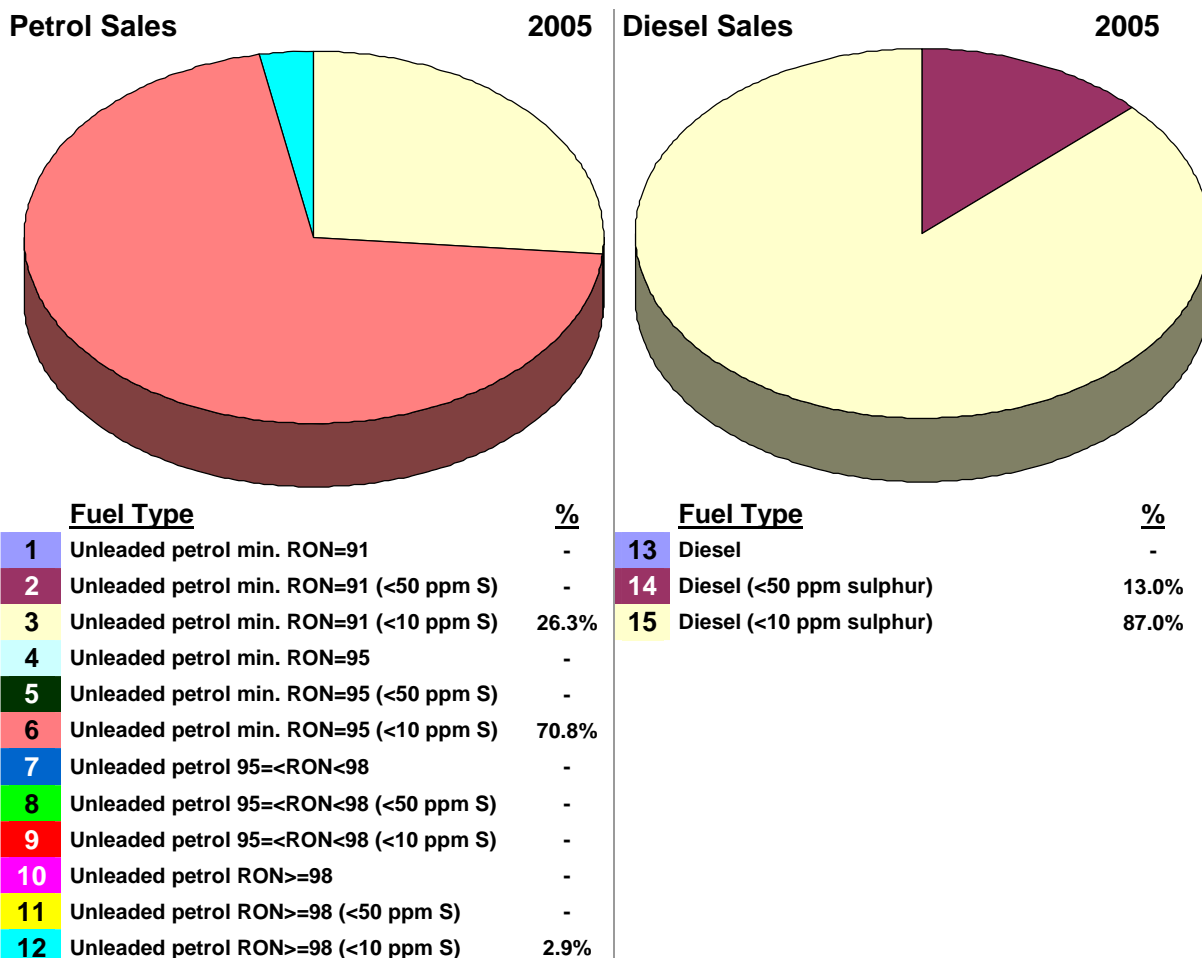


Figure 3.1 clearly shows that RON 91 petrol was still sold widely in Austria in 2005, accounting for 26% sales (30% in 2001), sales of RON 95 petrol were 71% compared to 65% in 2001, with RON 98 only accounting for 3% sales. Sales of sulphur free (<10 ppm) petrol

have increased significantly from just over 4% of sales to 100% in 2005. Since 2003 significant quantities of sulphur-free diesel have been made available and comprised 87% (extrapolated from sampling) of sales in 2005 (74% in 2004).

### 3.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** An agreement was made in 2003 between the Federal Minister for Land, Forest, Environment and Water Management and the General Director of OMV AG (Austrian mineral oil administration) that from the 1st January 2004 a countrywide availability of sulphur free petrol and diesel will be guaranteed. From February 2004 it can be assumed that S-free fuel will be available on a country-wide level from all public petrol stations. All petrol was sulphur-free in 2005, and most of the diesel (87% extrapolated from 100 samples).

**Are sulphur-free grades clearly labelled differently / marketed separately?** Sulphur free fuels are not labelled, however all petrol is sulphur-free and most of the diesel.

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

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001, see Table 3.1.

**Additional information:**

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

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

AT	Average Sulphur Content, ppm					EU25
Fuel/Year	2001	2002	2003	2004	2005	2005
Petrol	21	17	14	7	5	19
Diesel	277	236	213	14	13	25

## 3.2 Fuel Quality Monitoring 2005

### 3.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** Austria is served by a single refinery installation (Refinery Schwechat), accounting for approximately 70% of the total domestic petrol use as well as approximately 56% of diesel fuel use. The remaining demand is accounted for by imports from Germany, Italy, Slovakia and Hungary. Data on the regional distribution of the imported fuel in Austria is not available at the current time. The fuel controls carried out in recent years show no regional quality differences from which it can be assumed that there is a continual single quality of imported and domestically produced fuel.

### 3.2.2 Sampling and reporting

Austria was fully compliant with the sampling and reporting requirements in 2005. The following Table 3.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	26.3%	50	50	100	Yes	All of 18	
6	RON 95 <10 ppm S	6	70.8%	50	50	100	Yes	All of 18	
12	RON 98 <10 ppm S	12	2.9%	0	5	3	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>100</b>	<b>105</b>	<b>100</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	13.0%	50	50	100	Yes	All of 5	
15	Diesel <10 ppm S	14	87.0%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

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

### 3.2.3 Compliance with fuel quality limit values

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

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

#### **Normal Petrol**

**Detail:** Motor Octane Number (MON) minimum limit value (80.9) was not complied with by 1 sample (with 82.8) and summer vapour pressure (maximum 60) limit value was exceeded by 2 samples (max 62 kPa).

**Statistical significance:** The MON tolerance limit for statistical significance is 80.5, therefore this sample could not be judged non-compliant. The tolerance limit for the vapour pressure test method is 61.7 kPa and both samples were non-compliant with the Directive with respect to summer vapour pressure.

**Member State's notes:** -

#### **Super Petrol**

**Detail:** Motor Octane Number (MON) minimum limit value (85) was not complied with by 1 sample (with 82.8) and the Aromatics limit (35 %v/v) was exceeded by another sample (with 36.5).

**Statistical significance:** The tolerance limits for statistical significance for the test methods



were exceeded and these samples were non-compliant with the Directive.

Member State's notes: -

### Super Plus Petrol

All samples tested were in compliance with limit values.

### Diesel

Detail: Sulphur content (maximum 50ppm) limit values were exceeded by 2 samples, and the Distillation 95% point was exceeded by 1 sample.

Statistical significance: The tolerance limit for statistical significance for the were exceeded and the samples were non-compliant with the Directive.

Member State's notes: -

## 3.3 Temporal trends

The following Figure 3.2 to Figure 3.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol and diesel have both the increased, by 3% (down since 2004) and 38% respectively since 2001. However, of the petrol sales, regular grade sales have all converted to sulphur-free (< 10 ppm) grades and also now make up the majority of diesel sales (87%).

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

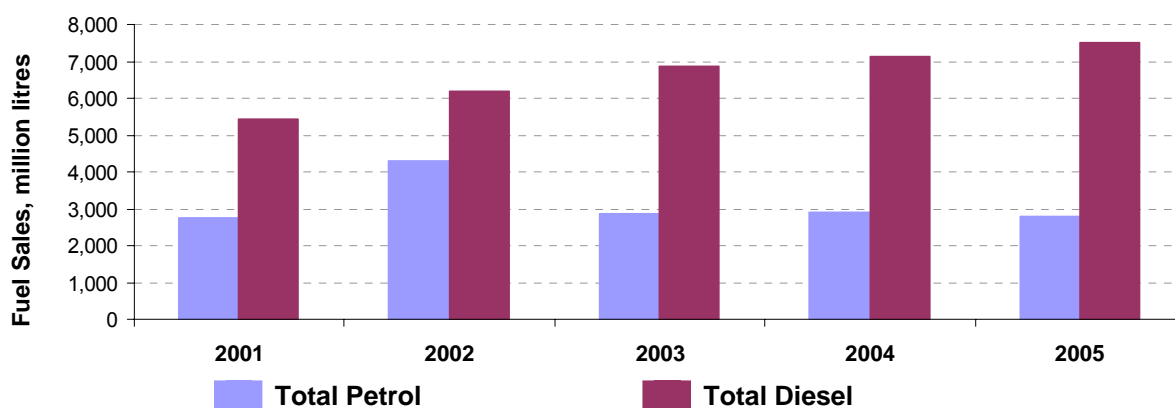
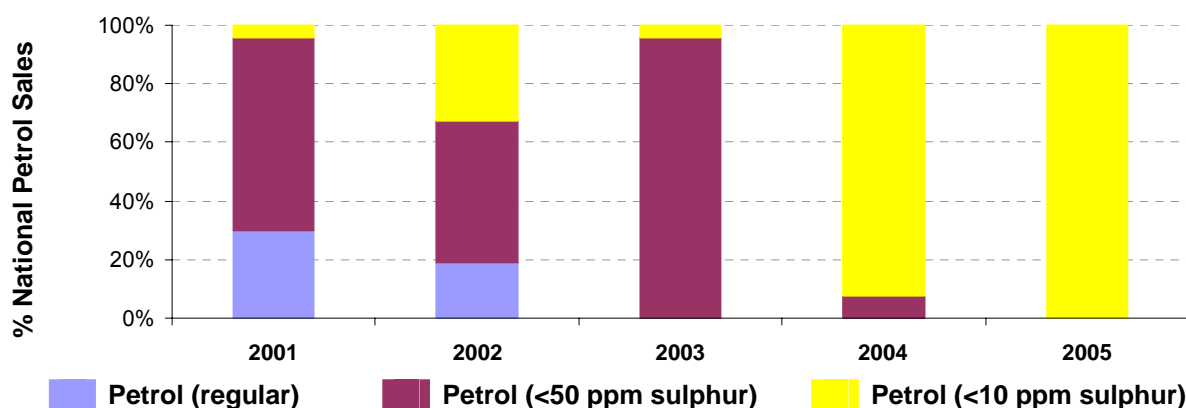


Figure 3.3: Temporal trends in national sales of low sulphur petrol (%)



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

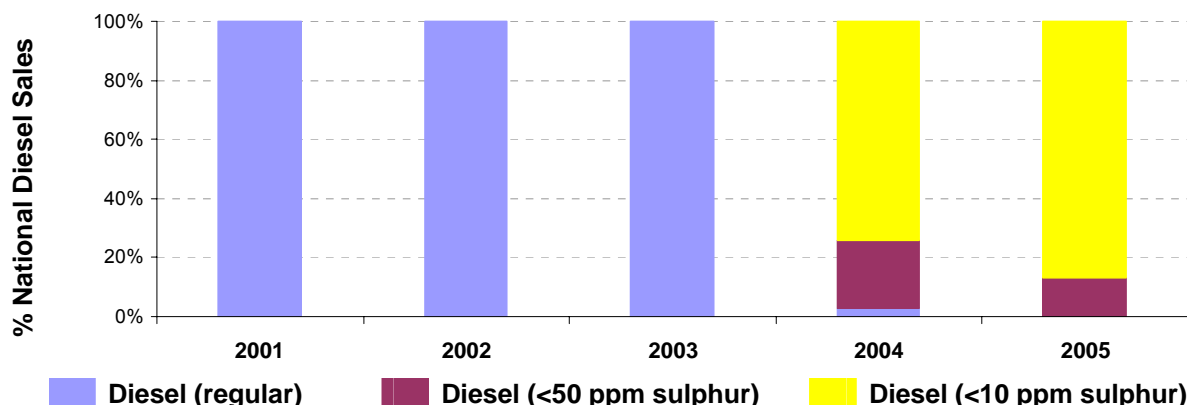
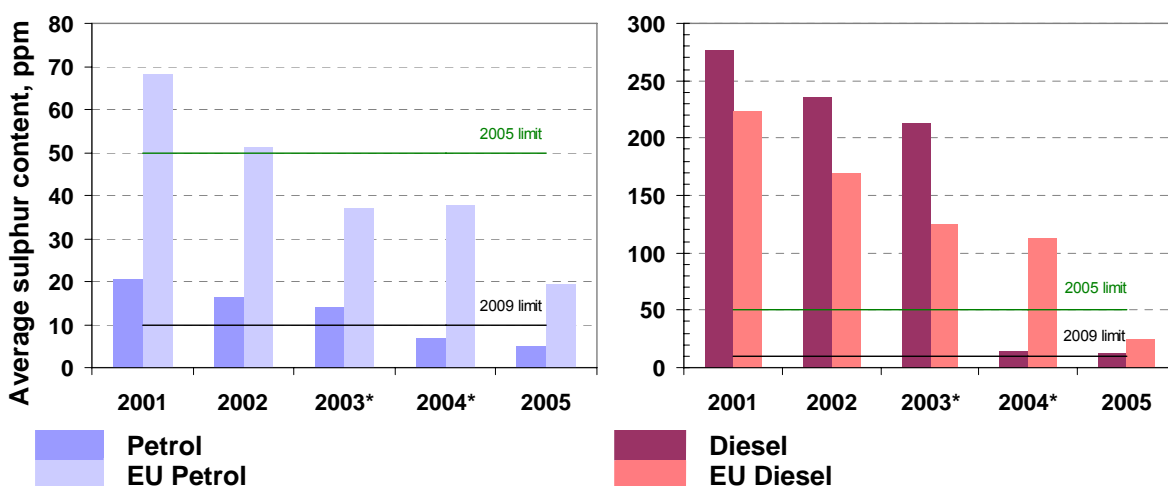


Figure 3.1 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The reduction in average sulphur content of both petrol and diesel fuels since 2001 continued in 2005 with full market conversion to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

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



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

### 3.4 Key Areas for Improvement

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

#### Key Areas for Improvement

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

## 4 Belgium

### 4.1 Fuel Availability 2005

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

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

#### 4.1.1 Sales

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

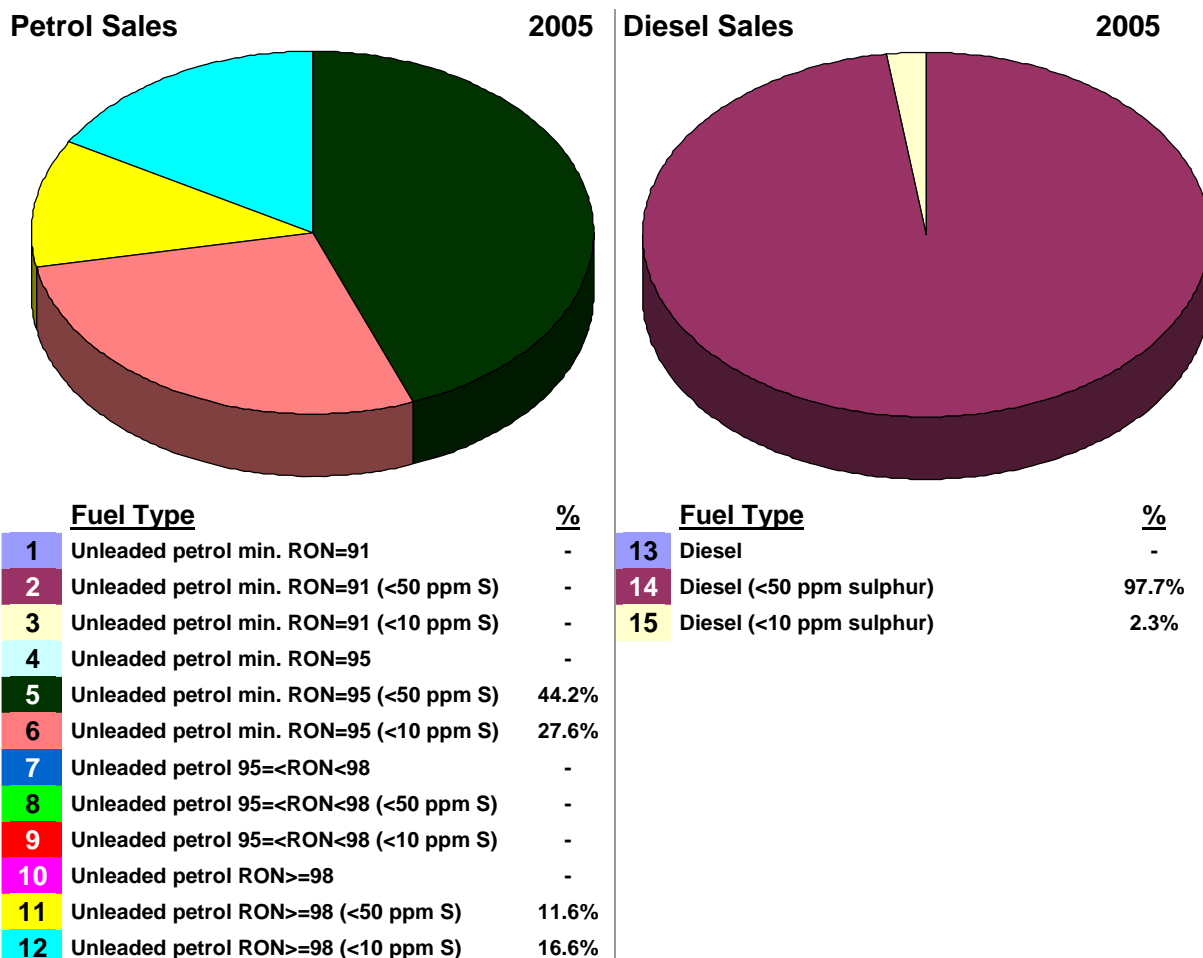


Figure 4.1 above shows that the majority (72% compared to 70% in 2004) of petrol sold in Belgium in 2005 was still RON 95 (up from 66% in 2001), with the remainder being sales of RON <98 fuel. Between 2002 and 2003 Belgium switched completely from regular RON <98

to low sulphur (<50 ppm) RON <98 and between 2003 and 2004 switched from regular to low sulphur RON 95 fuel. Low sulphur diesel (< 50 ppm) has comprised 100% of sales since beginning of 2002. Sales of fuels complying with the <10ppm limit value have been provided based upon the analysis data, although specific grades were not available (about 44% petrol and just over 2% of diesel).

#### 4.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** around 44% of samples of petrol fuel had a sulphur content of <10 ppm, based on the analysis results. The value for diesel was just over 2%.

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

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

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

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

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

BE	Average Sulphur Content, ppm					EU25
Fuel/Year	2001	2002	2003	2004	2005	2004
Petrol	68	44	42	33	14	19
Diesel	269	47	40	40	31	25

## 4.2 Fuel Quality Monitoring 2005

### 4.2.1 Description of system

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

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

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

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

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

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

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

**Collection of sales data:** National petroleum statistics

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

hours following collection. In case of non-compliance of the sample, another registered laboratory ensures a second check within 24 hours, thus the administration has final results within 2 to 3 days after the initial sampling. If the first registered laboratory for the analyses notices that one of the parameters does not respect the standard, the Administration of Energy gives the benefits of doubt to the oil station and does not follow the case. If the second check confirms the breach, the pump attendant is quickly informed by the Administration of Energy. They are aware that they have to replace the non-compliant fuel within 24 hours and that they will be subject to a new control in the following days. Charges varying between 125 to 250 euros are transferred to the concerned pump attendant as a result of the analysis of the non-compliant samples, as a kind of fine.

In 1996, more than 13% of samples were not compliant with standards, in 2000 this percentage dropped to 2% but in 2002 abnormal samples increased to 5.4% and down to 3.94% in 2005. This is due mainly to the extension of checking to private stations and to a shortfall of sales of fuels with substitutes of lead, which leads to breaches on the parameter of vapour pressure (there is still some left over winter quality during summer months).

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

The number of public refuelling points has reduced from 4414 in 2001 down to 3458 in 2005. Although the total number of samples has also reduced, proportionally more are taken on average per refuelling station.

#### 4.2.2 Sampling and reporting

Belgium was for the most part compliant with the sampling and reporting requirements in 2005, however no information on oxygen content was reported, there was not separate reporting for summer and winter and no information was provided on equivalence to the requirements of EN 14274. However, sampling numbers are extremely high in comparison to other Member States, so it is expected that the Belgian system gives a high level of confidence. The following Table 4.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC. Analysis data was only provided for public refuelling stations, however additional information on measurements at private refuelling points were provided in an accompanying report.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	44.2%	1246	1384	-	No	17 of 18	(1)
6	RON 95 <10 ppm S	5	27.6%	0	0	-			
11	RON 98 <50 ppm S	11	11.6%	1084	1243	-	No	17 of 18	(1)
12	RON 98 <10 ppm S	11	16.6%	0	0	-			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>2330</b>	<b>2627</b>	-	<b>No</b>	<b>17 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	97.7%	1791	1957	-	No	5 of 5	
15	Diesel <10 ppm S	14	2.3%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>1791</b>	<b>1957</b>	-	<b>No</b>	<b>5 of 5</b>	

**Notes:** S = Summer; W = Winter  
(1) Oxygen content has not been reported

### 4.2.3 Compliance with fuel quality limit values

Analysis data was only provided for public refuelling stations, however additional information on measurements at private refuelling points were provided in an accompanying report.

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

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

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

*Detail:* Of the 2630 public and 38 private samples, 92 and 9 samples respectively were non-compliant. For public stations non-compliances included 9 exceeding the limit values for RON, 7 for MON, 85 summer vapour pressure (DVPE), 2 for distillation - evaporation at 150°C, and 1 sample for sulphur content. For private stations there were 9 infringements of vapour pressure and 1 of aromatics.

*Statistical significance:* These samples were in non-compliance with the Directive.

*Member State's notes:* Non-compliant samples for vapour pressure were deemed mostly due to low rotation of stocks in transition periods between winter and summer grades. See also section 4.2.

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

*Detail:* Of the 2327 public and 48 private samples, 114 and 15 samples respectively were non-compliant. For public stations non-compliances included 17 for RON, 26 for MON, 79 for summer vapour pressure (DVPE) and 18 for distillation-evaporation at 100°C and 150°C. For private stations non-compliances included 11 for vapour pressure, 3 for RON, 5 for MON and 1 for aromatics.

*Statistical significance:* These samples were in non-compliance with the Directive.

*Member State's notes:* Non-compliant samples for vapour pressure were deemed mostly due to low rotation of stocks in transition periods between winter and summer grades. See also section 4.2.

##### **Diesel**

*Detail:* Of the 3748 public and 1524 private samples, 40 and 192 samples respectively were non-compliant. For public stations 15 samples exceeded the limit values for density and 25 the sulphur limit. For private stations 2 samples exceeded the limit values for Density at 15 C and 192 the sulphur limit value.

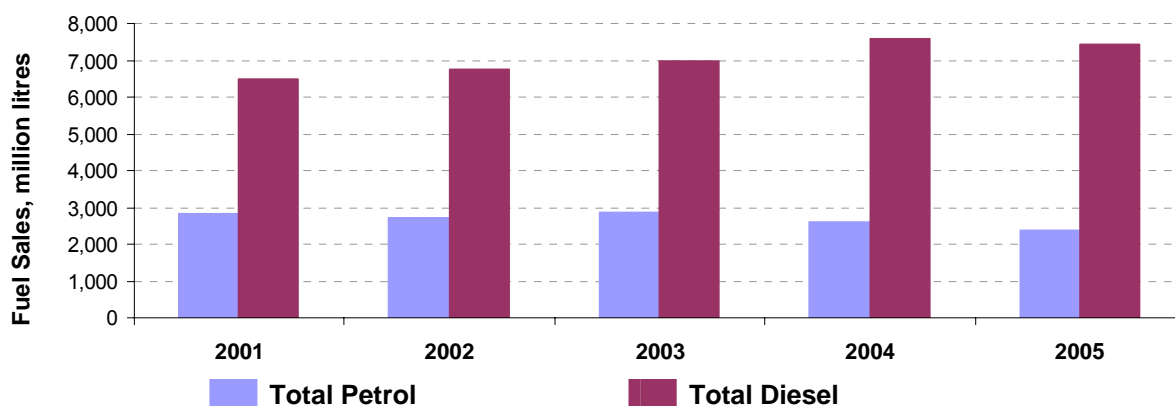
*Statistical significance:* These samples were in non-compliance with the Directive.

*Member State's notes:* Non-compliant samples were deemed mostly due to contamination with other higher sulphur fuels. Only 8 of the samples were higher than 100ppm. See also section 4.2.

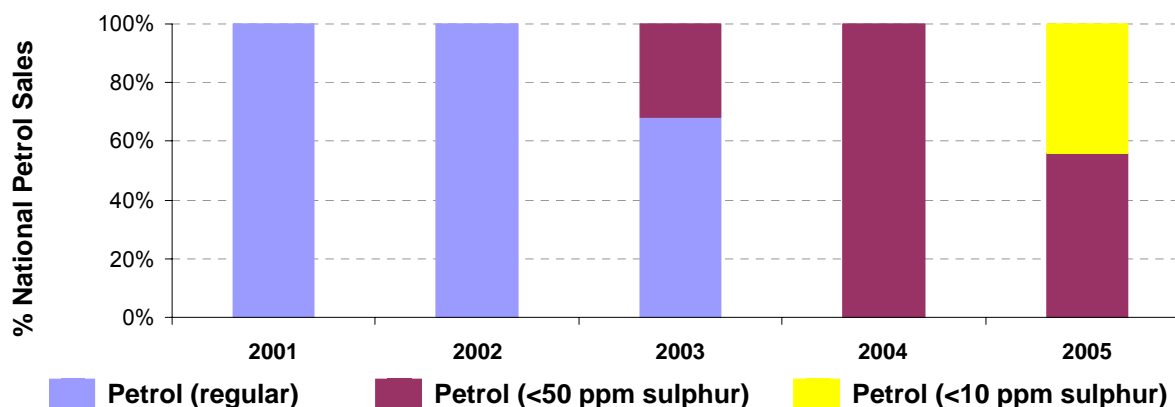
### 4.3 Temporal trends

The following Figure 4.2 to Figure 4.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol have decreased by 15% since 2001, whilst those of diesel have increased by 15%. However, regular grades of petrol and diesel have been completely phased out – low sulphur diesel was introduced in 2002, low sulphur RON 98 became available for the first time in 2003 and low sulphur RON 95 was introduced in 2004. Information on the proportion of sales being sulphur-free (44% for petrol, just over 2% for diesel) is based upon analysis results, as specific grades were not available in 2005.

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



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



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

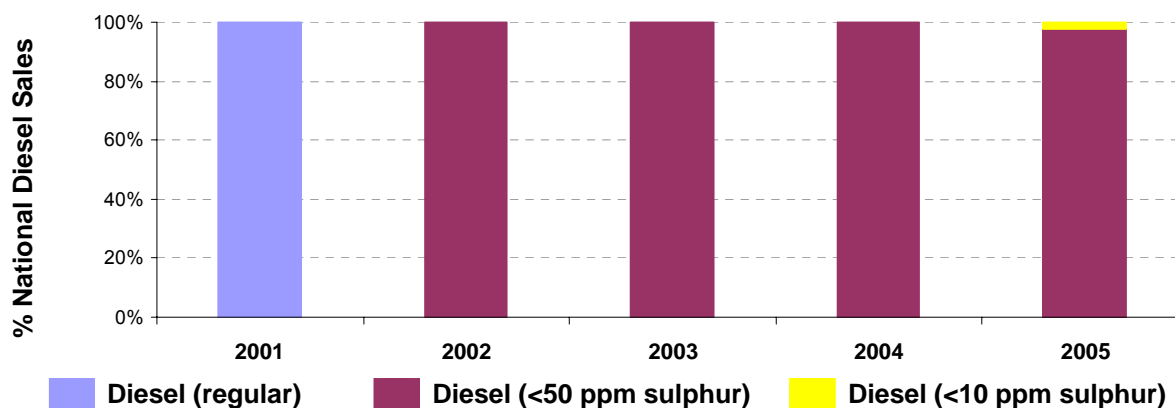
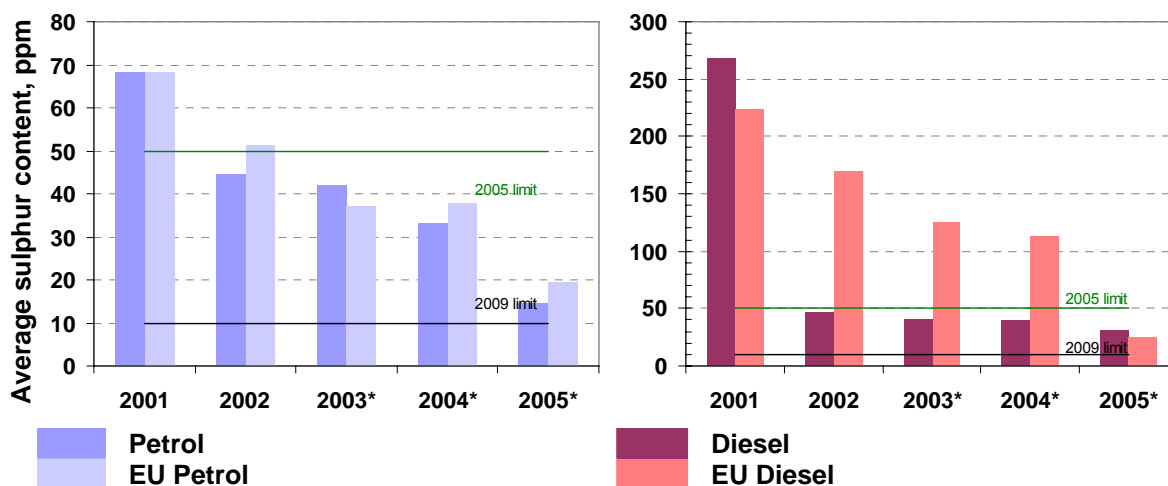


Figure 4.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). Average sulphur content of petrol has reduced by about half since 2004 and are above EU averages. Diesel sulphur levels are above the EU average and have not significantly reduced since 2004.

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



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

## 4.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The report submission was received after the 30 June deadline – over 5 months late.
- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle. Specific sulphur free fuel grades are not available, although fuels meeting the <10ppm specification do appear to have been sold. Information on geographical availability was therefore also absent from the report.
- Belgium has reported a higher proportion of non-compliant samples than other Member States (although this has improved compliance levels on previous years).
- Summer and winter results should ideally be reported separately.



## 5 Cyprus

### 5.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Unleaded RON 95	5
11	RON 98	<50 ppm	Unleaded RON 98 and RON 100	11
14	Diesel	<50 ppm	Diesel	14

#### 5.1.1 Sales

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

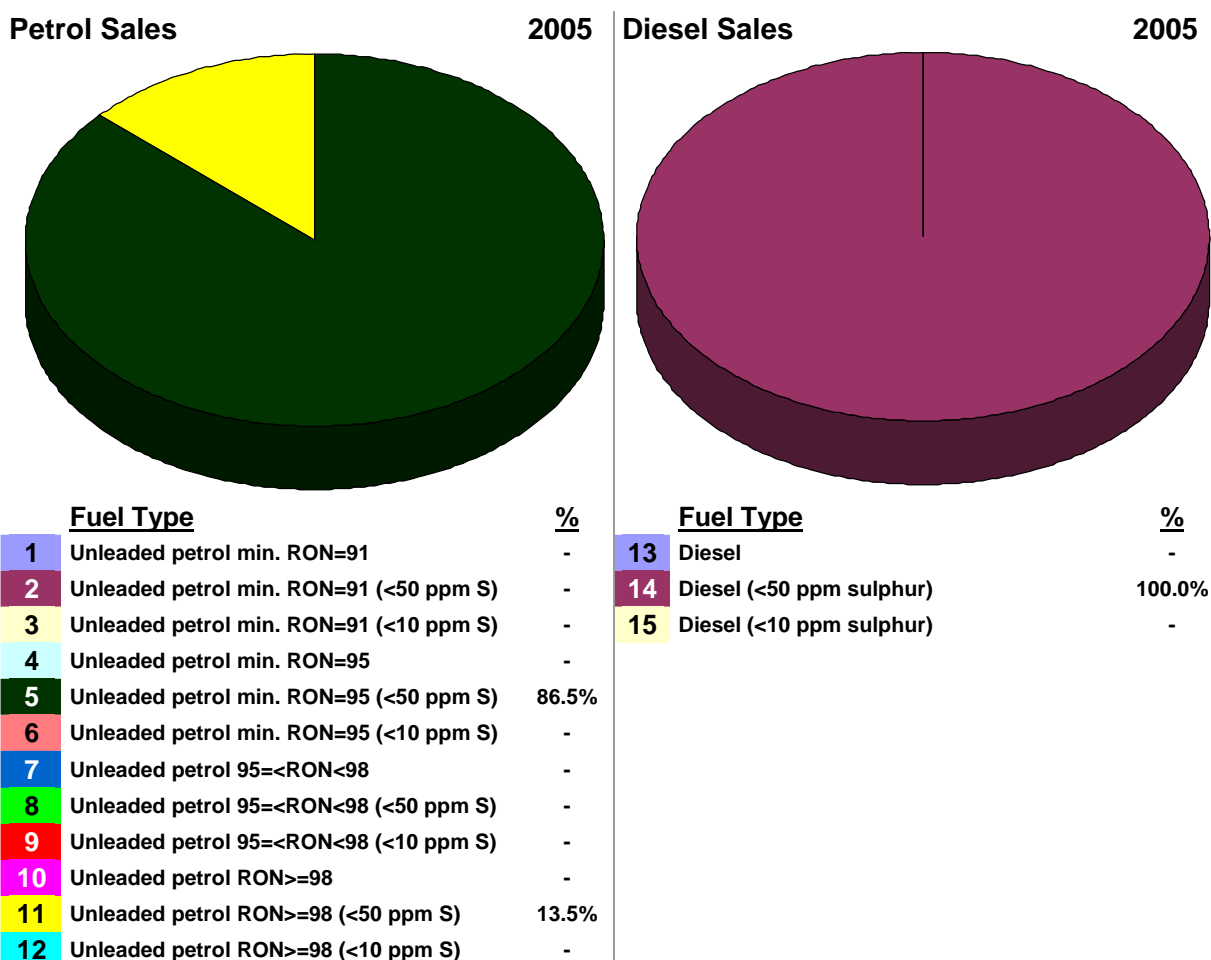


Figure 5.1 shows the majority of fuel available in 2005 in Cyprus was RON 95 (86.5%, up from 83% in 2004) and that no specific sulphur-free grades of petrol or diesel were available.

## 5.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** none available in 2005. The Ministry of Commerce, Industry and Tourism is considering introducing into the island oil market diesel produced from natural gas as an alternative fuel.

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

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** None available.

**Average sulphur content of all petrol and diesel sold:** Table 5.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

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

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

CY	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Fuel/Year</b>						
<b>Petrol</b>				70	30	19
<b>Diesel</b>				197	46	25

## 5.2 Fuel Quality Monitoring 2005

### 5.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** Cyprus is dependent completely on imported petroleum products. The network of importing, handling and distributing of petroleum products in Cyprus is compact and simple in operation. The installations of the oil marketing companies and the tank farm of the Cyprus Oil Terminal Ltd (former refinery) are located in a single depot at the Larnaca coastal area. There are 250 petrol stations throughout the country.

## 5.2.2 Sampling and reporting

Cyprus was essentially compliant with the sampling and reporting requirements in 2005. The following Table 5.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Category	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	86.5%	34	48	-	No	11 of 18	(1)
11	RON 98 <50 ppm S	11	13.5%	32	35	-	No	11 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>66</b>	<b>83</b>	<b>-</b>	<b>No</b>	<b>11 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	100.0%	37	118	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>37</b>	<b>118</b>	<b>-</b>	<b>No</b>	<b>5 of 5</b>	

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

- (1) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenates test methods. However, the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear whether this has been carried out. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.

## 5.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

All samples tested were in compliance with limit values

#### **RON 98 Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

**Detail:** Distillation 95% point limit values (max 360 °C) was exceeded by some samples with a maximum of 491 °C and sulphur content was exceeded by 19 samples, with a maximum of 212 ppm.

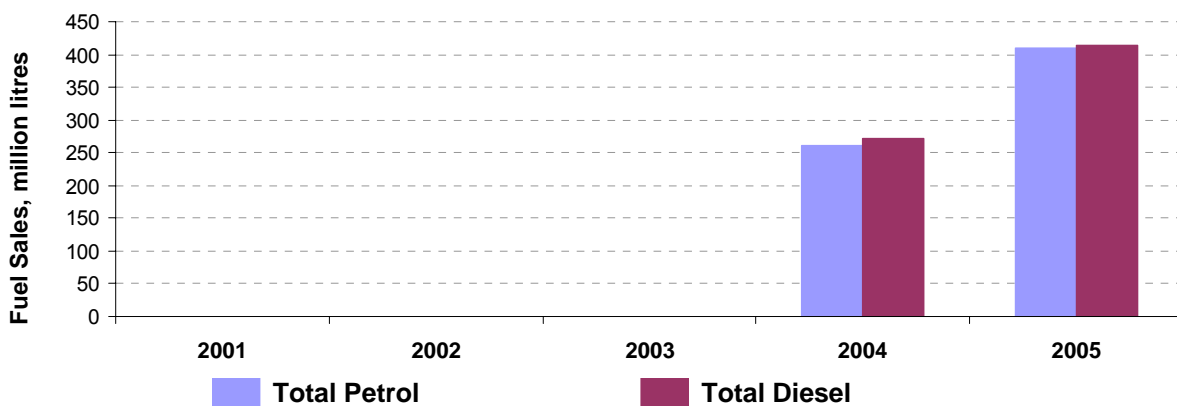
**Statistical significance:** The tolerance limit for statistical significance for the test method were exceeded for these samples, which were therefore non-compliant with the Directive.

**Member State's notes:** During the transition period for the replacement of diesel with 350 ppm sulphur content with diesel 50 ppm (beginning of January 2005), nineteen (19) samples of diesel, taken mostly from petrol stations with low volume of sales, were not in compliance regarding sulphur content specification. Six (6) samples from the nineteen were not in compliance with distillation 95% specification. All quantities of diesel were immediately downgraded as heating gas oil.

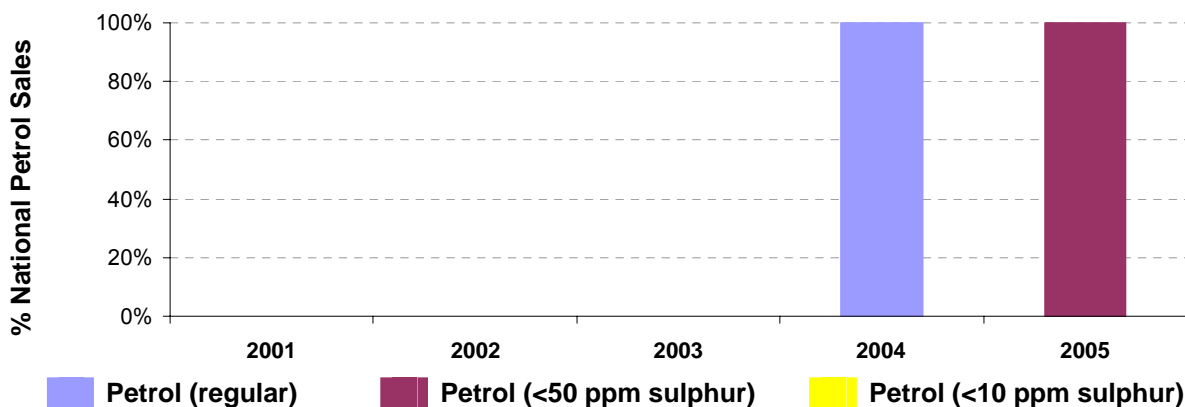
### 5.3 Temporal trends

The following Figure 5.2 to Figure 5.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since the first year of reporting for the new EU Member States in 2004, sales have increased by over 50% for petrol and diesel. However for 2004 Cyprus data only included sales May to December, so the actual annual increase is likely to be much smaller.

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



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



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

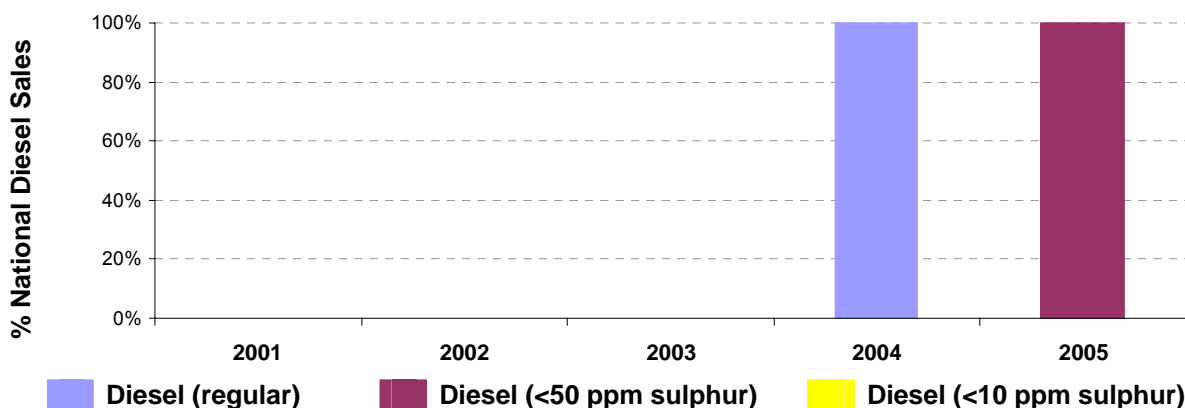
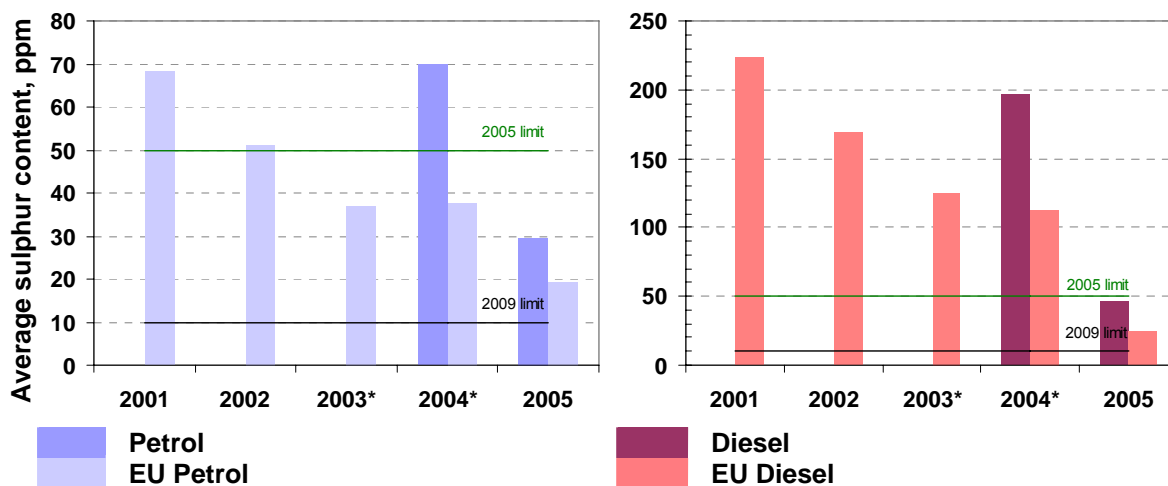


Figure 5.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). Average sulphur content has reduced since 2004, with the mandatory limit of <50ppm since the start of 2005. Sulphur levels are above EU averages.

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



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

## 5.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Sulphur free fuels are not available as required under the Directive.
- The report submission was received after the 30 June deadline - up to 1 month late.
- A few non-compliances with diesel limit values were reported due to the transition to <50 ppm fuels and low throughputs in early 2005.

## 6 Czech Republic

### 6.1 Fuel Availability 2005

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

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

#### 6.1.1 Sales

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

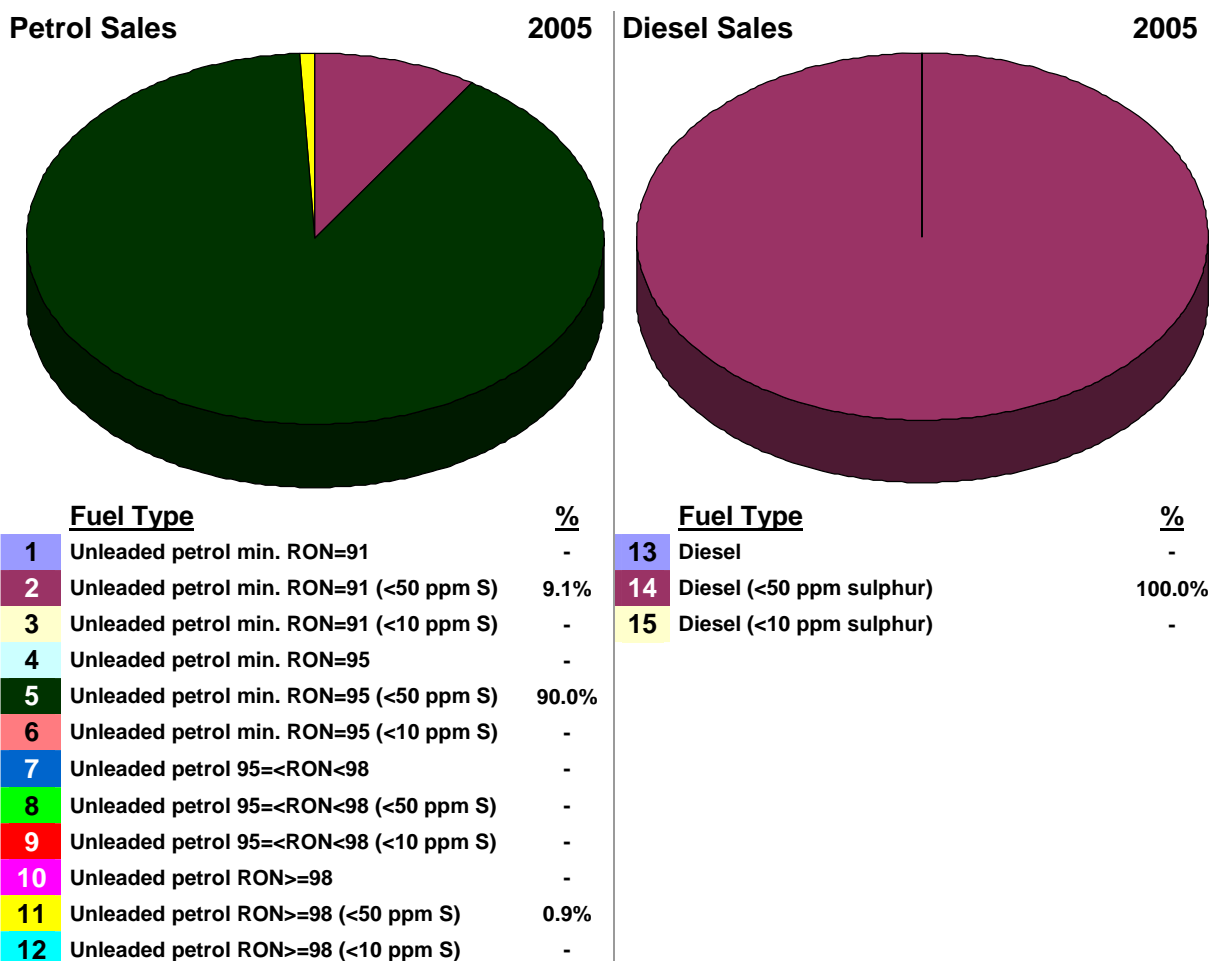


Figure 6.1 shows only low sulphur fuel grade is where available in 2005. Ron 91 only comprised of over 9% of Petrol Sales (10% in 2004), with RON 95 accounting for 90% (88% in 2004) and RON 98 only 1% (same as 2004). There was only one grade of diesel available.

## 6.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur-free fuels are available, but not marketed separately – this is planned for 2007.

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

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

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

**Additional information:**

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

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

CZ	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
Fuel/Year						
Petrol				132	27	19
Diesel				238	32	25

## 6.2 Fuel Quality Monitoring 2005

### 6.2.1 Description of system

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

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

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

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

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

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

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

**Collection of sales data:** Data about Total Sales of Petrol and Diesel are taken from the statistics figures kept by the Ministry of Industry and Trade of the Czech Republic for its needs. The Czech Statistical Office does not monitor data about unleaded petrol from the point of view of fuel grade (minimum RON = 91, 95 or 98).

**Other details:** Sampling was carried out by CTI. Outlets with samples in non-compliance with limit values are sampled more frequently. In the event that serious reaches of fuel quality standards are discovered, the Czech Commercial Inspectorate has the responsibility of applying financial sanctions or closing the refuelling station until such time as fuel quality is judged to have been restored.

## 6.2.2 Sampling and reporting

The Czech Republic was essentially compliant with the sampling and reporting requirements in 2005, however it did not separately report analyses of samples from summer and winter periods [but have stated they will report these separately for 2006 monitoring]. The following Table 6.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
2	RON 91 <50ppm S	2	9.1%	154	143	10	No	All of 18	
5	RON 95 <50 ppm S	5	90.0%	569	503	100	No	All of 18	
11	RON 98 <50 ppm S	11	0.9%	7	5	1	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>730</b>	<b>651</b>	<b>111</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	876	777	100	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>876</b>	<b>777</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

Notes: S = Summer; W = Winter

## 6.2.3 Compliance with fuel quality limit values

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

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

#### **RON 91 Petrol**

**Detail:** The RON, summer vapour pressure, oxygen content, ethanol and sulphur limit values (of min 91, 60.0 kPa, min. 2.7 %v/v, 5 %v/v, 50 ppm) were exceeded by 1, 2, 1, 2 and 6 samples respectively. .

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

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

#### **RON 95 Petrol**

**Detail:** The RON, MON, summer vapour pressure, distillation at 100°C and 150 °C, aromatics, benzene, oxygen content, ethanol and sulphur limit values (of min. 95, min. 85, 60.0 kPa, min. 46 %v/v, min 75 %v/v, 35.0 %v/v, 1.0 %v/v, 2.7 %m/m, 5.0 %v/v and 50 ppm) were exceeded by 22, 19, 1, 4, 1, 4, 4, 7, 8 and 2 samples respectively.

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

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



### RON 98 Petrol

All samples tested were in compliance with limit values.

### Diesel

*Detail:* The cetane number, density at 15°C, distillation 95 % point and sulphur content limit values (of min. 51, 845 kg/m<sup>3</sup>, 360°C and 350 ppm) were exceeded by 1, 3, 42 and 63 samples. (The very high values for distillation – up to 422.5 – and sulphur content – up to 1840 – in some samples suggests contamination or substitution with gas oil.)

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

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

## 6.3 Temporal trends

The following Figure 6.2 to Figure 6.5 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Although for the new Member States 2005 was the first full year of reporting, Czech Republic also supplied full sales data for the 2004 year. In 2004 sales comprised 100% 'regular' petrol and diesel fuels, with a shift to 100% low sulphur (<50 ppm) fuels in 2005. The result was a significant reduction in sulphur content, to well below the 2005 limit (<50 ppm) but above the EU average for both petrol and diesel.

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

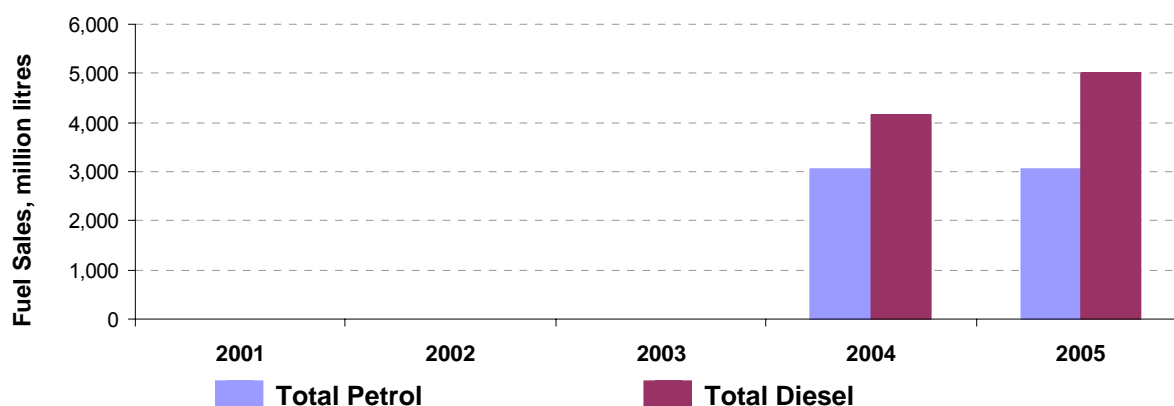


Figure 6.3: Temporal trends in national sales of low sulphur petrol (%)

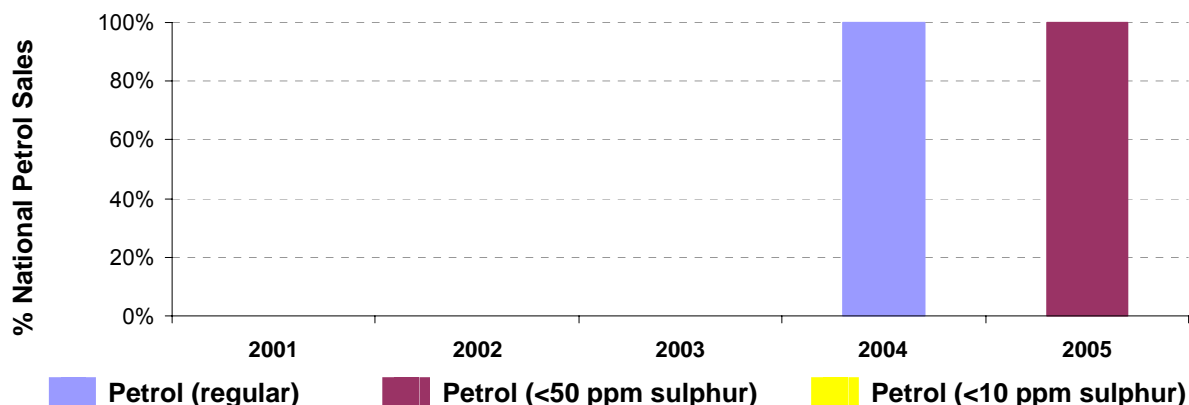


Figure 6.4: Temporal trends in national sales of low sulphur diesel (%)

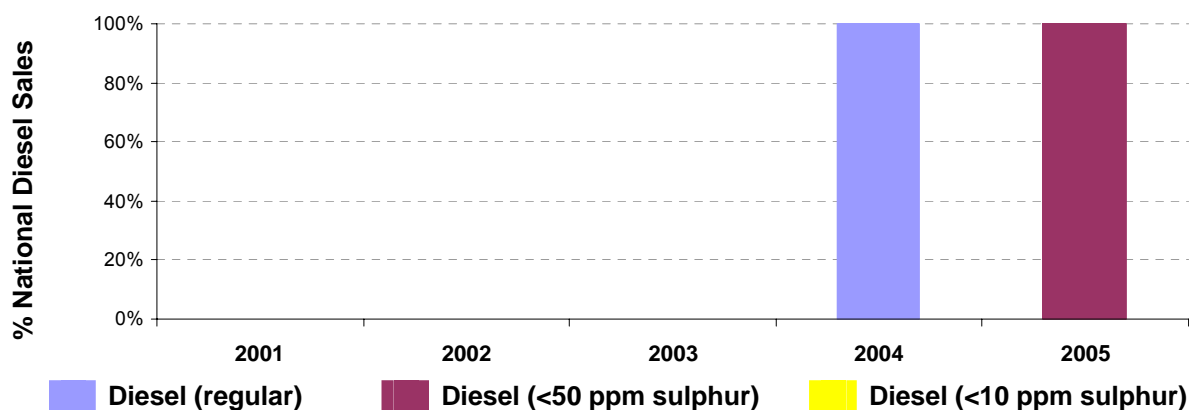
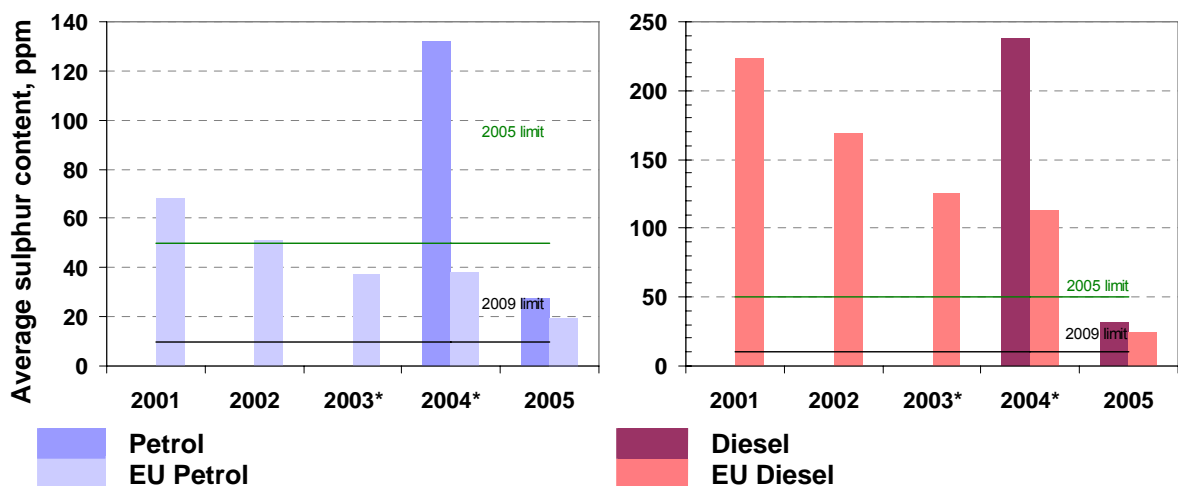


Figure 6.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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

## 6.4 Key Areas for Improvement

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

Key Areas for Improvement
<ul style="list-style-type: none"><li>• Czech Republic has used FQMS Statistical Model C. Given the size of the country it is recommended that the Czech Republic investigate whether Models A or B may be more appropriate.</li><li>• Sampling was conducted 'primarily at refuelling stations'. The Czech Republic should ideally indicate the number of samples taken at refuelling stations to demonstrate compliance with EN14274.</li><li>• Czech Republic was partially compliant with reporting requirements, as summer and winter results should be reported separately;</li><li>• Sulphur free fuels were not widely available in 2005 – they were supplied to market but were not separately marketed at refuelling stations. This is due to take place during 2007.</li><li>• A significant number of exceedances of limit (tolerance) values were reported again, particularly RON/MON for petrol and very high values for distillation and sulphur content in some diesel samples, suggesting contamination or substitution with gas oil. Czech Republic has reported on its sanctions to those filling stations where samples exceeded specifications (penalty, sales suspension or closure of the filling station) and current criminal investigations into gross breaches. However, clearly there is still some work to be done in ensuring reliable fuel quality at refuelling stations across Czech Republic.</li></ul>

## 7 Denmark

### 7.1 Fuel Availability 2005

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

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

#### 7.1.1 Sales

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

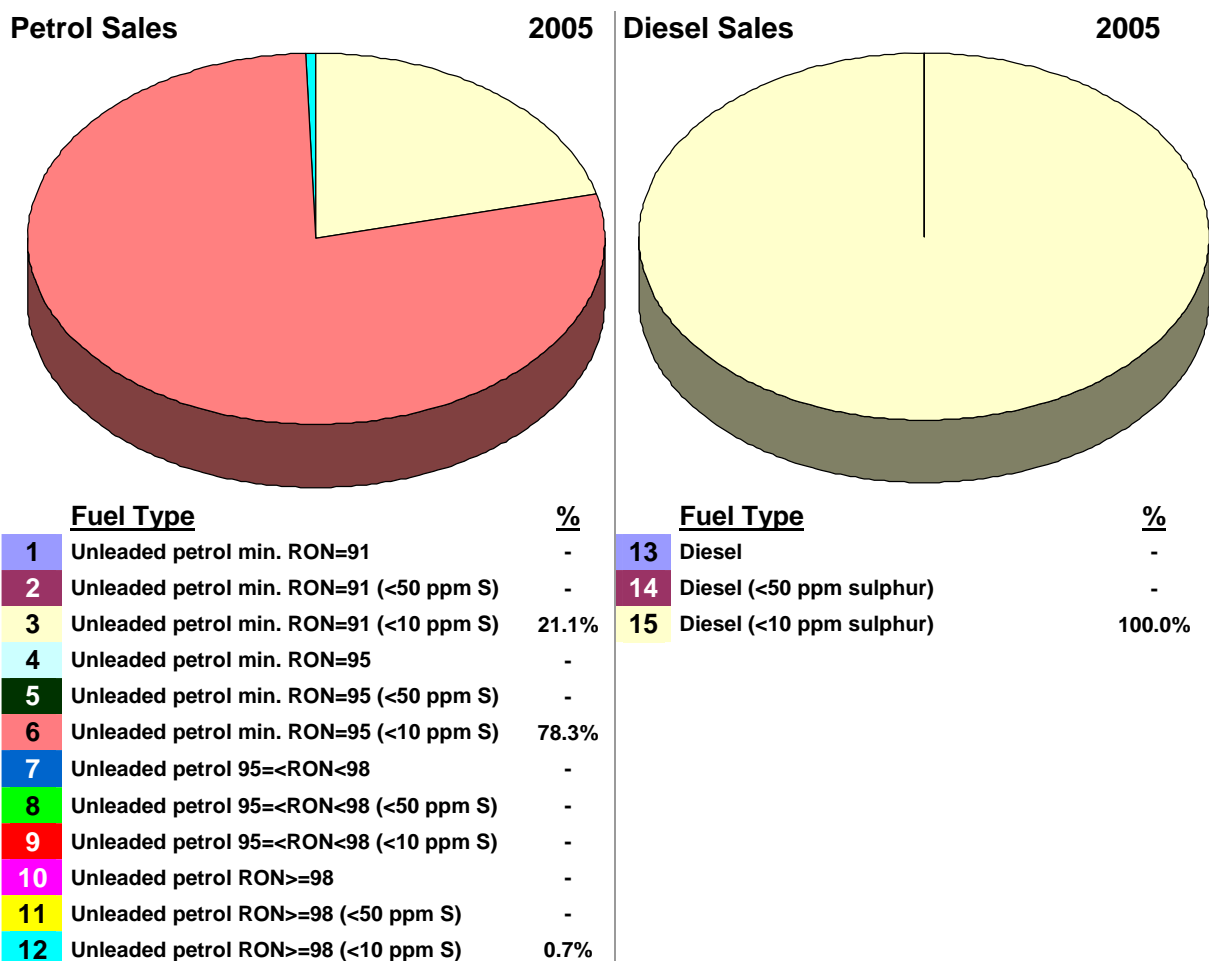


Figure 7.1 above shows all petrol and diesel fuels sold in Denmark in 2005 were sulphur-free (<10 ppm). The majority of petrol sales (78%) were RON 95 grades (79% in 2004), 21% of sales were at the lowest RON 91 petrol fuel grade (20% in 2004), and the remainder was RON>98.

## 7.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In order to promote the availability of sulphur free petrol and diesel, a tax exemption of 0,04 DKK pr. litre (approx. 0,5 Euro cents pr. litre) petrol and 0,02 DKK pr. litre (approx. 0,25 Euro cents pr litre) diesel was introduced on 1st January 2005. Due to the alternative of distributing two different qualities of petrol and diesel, the tax exemption has led to a 100% conversion to sulphur free petrol and diesel on Danish petrol stations.

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

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

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001 with a substantial drop in 2005 with full market conversion to <10ppm fuels, see Table 7.1.

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

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

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

DK	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	47	40	19	23	3	19
<b>Diesel</b>	51	48	28	35	8	25

## 7.2 Fuel Quality Monitoring 2005

### 7.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** The Danish Fuel Quality Monitoring Programme is described in the Danish Statutory Order no. 884 of 3. November 2003 which was sent to the Commission in November 2003 when notifying the implementation of Directive 2003/17. Compared to the

procedure described in EN 14274 the number of samples is reduced. The reasoning behind Danish programme is as follows:

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

## 7.2.2 Sampling and reporting

Denmark was compliant with the sampling and reporting requirements in 2005, however the numbers of samples of RON 91 taken for analysis appear quite low considering it comprises over 20% of sales. The following Table 7.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	21.1%	3	3	-	No	All of 18	
6	RON 95 <10 ppm S	6	78.3%	15	15	-	No	All of 18	
12	RON 98 <10 ppm S	12	0.7%	2	2	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	10	10	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>10</b>	<b>10</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

## 7.2.3 Compliance with fuel quality limit values

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

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

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

All samples tested were in compliance with limit values.

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

All samples tested were in compliance with limit values.

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

All samples tested were in compliance with limit values.

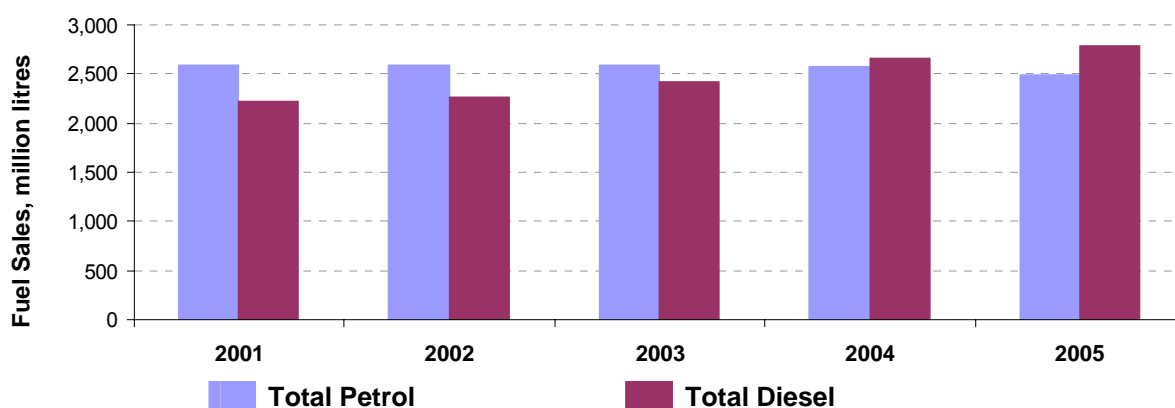
**Diesel**

All samples tested were in compliance with limit values.

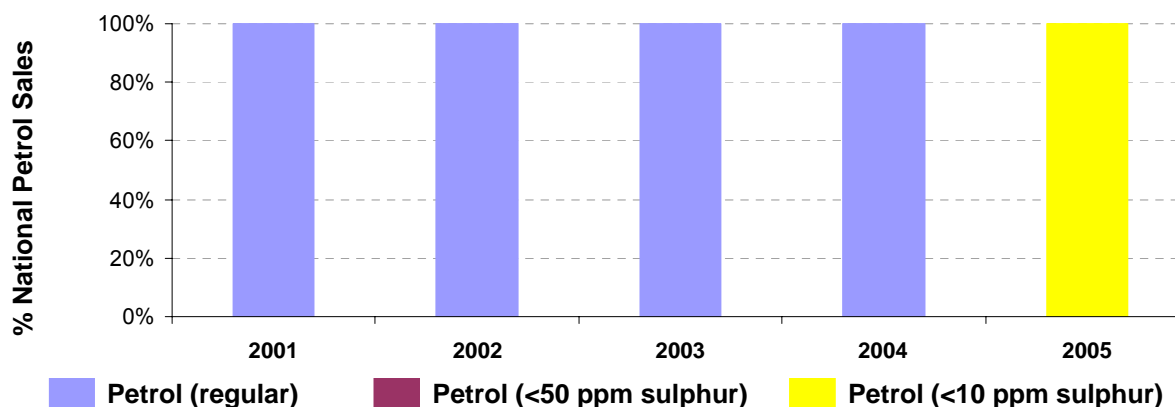
### 7.3 Temporal trends

The following Figure 7.2 to Figure 7.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. There was a small decrease in the sales of petrol (-4%) but a 25% increase in the sales of diesel since 2001. The sales share of RON 91, RON 95 and RON 98 petrol has remained fairly stable. There was a full switch to sulphur-free (<10ppm) fuels in 2005.

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



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



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

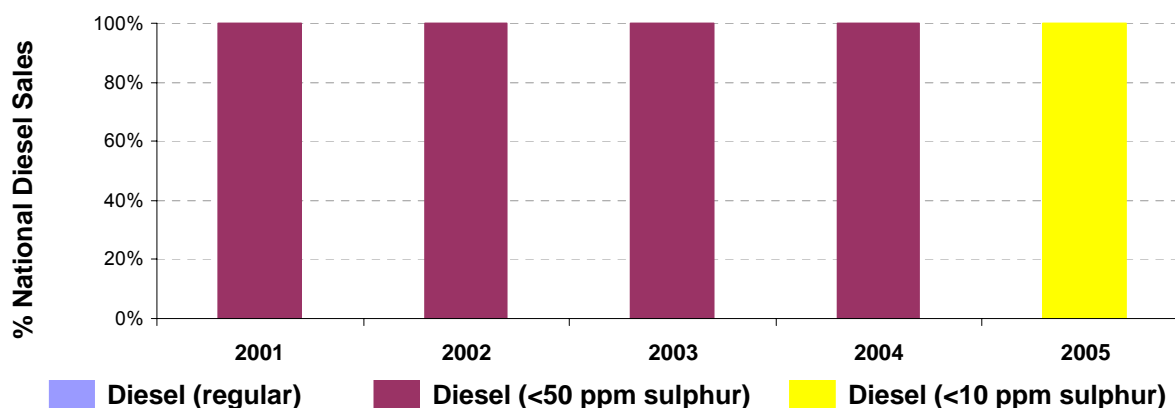
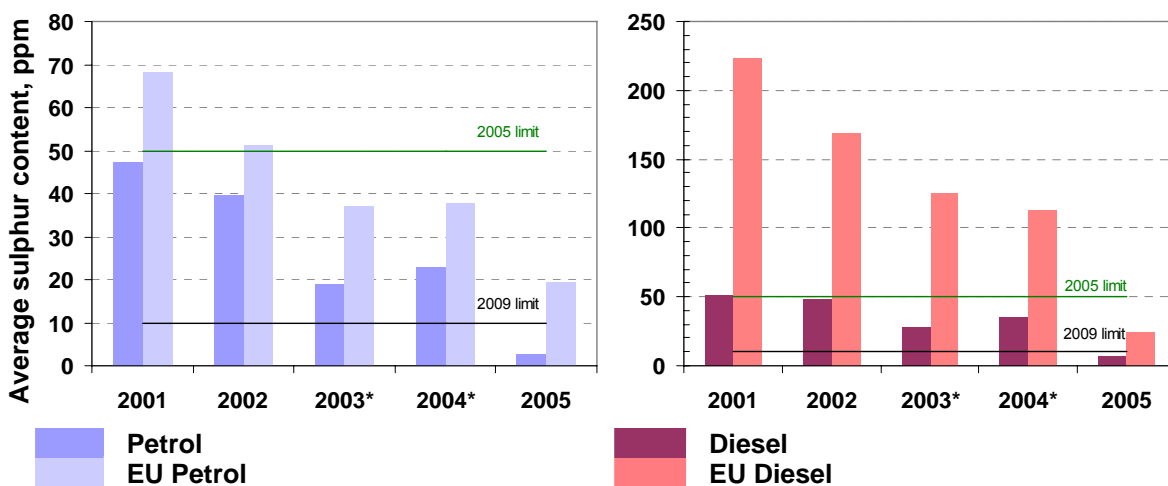


Figure 7.5 shows the trend in average sulphur content of petrol and diesel fuels in Denmark compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased since 2001 with a substantial drop in 2005 with full market conversion to <10ppm fuels. The average sulphur contents were well below the 2005 limit, EU average and forthcoming 2009 limit.

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



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

## 7.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The numbers of samples of RON 91 taken for analysis appear quite low considering it comprises over 20% of sales. It is recommended that a greater number of samples are taken and analysed for future years.



## 8 Estonia

### 8.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	pliiivaba bensiin (RON 91)	5
3	RON 91	<10 ppm	väävli- ja pliiivaba bensiin (RON 91)	5
5	RON 95	<50 ppm	pliiivaba bensiin (RON 95)	5
6	RON 95	<10 ppm	väävli- ja pliiivaba bensiin (RON 95)	5
11	RON 98	<50 ppm	pliiivaba bensiin (RON 98)	5
12	RON 98	<10 ppm	väävli- ja pliiivaba bensiin (RON 98)	5
14	Diesel	<50 ppm	diisel	14
15	Diesel	<10 ppm	väävliivaba diisel	14

#### 8.1.1 Sales

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

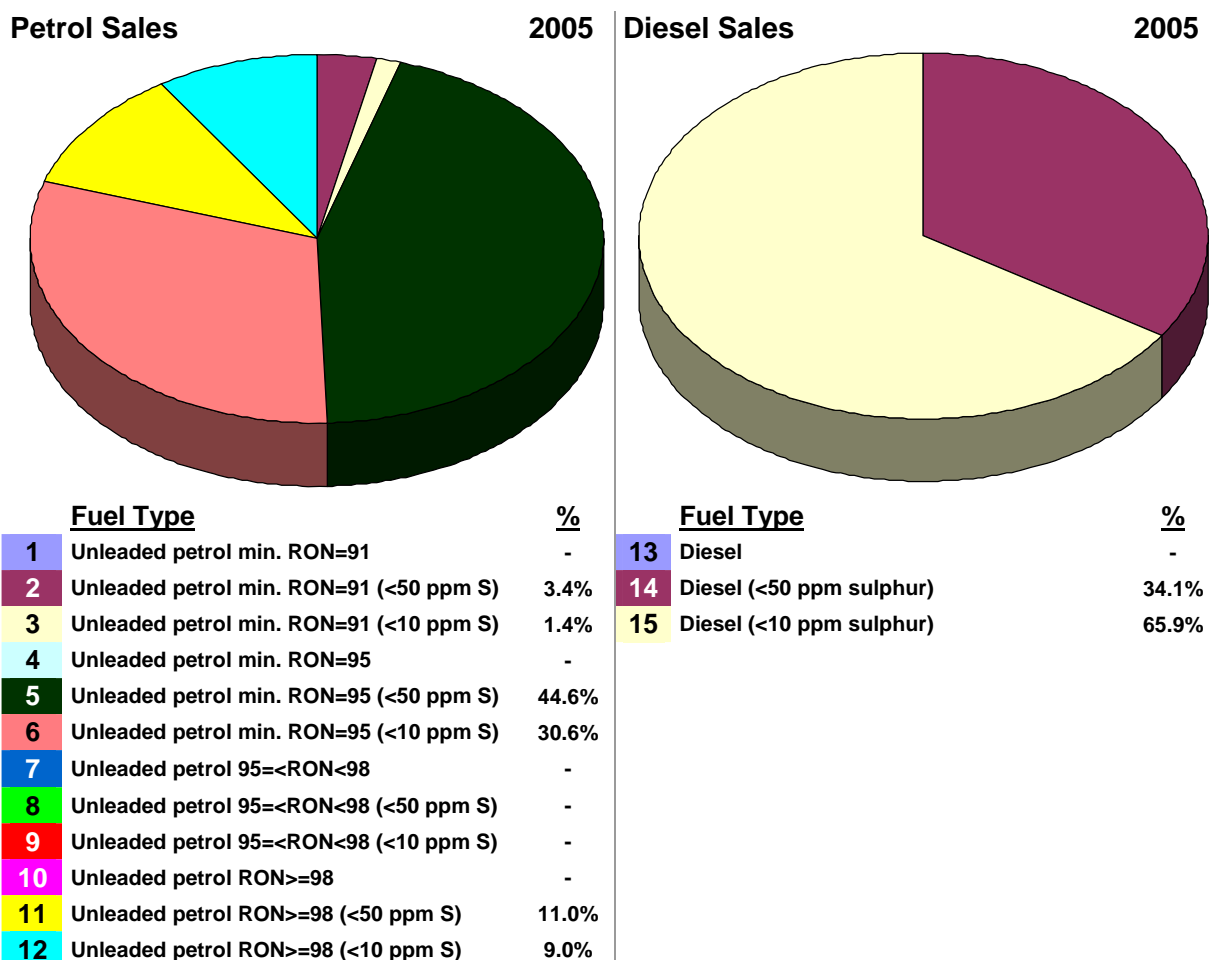


Figure 8.1 shows that sulphur-free fuel grades were available in 2005 comprising in total 41% of petrol sales and 66% diesel sales. The predominant petrol RON grade was RON 95 (75% compared to 82% in 2004), with 20% (13% in 2004) of petrol sales of RON 98 and only 5% RON 91 (as for 2004).

### 8.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Due to small size of the country the filling stations are well spread according to the demand over the territory. In 2005 the average consumption of sulphur-free fuels in Estonia was 50%. There are no large refuelling stations or highway/motorway stations in Estonia.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 8.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

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

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

EE	Average Sulphur Content, ppm					EU25
Fuel/Year	2001	2002	2003	2004	2005	2005
<i>Petrol</i>				57	20	19
<i>Diesel</i>				188	25	25

## 8.2 Fuel Quality Monitoring 2005

### 8.2.1 Description of system

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

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

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

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

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

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

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

**Collection of sales data:** The sales data of the fuels were provided by TCB.

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

## 8.2.2 Sampling and reporting

Estonia was not completely compliant with the sampling and reporting requirements in 2005, however samples for the RON 91, 95 and 98 grades of petrol were not reported separately nor split into summer and winter periods. The following Table 8.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	5	3.4%	0	0				
3	RON 91 <10ppm S	5	1.4%	0	0				
5	RON 95 <50 ppm S	5	44.6%	150	150	300	No	All of 18	(1)
6	RON 95 <10 ppm S	5	30.6%	0	0				
11	RON 98 <50 ppm S	5	11.0%	0	0				
12	RON 98 <10 ppm S	5	9.0%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>150</b>	<b>150</b>	<b>316</b>	<b>No</b>	<b>All of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	34.1%	50	64	200	Yes	All of 5	
15	Diesel <10 ppm S	14	65.9%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>50</b>	<b>64</b>	<b>200</b>	<b>Yes</b>	<b>All of 5</b>	

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

- (1) Estonia also reported 5 samples of sulphur-free petrol and 4 samples of sulphur-free diesel that exceeded the 10ppm sulphur tolerance limits for this class of fuel in national specifications. These non-compliant samples are not included in the total as they are within the mandatory <50ppm limit value for petrol and diesel.

## 8.2.3 Compliance with fuel quality limit values

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

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

#### **RON 91, 95 and 98 Petrol**

**Detail:** 5 samples were beyond the limit value for vapour pressure (ranging from 71.9 – 77.1 kPa), 1 sample was beyond the limits for Distillation at 100°C (with 43.6), 3 samples exceeded the limit for aromatics (with 38.4 – 40.1 %v/v), 5 samples exceeded the sulphur limit value for sulphur-free fuels (with 11.6 – 12.0) and 1 sample exceeded the limit for lead content (with 0.007 g/l).

**Statistical significance:** The tolerance limit for statistical significance for the respective test method was not adhered to and therefore the samples were non-compliant with the Directive. The samples that were non-compliant with the 'sulphur-free' limit were compliant with the mandatory limit of <50ppm.

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

**Diesel**

*Detail:* Sulphur content limit value (of 50 ppm) was exceeded by 1 sample with 114 ppm.

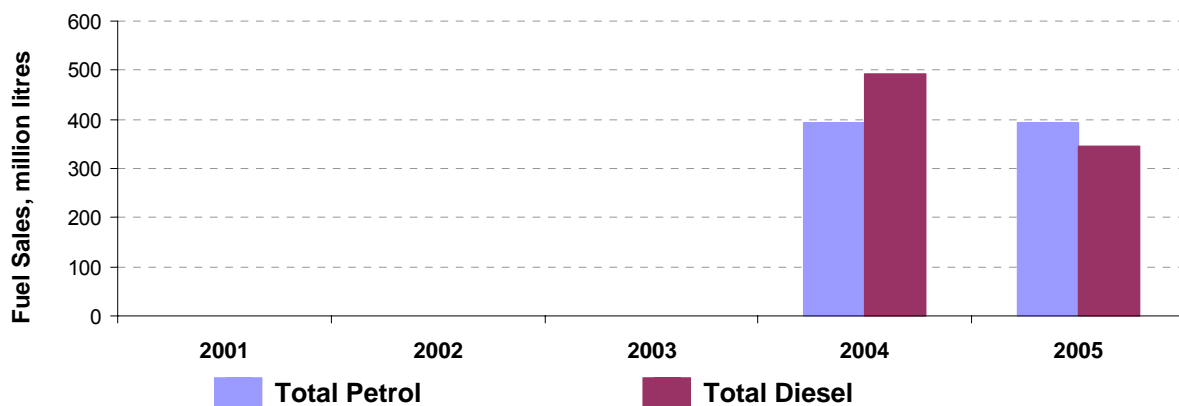
*Statistical significance:* The tolerance limit for statistical significance for the sulphur test method was not adhered to and therefore the sample was non-compliant with the Directive.

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

### 8.3 Temporal trends

The following Figure 8.2 to Figure 8.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Since the first year of reporting for the new EU Member States in 2004, sales of petrol have not changed significantly, however sales of diesel in Estonia have actually decreased by 30%. The reason for this decrease is not clear. Since 2004, 41% of the petrol fuel sales have become sulphur-free, with the figure for diesel 66%. This trend is confirmed from the sampling and analysis results, with a significant reduction in the average sulphur content of these fuels since 2004 shown in Figure 8.5.

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



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

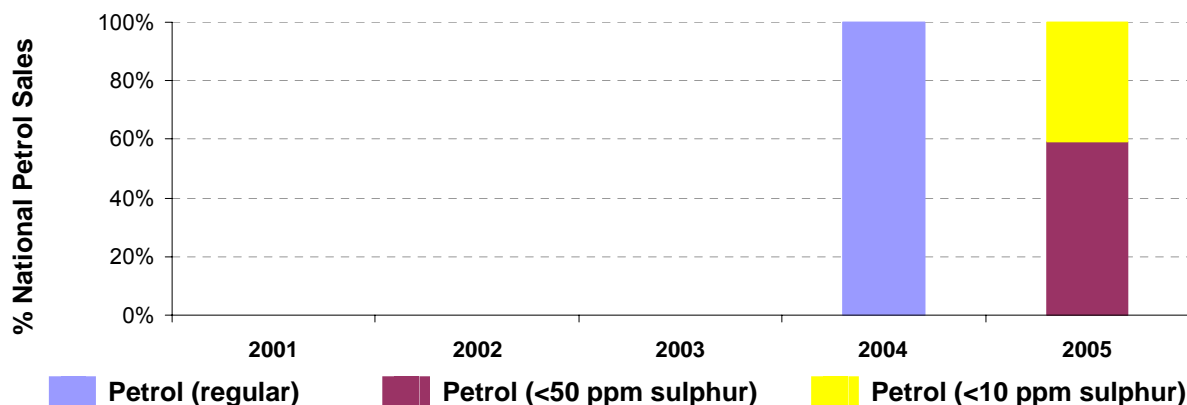


Figure 8.4: Temporal trends in national sales of low sulphur diesel (%)

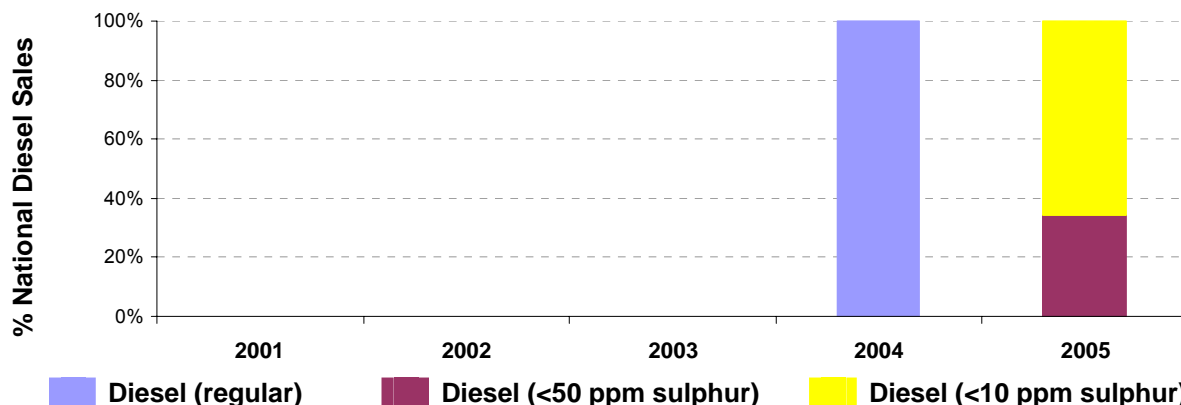
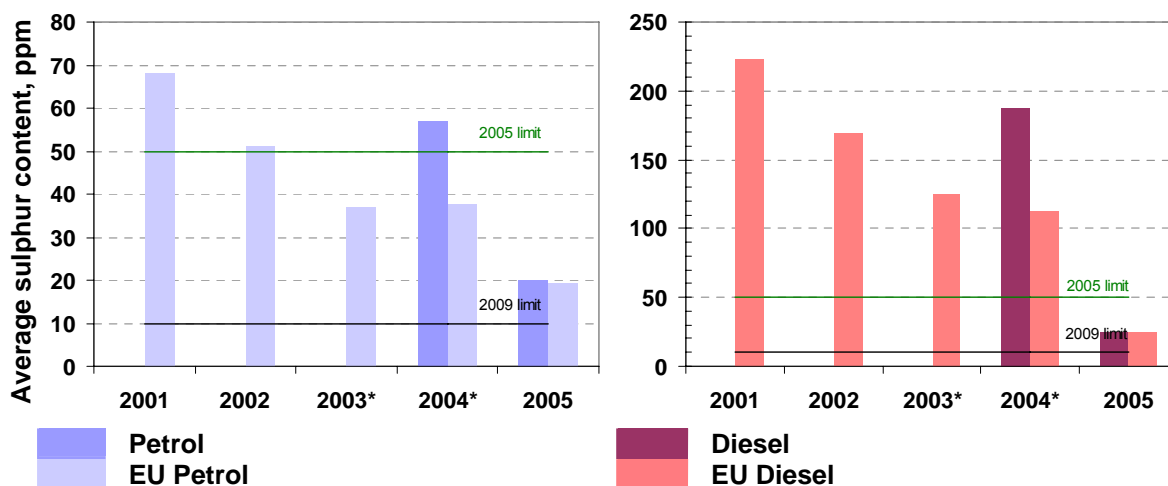


Figure 8.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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

## 8.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Estonia submitted its report almost 4 months late this year.
- Estonia is not fully compliant with reporting requirements as it did not present results of sample analyses separately for different petrol RON grades and for different periods.

## 9 Finland

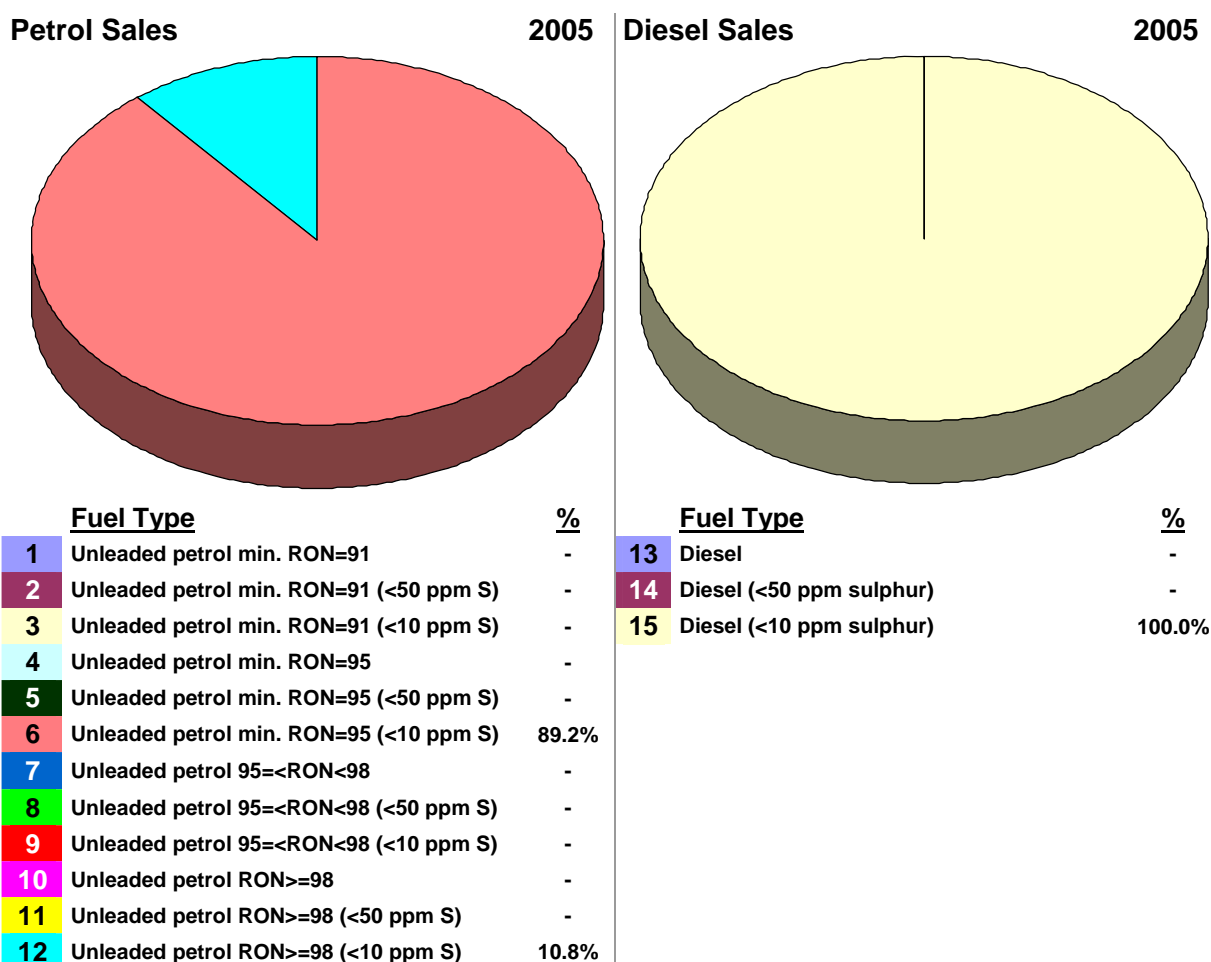
### 9.1 Fuel Availability 2005

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

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

#### 9.1.1 Sales

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



All petrol and diesel fuels sold in Finland in 2005 were sulphur-free (<10 ppm). Of petrol sales, 89% were of RON 95 classification (up from 85% in 2001), with the remainder being of RON>98.

## 9.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** As from 1 September 2004 sulphur free petrol and diesel have been subject to lower excise duty than other fuel qualities (Law on the Excise Duty on Liquid Fuels 394/2004 amending the provisions of 1472/1994). As from 1 January 2005 sulphur free qualities put on the market have to be marked at the point of sale.

Due to the change in excise duty fuel suppliers have informed that all the petrol and diesel fuels distributed by them have been sulphur free after 1 September 2004.

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

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 9.1. The sulphur content of samples taken in all regions was below 10 ppm in 2005.

### Additional information:

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

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

FI	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	84	53	23	11	8	19
<b>Diesel</b>	34	24	14	7	6	25

## 9.2 Fuel Quality Monitoring 2005

### 9.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** Primarily on refuelling stations (83% of petrol and 75% diesel samples with 213 and 105 samples respectively), with the rest from terminals and refineries (44 petrol and 36 diesel samples).

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

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

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

**Other details:** The Finnish Customs Authority takes samples from retail sites, refineries and terminals, but the laboratory test programmes are differentiated. The samples taken from retail sites (213 petrol and 105 diesel) go through a test procedure where all regulated parameters except RON, MON and cetane are analyzed. 44 petrol samples and 36 diesel fuel samples taken from the refineries and terminals - are analyzed only partly to determine the RON, MON and cetane number. A few samples from refuelling sites are also checked for RON, MON and cetane (8 for petrol and 6 for diesel). The oil industry also reports to the Ministry of Environment a summary of their own fuel quality monitoring programmes. This annual data is compared with the monitoring results from the retail sites and, so far, the data comparability has been good.

]

## 9.2.2 Sampling and reporting

Finland was compliant with the sampling and reporting requirements in 2005. A limited number of extra samples were taken, mostly at terminals and refineries, for the analysis of RON, MON and Cetane. The following Table 9.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1)</sup>			
6	RON 95 <10 ppm S	6	89.2%	62	71	100	Yes	All of 18	
12	RON 98 <10 ppm S	12	10.8%	58	66	100	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>120</b>	<b>137</b>	<b>200</b>	<b>Yes</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	61	80	100	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>61</b>	<b>80</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

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

## 9.2.3 Compliance with fuel quality limit values

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

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

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

**Detail:** The RON value (94.5) of 1 sample was below the limit value of 95.

**Statistical significance:** The statistical significance tolerance limit (95% confidence) for RON was not complied with; therefore the sample was in breach of the Directive. Other samples were within the tolerance limits.

**Member State's notes:** The RON value (94.5) of 1 sample was below the limit value of 95.

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

**Detail:** One sample exceeded the maximum limit value for aromatics (35.0 %v/v), with 37.3%(v/v).

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



*Member State's notes:* The expanded relative uncertainty of measurement used in Finnish Customs Laboratory is + - 10 % in the confidence level of 95 %. The true value of aromatics content in the sample (33.6 – 41.0 % (v/v)) may also be below the limit value 35.0 % (v/v).

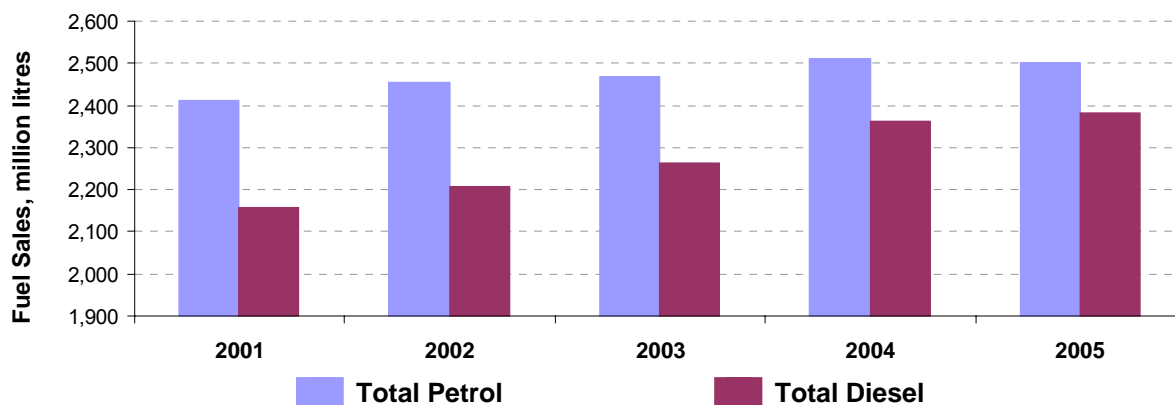
**Diesel**

All samples tested were in compliance with limit values.

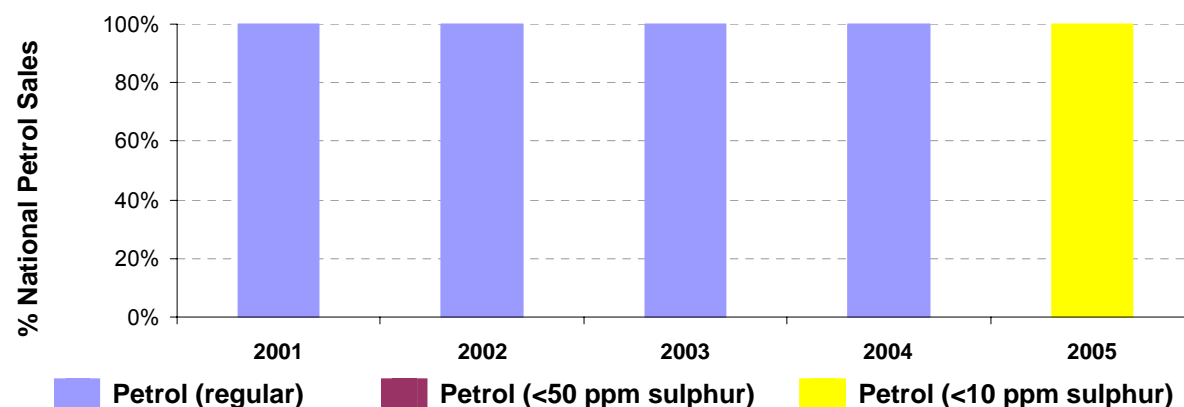
### 9.3 Temporal trends

The following Figure 9.2 to Figure 9.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Small increases occurred in the sales of petrol and greater for diesel between 2001 and 2005 (4% for petrol and 10% for diesel). There was a full switch to sulphur-free (<10ppm) fuels in 2005.

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



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



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

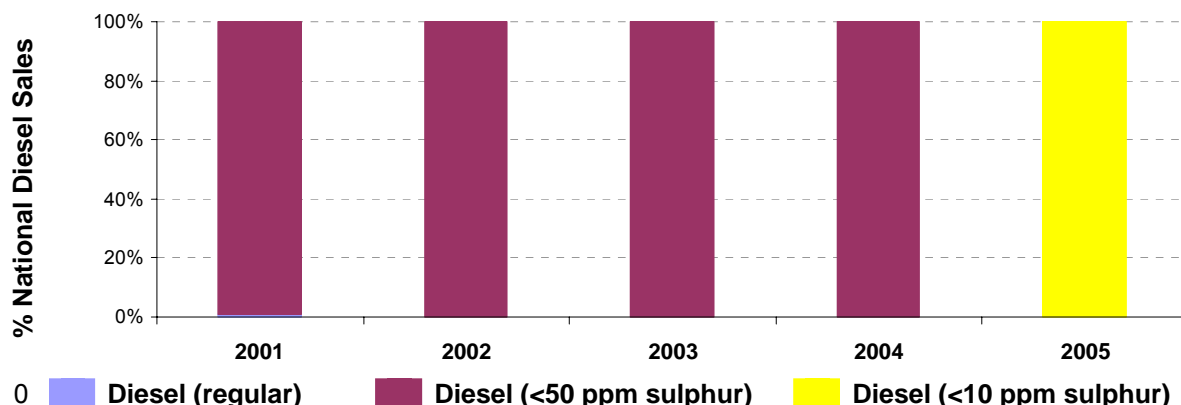
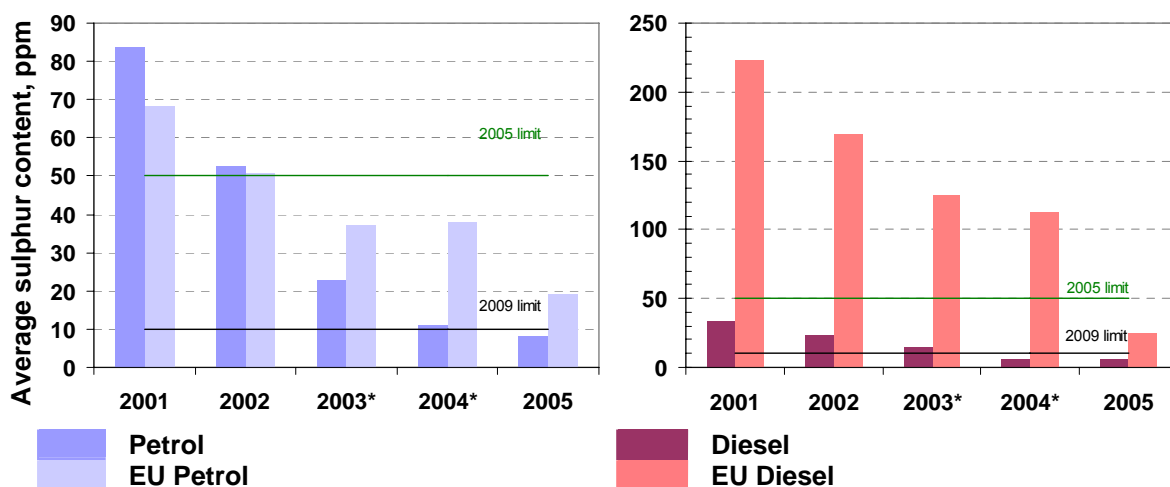


Figure 9.5 shows the trend in average sulphur content of petrol and diesel fuels in Finland compared with the EU average (derived from sample analysis results and relative sales). The reduction in average sulphur content of both petrol and diesel fuels since 2001 continued in 2005 with full market conversion to <10ppm fuels. The average sulphur contents were well below the 2005 limit, EU average and forthcoming 2009 limit.

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



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

## 9.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Sampling was conducted at refuelling stations, refineries and terminals. Finland should ideally indicate the number of samples taken specifically at refuelling stations to demonstrate compliance with EN14274. A limited number of samples were taken, mostly at terminals and refineries, for the analysis of RON, MON and Cetane.

## 10 France

France provided no reporting submissions for 2003, 2004 or 2005 fuel quality monitoring. Limited information has been supplied stating that some monitoring took place in 2005 including some 140 samples taken for analysis across the territory and providing summary information on sulphur content analysis results.

### 10.1 Key Areas for Improvement

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

#### Key Areas for Improvement

- The EC is considering action against France with regards to their non-compliance with the Directive requirements on reporting. It is hoped this will result in a complete report in 2006 and improvements to the national FQMS.
- France has stated that it took 140 samples for analysis in 2005, however this far below what would be required by the European Standard specification, which for the 3 grades of fuel assumed to be still available in France (RON95, RON98 and Diesel) would require 600 or 1200 samples total for statistical Model A or B respectively.
- France has stated that 4% of analysed samples of petrol and diesel contained levels of sulphur non-compliant with the Directive limits; the non-compliances were mostly for diesel. This percentage is significantly higher than the EU average.

# 11 Germany

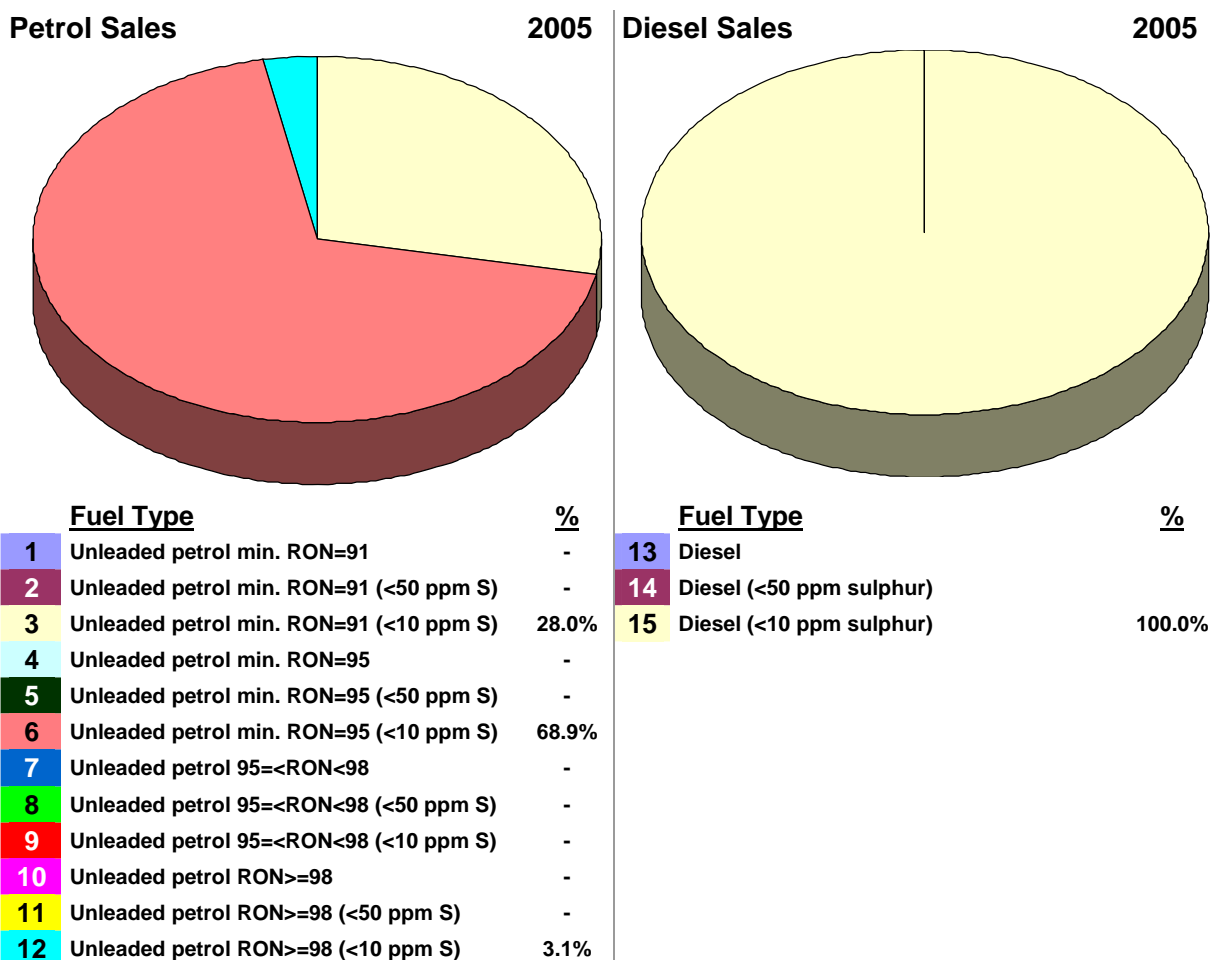
## 11.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
3	RON 91	<10 ppm	Normalbenzin	3
9	95<RON<98	<10 ppm	Eurosuper	6
12	RON 98	<10 ppm	Super Plus	12
15	Diesel	<10 ppm	Dieselmkraftstoff	15

### 11.1.1 Sales

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



The German market switched entirely to sulphur free fuels at the beginning of 2003. The share of the three petrol grades was almost the same as in 2004: whilst most of the fuel sold was RON 95 quality (69% compared to 55% in 2001), 28% of fuel sold was still RON 91, with RON 98 making up the remainder.

## 11.1.2 Sulphur content

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

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

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased significantly since 2001, see Table 11.1.

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

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

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

DE	Average Sulphur Content, ppm					EU25
Fuel/Year	2001	2002	2003	2004	2005	2005
<i>Petrol</i>	54	23	7	7	6	19
<i>Diesel</i>	249	31	8	7	7	25

## 11.2 Fuel Quality Monitoring 2005

### 11.2.1 Description of system

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

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

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

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

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

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

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

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

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

## 11.2.2 Sampling and reporting

Germany was generally compliant with the sampling and reporting requirements in 2005, however they have not provided information on whether their national monitoring system is equivalent in statistical confidence with the requirements of EN 14274. Excepting summer vapour pressure, sample results were not provided separately for summer and winter periods. The following Table 11.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
3	RON 91 <10ppm S	3	28.0%	74	83	-	No	All of 18	
6	RON 95 <10 ppm S	9	68.9%	108	85	-	No	All of 18	
12	RON 98 <10 ppm S	12	3.1%	108	85	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>290</b>	<b>253</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
15	Diesel <10 ppm S	15	100.0%	120	120	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>120</b>	<b>120</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	
3	RON 91 <10ppm S	3	28.0%	74	83	-	No	All of 18	

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

## 11.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol RON 91**

**Detail:** The summer vapour pressure limit of 60 kPa was exceeded by one sample, with a value of 66.7 kPa.

**Statistical significance:** The tolerance limit for statistical significance for vapour pressure test method is 61.8 kPa, therefore the sample was in non-compliance with the Directive.

**Member State's notes:** No complaint was raised.

#### **Petrol RON 95**

**Detail:** The summer vapour pressure limit of 60 kPa was exceeded by one sample, with a value of 63.4 kPa.

**Statistical significance:** The tolerance limit for statistical significance for vapour pressure test method is 61.8 kPa, therefore the sample was in non-compliance with the Directive.

**Member State's notes:** No complaint was raised.

#### **Petrol RON 98**

**Detail:** The summer vapour pressure limit of 60 kPa, other oxygenates (limit 10 %v/v) and aromatics (limit 35%v/v) were exceeded by one sample each with values of 68.7 kPa, 14.7%v/v and 37.0%v/v

respectively.

**Statistical significance:** The tolerance limit for statistical significance for vapour pressure test method is 61.8 kPa and for other oxygenates is 10.5%v/v, therefore the samples were non-compliant with the Directive. The test method for aromatics used was EN14517, with a tolerance limit of 36.0, therefore this sample was non-compliant also.

**Member State's notes:** No complaints were raised.

### Diesel

**Detail:** The limit value for distillation at 95°C (min. 360°C) was exceeded by one sample with a maximum value of 369°C.

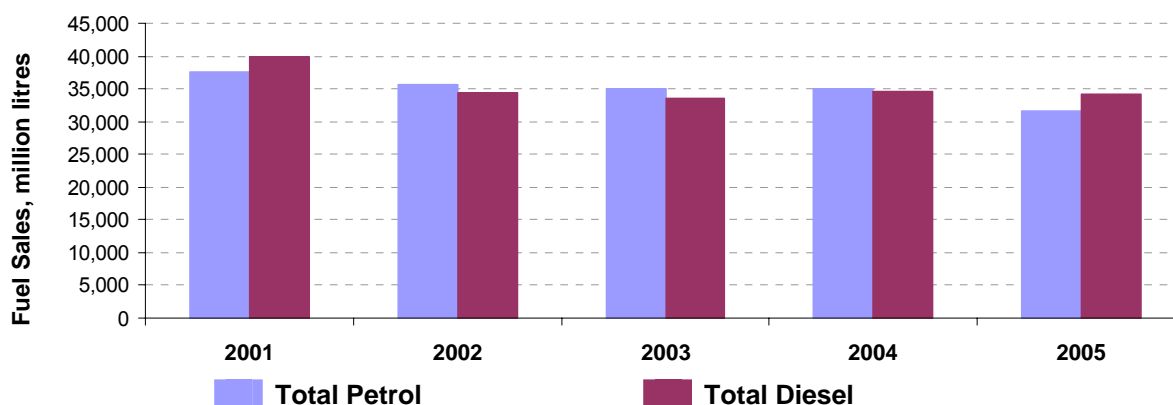
**Statistical significance:** The tolerance limit for distillation (min. 365.9°C) was exceeded and therefore the sample was not compliant with the Directive.

**Member State's notes:** No complaint was raised.

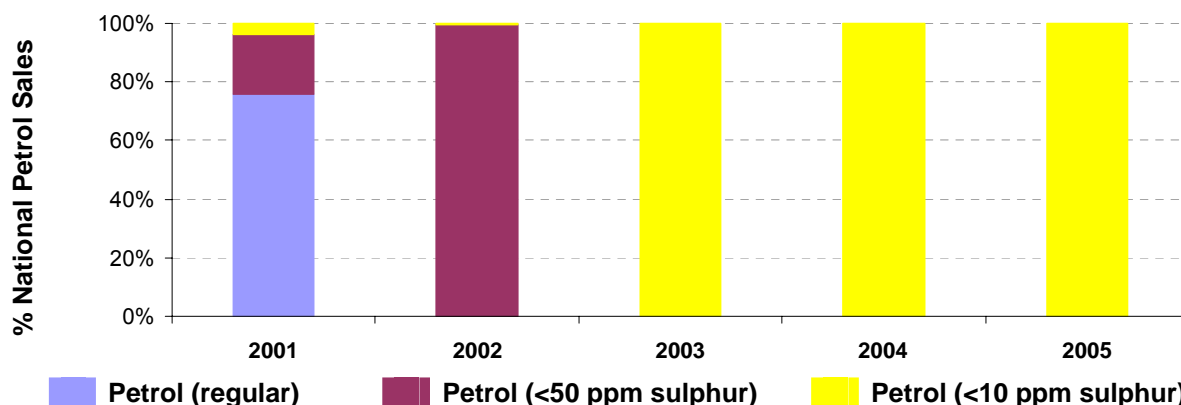
## 11.3 Temporal trends

The following Figure 11.2 to Figure 11.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2005, sales of petrol decreased by 15%, while sales of diesel decreased by 14%. Since the beginning of 2003, all petrol and diesel grades have switched to sulphur free fuel.

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



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



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

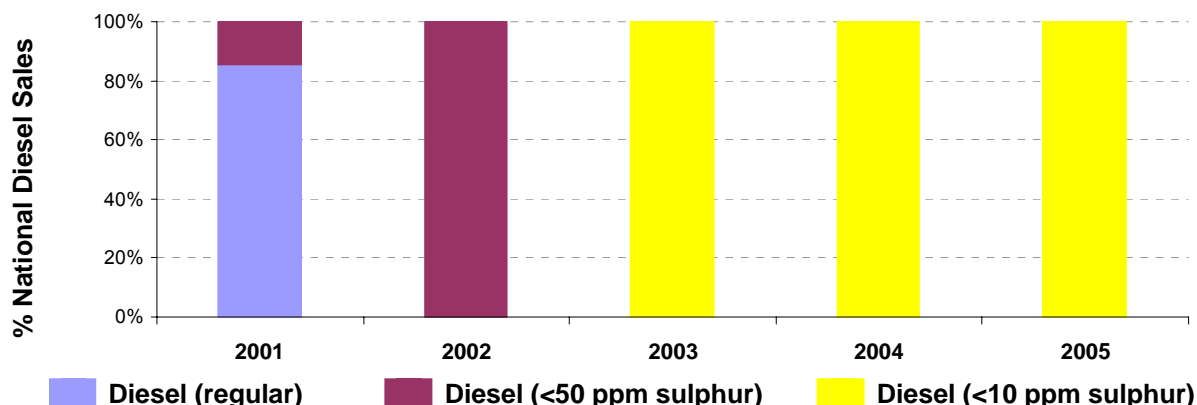
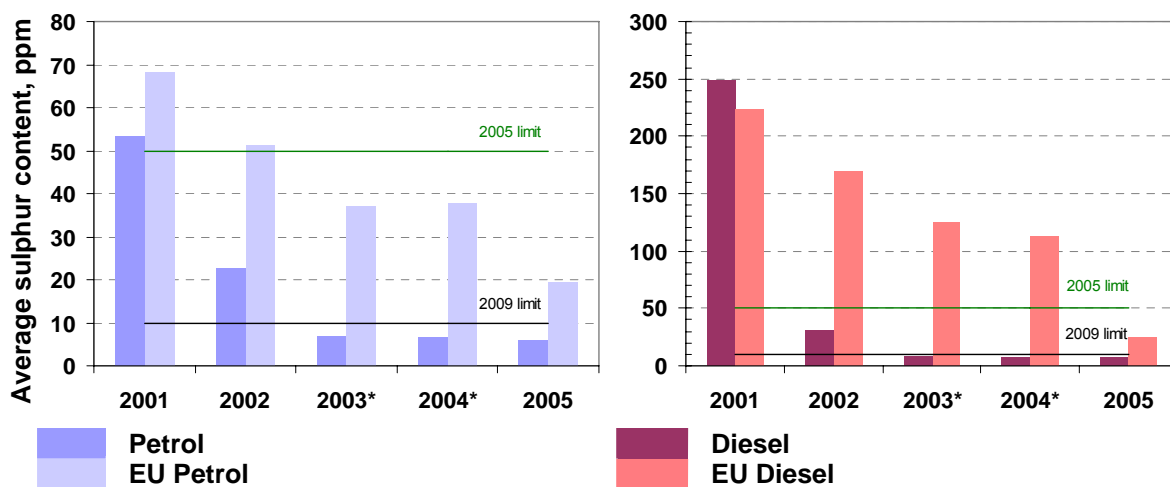


Figure 11.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels have decreased since 2001 with levels remaining at a similar level since full market conversion to <10ppm fuels at the beginning of 2003. The average sulphur content for both petrol and diesel were well below the 2005 limit and EU average and were also below the forthcoming 2009 limit.

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



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

## 11.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The report submission was received after the 30 June deadline - up to 3 months late.
- Germany has not provided information on whether their national monitoring system is equivalent in statistical confidence with the requirements of EN 14274.
- Summer and winter results should ideally be reported separately.
- Detail on numbers of non-compliances and action taken were not supplied in the report.



## 12 Greece

### 12.1 Fuel Availability 2005

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

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

#### 12.1.1 Sales

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

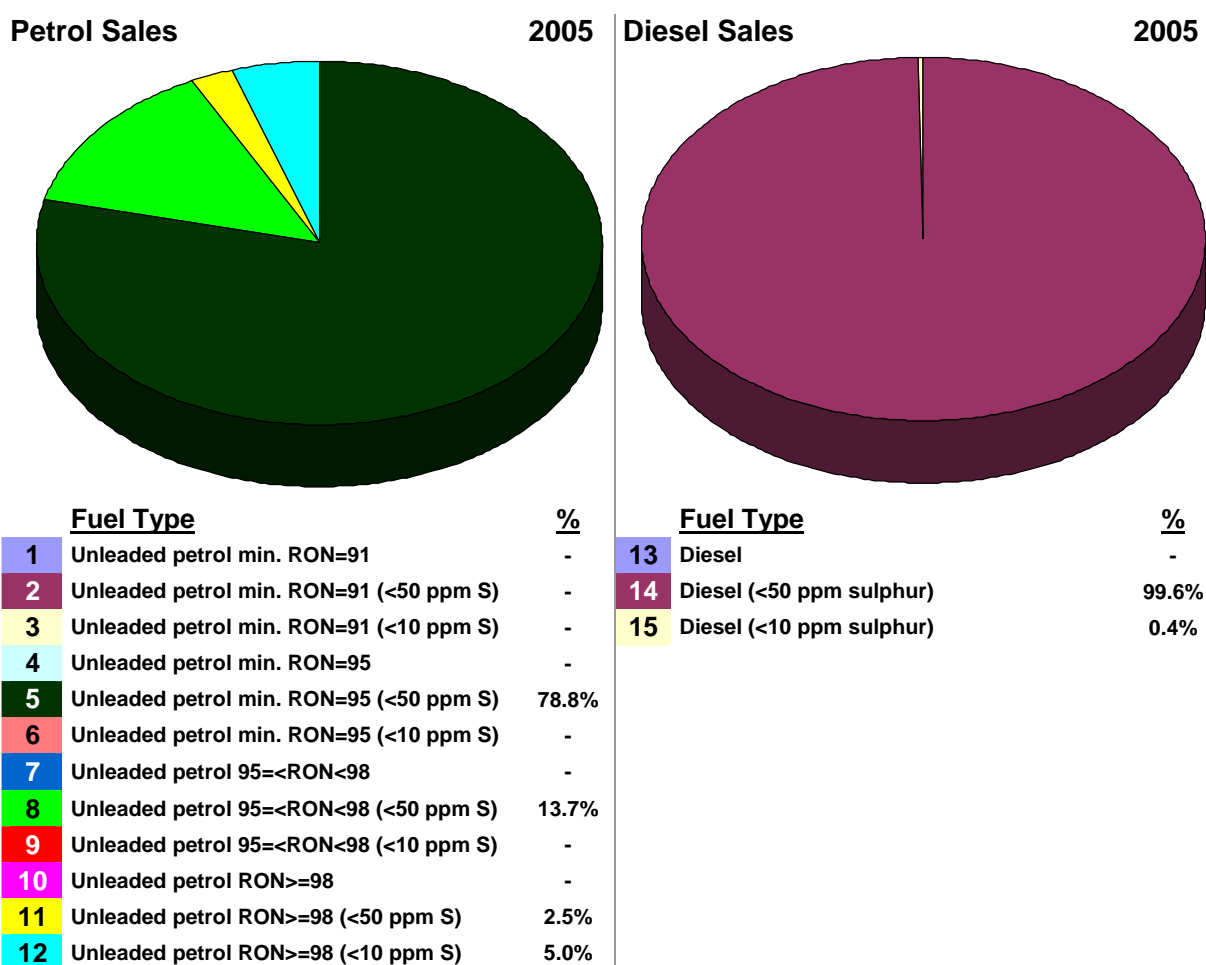


Figure 12.1 above shows that the majority of petrol sold in Greece in 2005 (79%) was RON 95 level (93% in 2001). Sulphur-free fuel sales were available for RON 98 petrol and diesel,

though total sales were low. Sales of Lead Replacement Petrol (LRP) were reported under Unleaded petrol 95=<RON<98.

### 12.1.2 Sulphur content

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

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

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of petrol has decreased since 2001, however it has increased slightly for diesel, see Table 12.1.

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

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

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

<b>EL</b>	<b>Average Sulphur Content, ppm</b>					<b>EU25</b>
<b>Fuel/Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2005</b>
<b>Petrol</b>	108	72	92	69	38	19
<b>Diesel</b>	281	500	290	283	38	25

## 12.2 Fuel Quality Monitoring 2005

### 12.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** The samples are taken at the refineries, the storage tanks of the marketing companies and petrol stations.

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

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

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

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

The official sampling authorities in Greece are Service of Special Controls (ΥΠ.Ε.Ε.) of the Ministry of Economics and Finance, Inspection Teams for the Trading and Storage of Fuel (Κ.Ε.Δ.Α.Κ) of the Ministry of Development, and Division of control of atmospheric pollution and noises (ΕΑΠΘ) of the Ministry of Environment. These authorities collect samples from the storage tanks of the marketing companies and the petrol stations but they follow the national fuel quality system. This is the main technical reason why the monitoring system of EN 14274 has not been fully applied.

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

## 12.2.2 Sampling and reporting

Greece was not fully compliant with the sampling and reporting requirements in 2005, as report concerns the results of the samples that are taken at refineries only, and none from petrol stations as required by EN 14274. Furthermore summer and winter period results from diesel analysis were not provided separately. The following Table 12.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	78.8%	41	67	100	Yes	12 of 18	(1)
8	95<RON<98 <50 ppm S	8	13.7%	40	53	100	Yes	12 of 18	(1)
11	RON 98 <50 ppm S	11	2.5%	43	45	8	Yes	12 of 18	(1)
12	RON 98 <10 ppm S	11	5.0%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>124</b>	<b>165</b>	<b>208</b>	<b>Yes</b>	<b>12 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	99.6%	45	44	100	No	5 of 5	
15	Diesel <10 ppm S	14	0.4%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>45</b>	<b>44</b>	<b>100</b>	<b>No</b>	<b>5 of 5</b>	

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

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

### 12.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol RON 95**

All samples tested were in compliance with limit values.

#### **LRP**

*Detail:* One sample exceeded the limit value for lead content (0.005 g/l) with a value of 1 g/l..

*Statistical significance:* The tolerance limit for statistical significance for lead content is 0.0062 g/l, so the sample was outside the tolerance limit and therefore non-compliant.

*Member State's notes:*

#### **Petrol RON 98**

All samples tested were in compliance with limit values.

#### **Diesel**

All samples tested were in compliance with limit values.

## 12.3 Temporal trends

The following Figure 12.2 to Figure 12.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol increased by 70% between 2001 and 2005 (up 40% between 2002 and 2003), with sales of diesel increasing to 2004 and then decreasing by 10% 2004-2005. The large petrol increase has been attributed by Greece to sales of Lead Replacement Petrol (LRP – reported under Unleaded petrol 95=<RON<98) being provided for the first time for 2003. LRP comprised almost 14% of total sales in 2005 and would explain the large increase in total sales since 2001 and 2002 (when LRP data was not available). Small quantities of sulphur-free RON 98 petrol (5%) and diesel (0.4%) were sold in 2005.

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

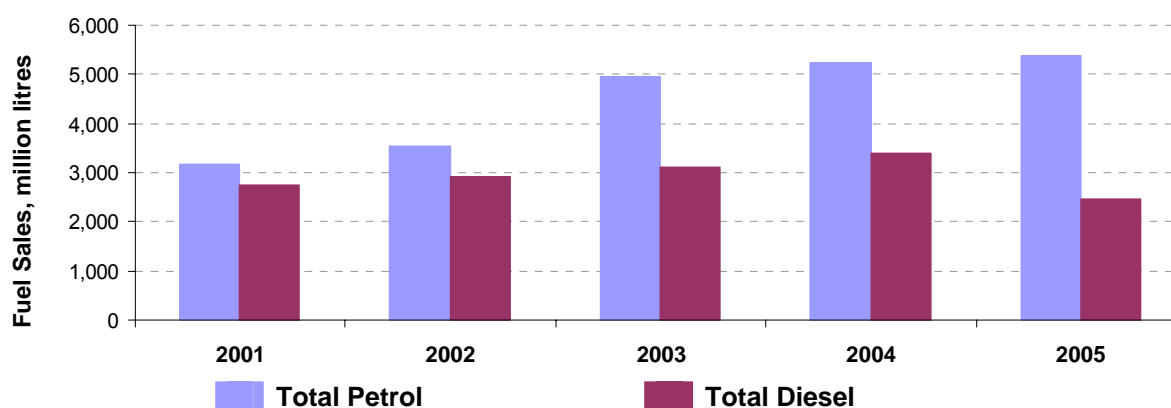


Figure 12.3: Temporal trends in national sales of low sulphur petrol (%)

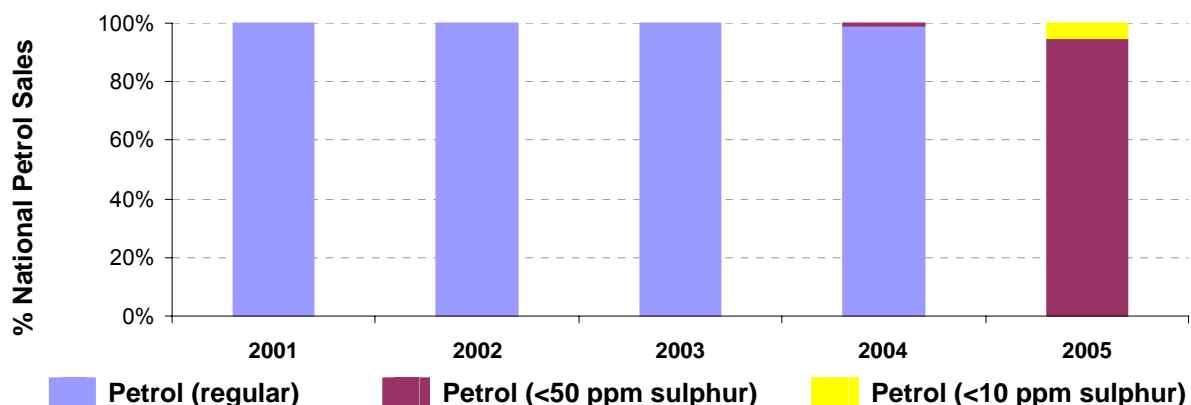


Figure 12.4: Temporal trends in national sales of low sulphur diesel (%)

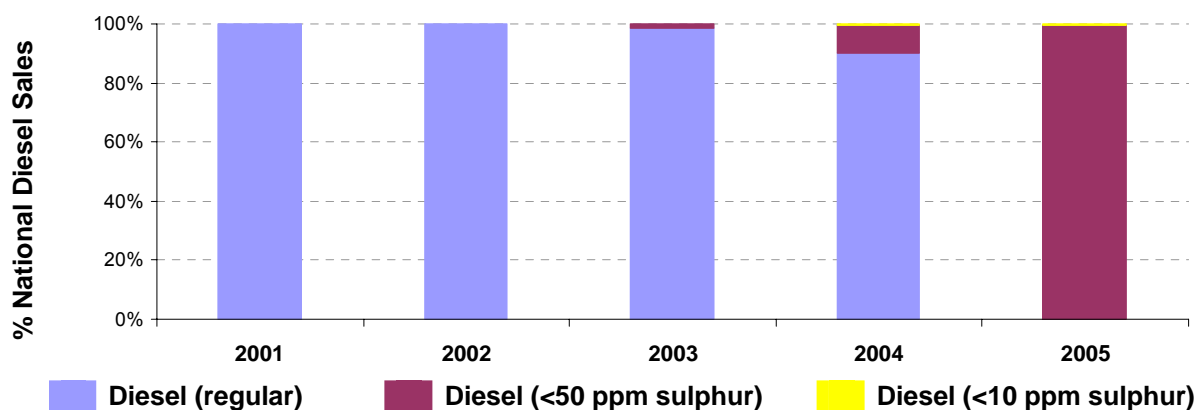
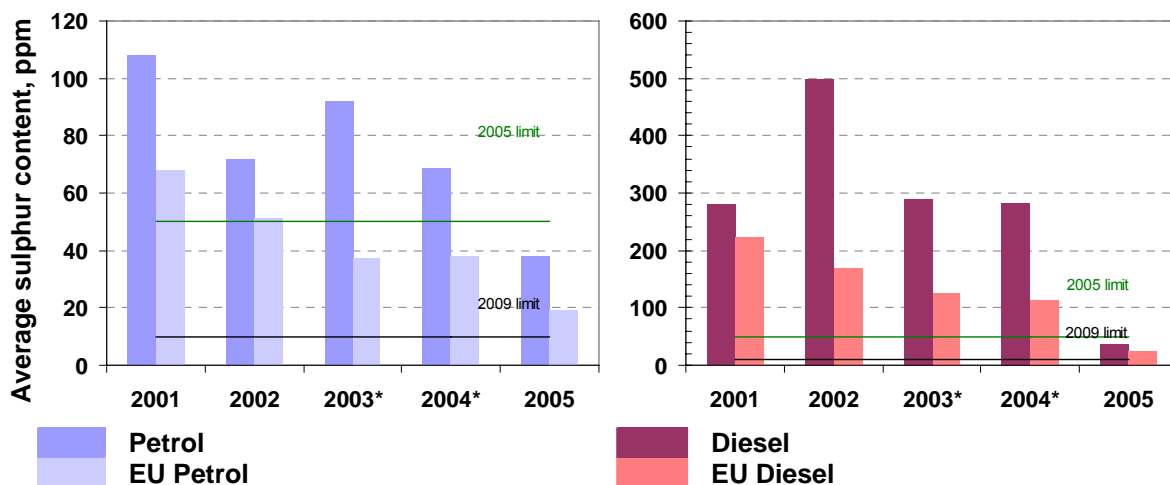


Figure 12.5 shows the trend in average sulphur content of petrol and diesel fuels in Greece compared with the EU average. The average sulphur content of both petrol and diesel fuels have decreased since 2001 with a substantial drop in 2005 as a result of the switch from 'regular' to low-sulphur and sulphur-free fuels. The average sulphur content for petrol and diesel were well below the 2005 limit but above the EU average and forthcoming 2009 limit.

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



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

## 12.4 Key Areas for Improvement

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

Key Areas for Improvement
<ul style="list-style-type: none"><li>• The report submission was received after the 30 June deadline - up to 2 months late.</li><li>• Samples were only taken at refineries, whereas EN 14274 requires samples to be taken at refuelling stations.</li><li>• Greece was partially compliant with reporting requirements as:<ul style="list-style-type: none"><li>- Summer and winter results for diesel should be reported separately, as they were for petrol</li><li>- Greece did not provide indications on results for six petrol oxygenate parameters.</li></ul></li></ul>

## 13 Hungary

### 13.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Premium unleaded, Esz-95	5
11	RON 98	<50 ppm	Super unleaded, Esz-98	11
12	RON 98	<10 ppm	Super unleaded, Esz-98, sulphur-free	12
14	Diesel	<50 ppm	Diesel fuel	14
15	Diesel	<10 ppm	Diesel fuel, sulphur-free	15

#### 13.1.1 Sales

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

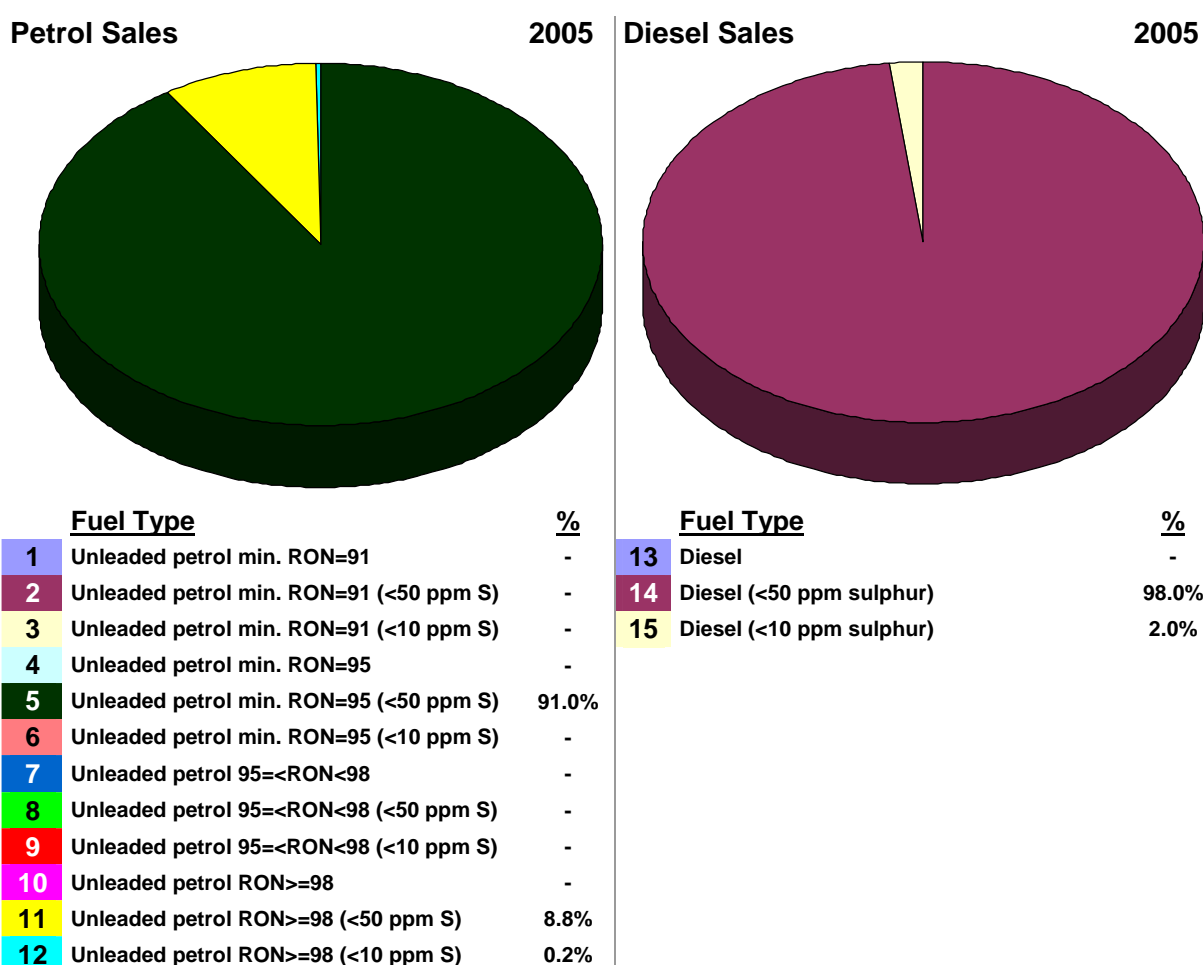


Figure 13.1 shows that in Hungary 2005 saw the introduction of a small share of sulphur-free fuel grades (0.2% petrol and 2% diesel). The majority of petrol sold comprised RON 95 (91%), with the remainder being RON 98 (8.8%), similar to 2004 figures.

### 13.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** In 2005 three oil companies (MOL, SHELL, OMV) declared to market sulphur-free fuels (marked on the pump with sulphur-free labelling), which fuels belonged to their top quality fuel category in compliance with their other parameters. According to data derived from suppliers the sales of sulphur-free fuels were evaluated approx. 2 % compared with parent fuel grades (unleaded petrol, diesel fuel). This relatively small value can be explained by the fact that their price is higher by approx. 25% and the customers are not willing to purchase them at this higher price.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 13.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

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

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

HU	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				13	9	19
<b>Diesel</b>				31	11	25

## 13.2 Fuel Quality Monitoring 2005

### 13.2.1 Description of system

**Responsible organisation(s):** Ministry of Economy and Transport and ÁMEI Petroleum Products Quality Inspection Company

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

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

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

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

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

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

**Collection of sales data:** According to monthly and yearly data originated from Energy Efficiency, Environment and Energy Information Agency Non-Profit Company and Hungarian Petroleum Association (MÁSZ).

**Other details:** Fuels marketed in Hungary originate from lot of different sources, i.e. from national refineries and abroad. Fuels produced in a refinery can appear anywhere in Hungary



due to small geographical distances. Therefore, the fuel distribution network becomes so complicated that Hungary is not divided into regions. In consequence of the above mentioned Hungary considers itself as a small country made up of one region and uses Model C.

### 13.2.2 Sampling and reporting

Hungary was essentially compliant with the sampling and reporting requirements in 2005, except that it did not present separate results for summer and winter period sample analysis (according to EN 14274), except for vapour pressure of petrol. The following Table 13.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
5	RON 95 <50 ppm S	5	91.0%	51	49	100	No	All of 18	
11	RON 98 <50 ppm S	11	8.8%	5	5	9	No	All of 18	
12	RON 98 <10 ppm S	12	0.2%	5	5	1	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>61</b>	<b>59</b>	<b>110</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	98.0%	51	49	100	No	All of 5	
15	Diesel <10 ppm S	15	2.0%	13	7	2	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>64</b>	<b>56</b>	<b>102</b>	<b>No</b>	<b>All of 5</b>	

Notes: S = Summer; W = Winter

### 13.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

*Detail:* Two samples were non-compliant with the RON limit value of 95 (93.4 and 93.0), one sample with the MON limit value of 85 (83.9), and two samples with the summer vapour pressure of 60 kPa (62.5 and 62.0).

*Statistical significance:* The tolerance limits for statistical significance for RON, MON and summer vapour pressure are 94.6, 84.5 and 61.8 kPa respectively, so the samples were outside the tolerance limits and therefore non-compliant.

*Member State's notes:*

#### **RON 98 Petrol**

*Detail:* Two samples were non-compliant with the summer vapour pressure of 60 kPa (65.2 and 67.6).

*Statistical significance:* The tolerance limit for statistical significance for summer vapour pressure is 61.8 kPa, so the samples were outside the tolerance limits and therefore non-compliant.

*Member State's notes:*

**Diesel**

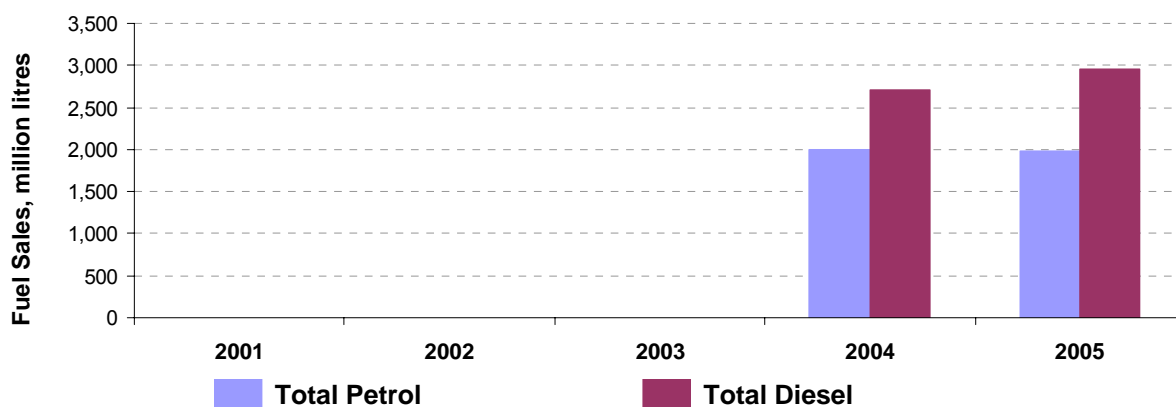
All samples tested were in compliance with limit values.

**Additional information:** In addition to the above non-compliances with the Directive were several exceedances of the <10ppm sulphur content limit for diesel fuels marketed as sulphur-free.

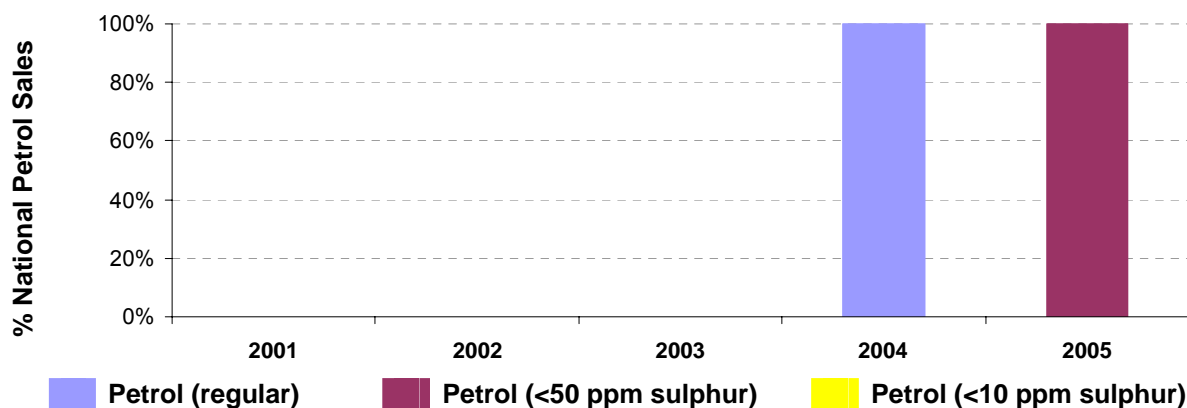
### 13.3 Temporal trends

The following Figure 13.2 to Figure 13.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. In Hungary petrol sales decreased from 2004 to 2005 by 1% and diesel sales increased in the same period by 9%.

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



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



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

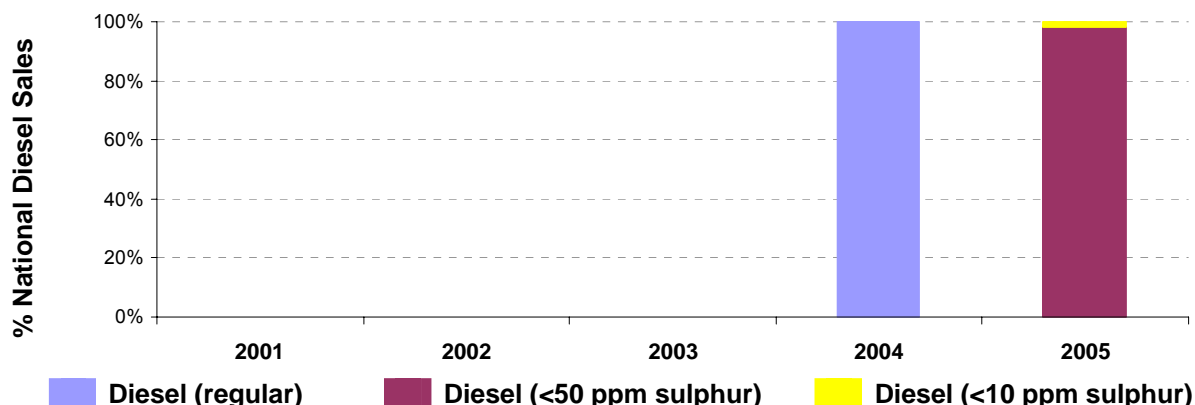
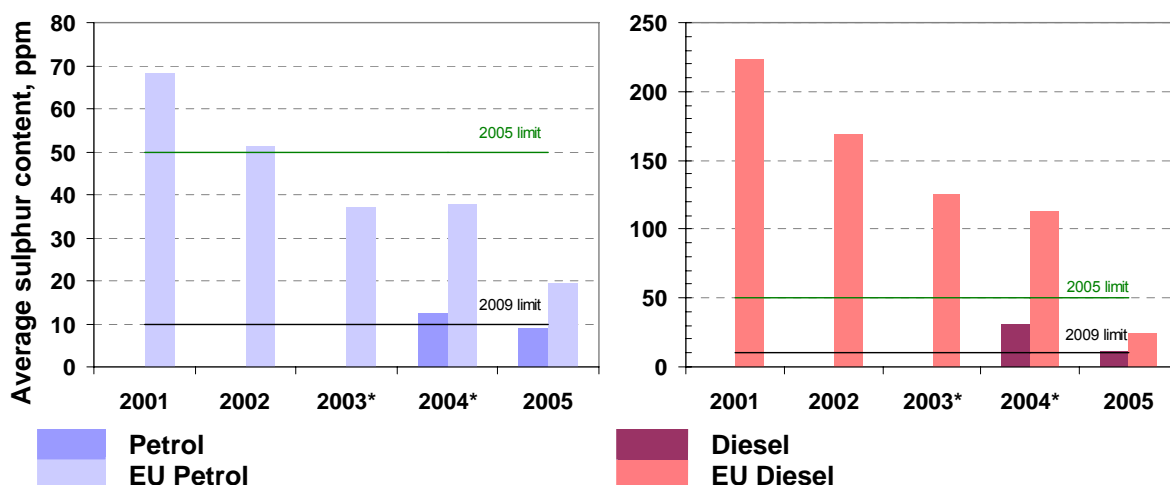


Figure 13.5 shows the trend in average sulphur content of petrol and diesel fuels in Hungary compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) and the EU average.

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



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

## 13.4 Key Areas for Improvement

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

### Key Areas for Improvement

- For full compliance with the requirements of EN 14274, summer and winter results should be reported separately.
- Hungary has used FQMS Statistical Model C. Given the size of the country and the complexity of the fuel supply it is recommended that it investigates whether Models A or B may be more appropriate.

## 14 Ireland

### 14.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	95 Unleaded	5
6	RON 95	<10 ppm	95 Unleaded	5
9	95<RON<98	<10 ppm	97 Unleaded	5
14	Diesel	<50 ppm	Diesel fuel	14

#### 14.1.1 Sales

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

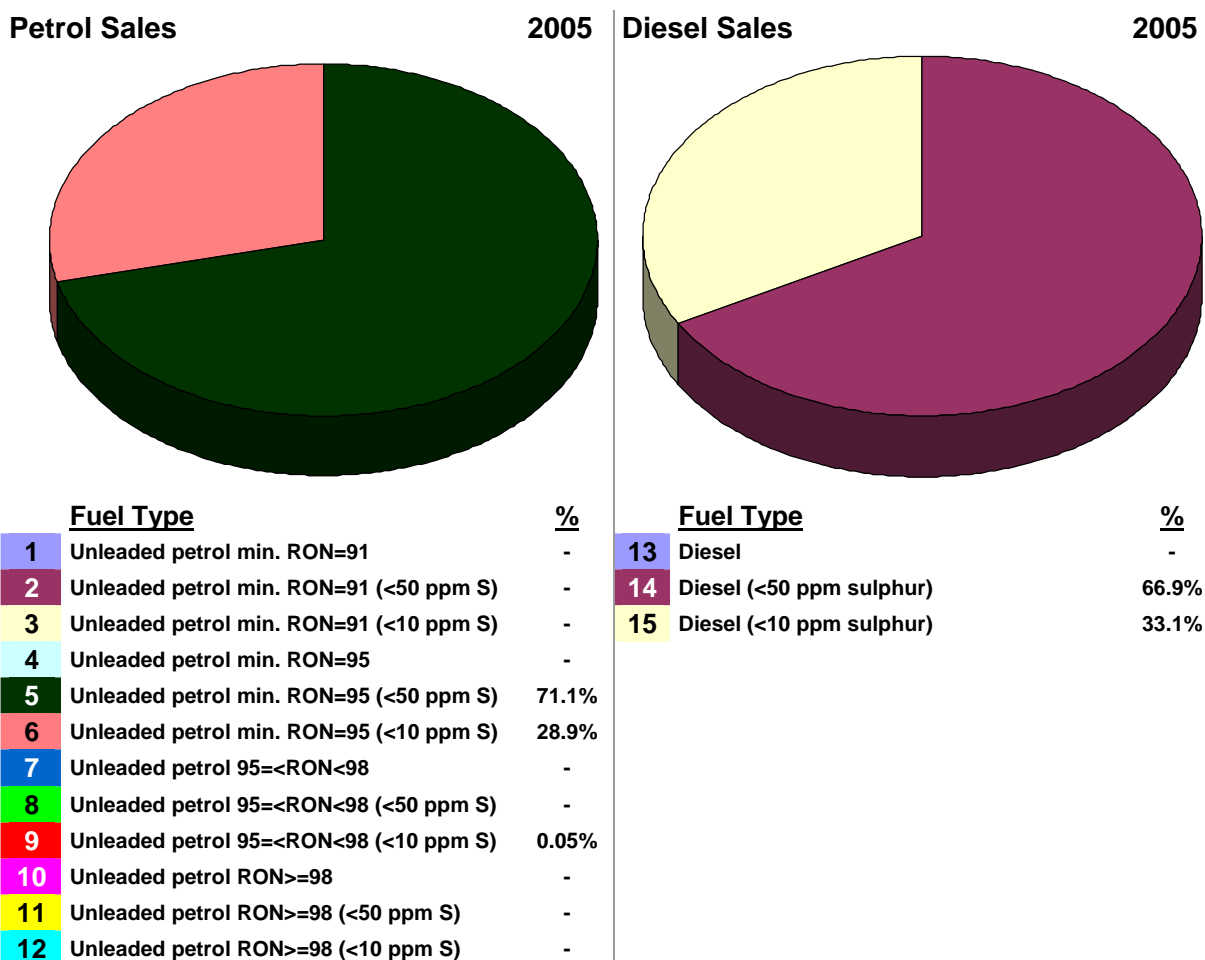


Figure 14.1 shows that 2005 petrol being available mostly at RON 95 grade (71%, compared to 73% in 2004), but with 29% (27% in 2004) being sulphur free. RON 97 fuel was available only as a sulphur-free grade and in extremely small quantities. Sulphur-free diesel was a new grade in 2005 and comprised 33% of all diesel sales.

## 14.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Petrol produced by the refinery at Whitegate is sulphur free at less than 2 ppm. The distribution of this material is by road to cover the Munster area and to sea fed terminals at Limerick, Galway and New Ross. In total this accounted for some 31% of national sales of petrol in 2005 and, geographically, covers Munster, parts of the midlands, western seaboard and south-eastern region. The eastern seaboard to the north of, and including, the Dublin region is not an area in which this product is marketed nor is it marketed in the north-west of the country.

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

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

**Average sulphur content of all petrol and diesel sold:** the average sulphur content of both petrol and diesel has decreased since 2001, see Table 14.1.

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

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

IE	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	83	57	52	43	20	19
<b>Diesel</b>	231	49	42	32	27	25

## 14.2 Fuel Quality Monitoring 2005

### 14.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** The availability of sulphur free petrol is a quirk of the refining process used, and the sulphur free petrol is not marketed separately from regular grades. In 2005 the oil companies association (Irish Petroleum Industry Association) continued its arrangement (begun in 2004) for its own sampling and testing of motor and gas oil at 23 forecourts and the Whitegate refinery in each of the periods July/August 2005 and December 2005 (i.e. 48 samples/tests in all), the results of which are incorporated in this report.

## 14.2.2 Sampling and reporting

Ireland was not completely compliant with the sampling and reporting requirements in 2005, as it did not perform the required number of samples in the summer period and did not provide separate summer and winter analysis reports. The following Table 14.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
5	RON 95 <50 ppm S	5	71.1%	41	77	100	No	12 of 18	(1)
6	RON 95 <10 ppm S	5	28.9%	0	0				
9	95<RON<98 <10 ppm S	5	0.05%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>41</b>	<b>77</b>	<b>100</b>	<b>No</b>	<b>12 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	66.9%	36	59	100	No	5 of 5	
15	Diesel <10 ppm S		33.1%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>36</b>	<b>59</b>	<b>100</b>	<b>No</b>	<b>5 of 5</b>	

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

- (1) No lead sample analysis results have been provided. Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, all substances on the list are measured at once using the oxygenates test methods.

## 14.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol RON 95**

**Detail:** One sample was non-compliant with the RON limit value of 95 (94.0), one sample with the aromatics limit value of 35 (40.3), and one sample with the benzene limit value of 1.0 % v/v (1.2%v/v).

**Statistical significance:** The tolerance limits for RON, aromatics and benzene are 94.6, 37.2 and 1.2%v/v respectively, so the samples were outside the tolerance limits and therefore non-compliant.

**Member State's notes:** RON: Fuel Supplier required to produce Refinery Quality Certificate to demonstrate compliance prior to distribution. The sample concerned was not a forecourt sample.

Aromatics: Department wrote to Fuel Supplier in March 2006.

Benzene: Refinery Quality Certificate supplied showing compliance.

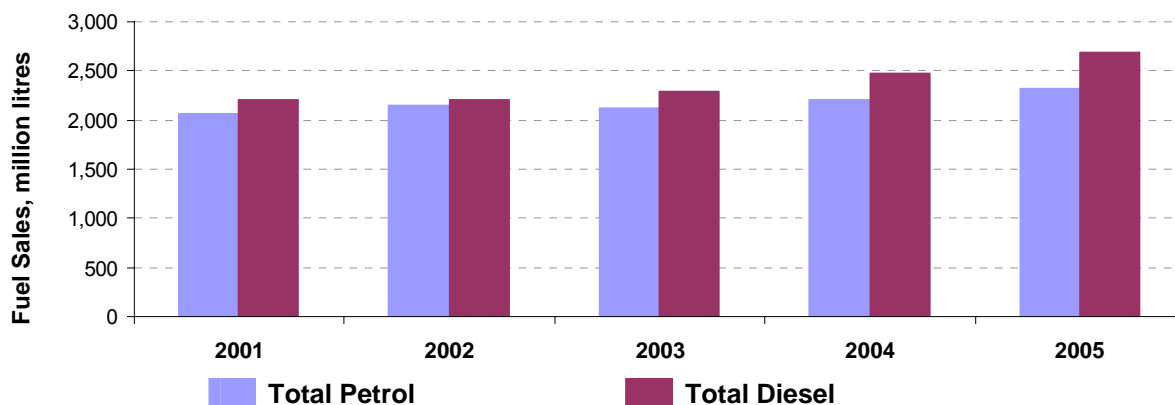
**Diesel**

All samples tested were in compliance with limit values.

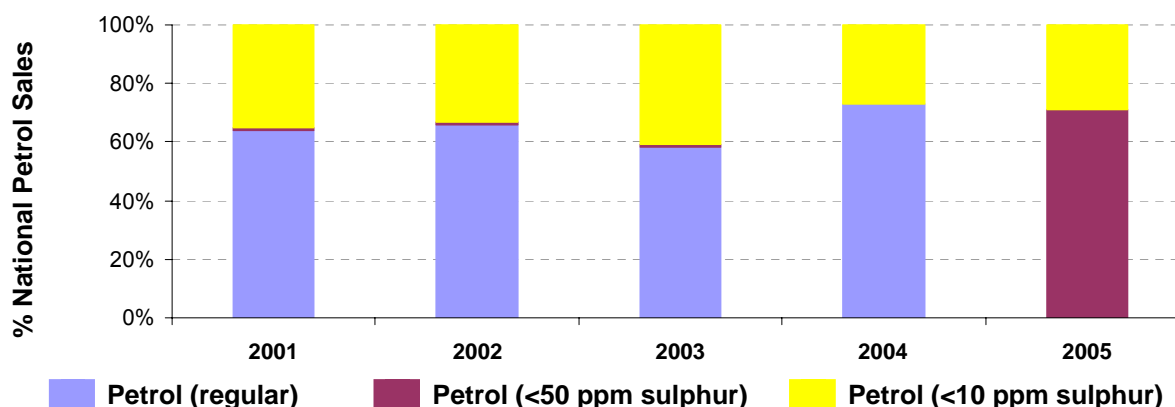
### 14.3 Temporal trends

The following Figure 14.2 to Figure 14.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2005, petrol sales increased by 12% and diesel sales increased by 22%. 2005 saw the introduction of sulphur free diesel fuel, which constituted a third of sales. In 2004 there was a 17% decrease in the sales of sulphur free petrol (due to planned maintenance at the Whitegate refinery that produces it). Diesel sales switched completely from regular grade to low sulphur (<50 ppm) diesel in 2002.

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



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



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

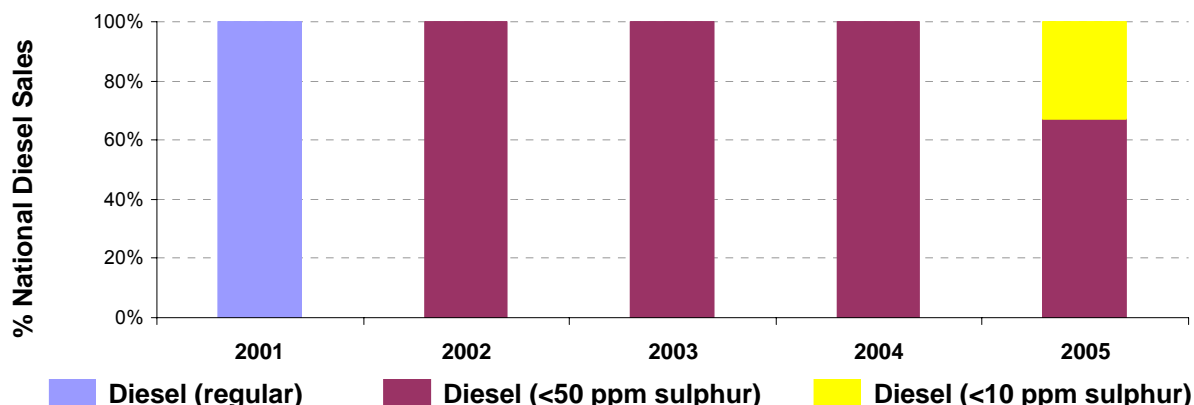
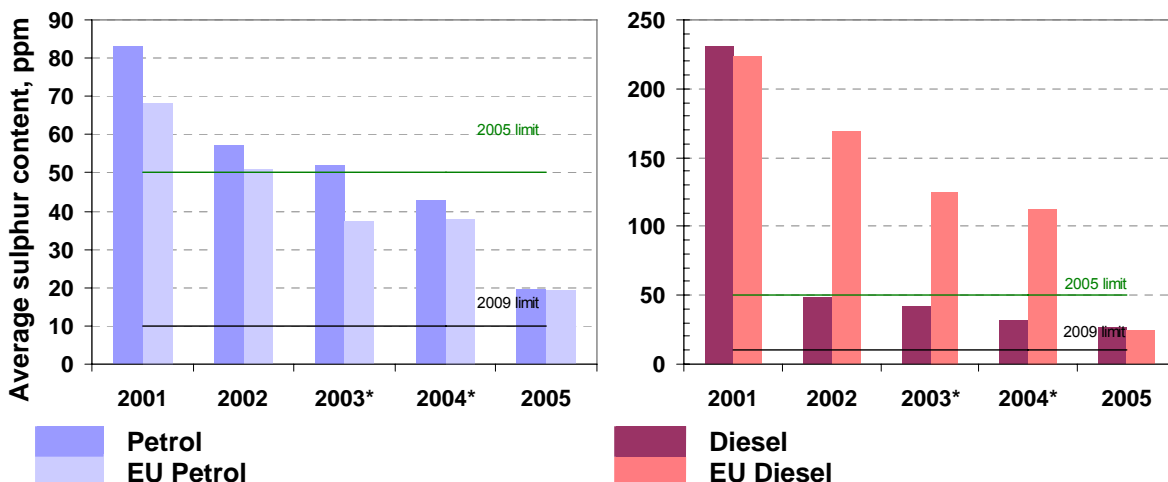


Figure 14.5 shows the trend in average sulphur content of petrol and diesel fuels in Ireland compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but slightly above the EU average.

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



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

## 14.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The report submission was received after the 30 June deadline - almost 2 months late.
- Sampling was conducted at refineries, depots and refuelling stations. Ireland should indicate whether the specific number of samples taken at refuelling stations matches the requirements of EN14274. The total sample numbers for diesel were below the 100 required for compliance.
- Ireland was not fully compliant with reporting requirements as summer and winter results should be reported separately;
- Ireland has used FQMS Statistical Model C. Given the size of the country it is recommended that it investigates whether Models A or B may be more appropriate.



# 15 Italy

## 15.1 Fuel Availability 2005

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

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

### 15.1.1 Sales

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

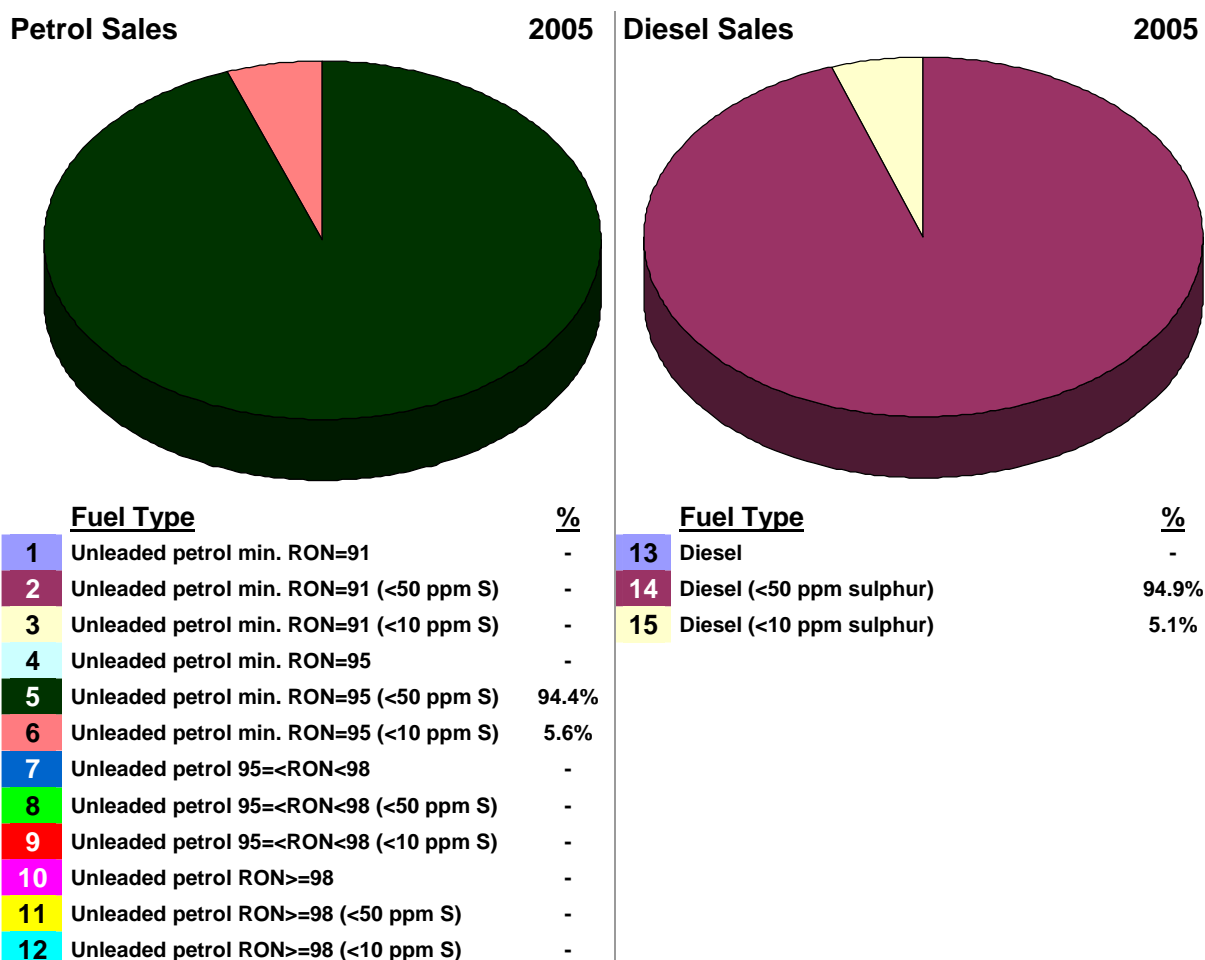


Figure 15.1 shows that at the beginning of 2005 there was a complete switch from 'regular' to low sulphur and sulphur free fuels. All petrol sales were of RON 95 grade, with 94.4% low

sulphur and 5.6% sulphur free. Nearly 95% of diesel fuel sold was of low sulphur with the remainder sulphur free.

### 15.1.2 Sulphur content

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

The information obtained on the basis of data advertised by these oil companies, shows that in at least 99% of all level 3 regions (NUTS) and in main motorways sulphur free fuels were available in Italy in 2004. Italy has adopted for the 2005 the following minimal criteria to ensure an appropriate geographical availability of sulphur free fuels:

*National level:*

- 10% refuelling stations with sulphur free petrol (compared to all national refuelling stations);
- 10% refuelling stations with sulphur free diesel (compared to all national refuelling stations);
- 15% refuelling stations with sulphur free petrol on motorway (compared to all national refuelling stations on motorway);
- 15% refuelling stations with sulphur free diesel on motorway (compared to all national refuelling stations on motorway);
- 300 km maximum distance between refuelling stations with sulphur free petrol on motorway;
- 300 km maximum distance between refuelling stations with sulphur free diesel on motorway.

*NUTS 3 regional areas (with a population more than 15,000):*

- 2% refuelling stations with sulphur free petrol (compared to all regional refuelling stations);
- 2% refuelling stations with sulphur free diesel (compared to all regional refuelling stations).

In order to ensure compliance with the minimal criteria, the owners of refuelling stations submitted to Ministry for the Environment and Territory a plan in which refuelling stations with sulphur free fuels are located (separate for petrol and diesel fuel). On the whole, the plans have met the above-mentioned criteria. Italy has established also the penalties applicable to breaches of the provisions contained in the plans. Italy presented tables for 2005 utilising options (A), (B) and (D) of the Commissions Recommendation and demonstrating the wide geographical availability of sulphur-free fuels.

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

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

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

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

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

IT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	61	51	53	53	25	19
<b>Diesel</b>	273	246	238	216	35	25

## 15.2 Fuel Quality Monitoring 2005

### 15.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** Italy established a fuel quality monitoring system, in accordance with the requirements of the European standard EN 14274:2003, by decree 3 February 2005. The 2005 monitoring system was set up using the statistical model A of EN 14274 (large country framework, five macro-regions). The distribution of samples throughout the national territory was: 29% North-West, 9% North-East, 26% Centre, 17% South and 19% Islands.

Compared to the total samples taken, the percentages of samples of sulphur free petrol and diesel fuel were 24% and 8%, respectively.

### 15.2.2 Sampling and reporting

Italy was fully compliant with the sampling and reporting requirements in 2005. The following Table 15.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
5	RON 95 <50 ppm S	5	94.4%	178	64	200	Yes	All of 18	
6	RON 95 <10 ppm S	6	5.6%	47	29	12	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>225</b>	<b>93</b>	<b>212</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	94.9%	203	82	200	Yes	All of 5	
15	Diesel <10 ppm S	15	5.1%	14	10	11	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>217</b>	<b>92</b>	<b>211</b>	<b>Yes</b>	<b>All of 5</b>	

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

### 15.2.3 Compliance with fuel quality limit values

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

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

##### **Petrol**

*Detail:* One sample was non-compliant with the RON limit value of 95 (94.3), one sample with the summer vapour pressure limit of 60 kPa (66.5), and one sample with the aromatics limit of 35%v/v (37.5).

*Statistical significance:* These samples were outside of the zone of tolerance for the test methods (94.6 for RON, 61.8 for summer vapour pressure and 37.2 for aromatics) and were therefore non-compliant with the Directive.

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

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

The results of these actions were positive: compared to 2004, the percentage of samples of petrol non-compliant with the Directive decreased.

##### **Diesel**

*Detail:* Six samples exceeded the limit for sulphur content (50 ppm) with values of 57 to 60.

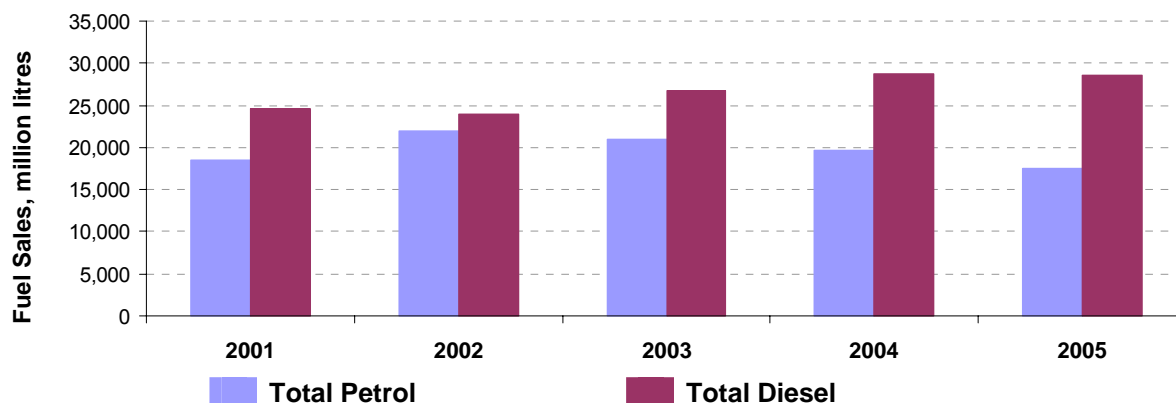
*Statistical significance:* The tolerance limit for sulphur content (54.7) was exceeded and therefore the sample was not compliant with the Directive.

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

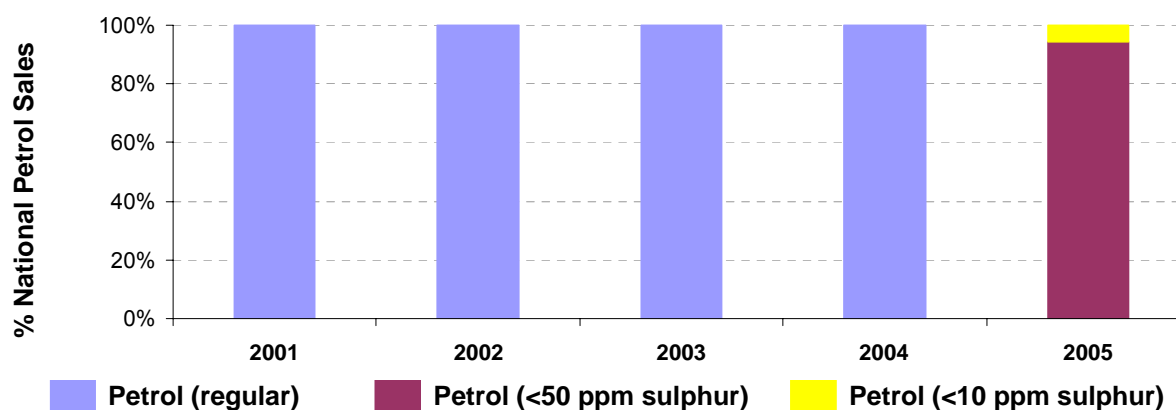
## 15.3 Temporal trends

The following Figure 15.2 to Figure 15.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Sales of petrol decreased by 5% between 2001 and 2005, while sales of diesel increased by 16%. There was a complete switch from 'regular' to low sulphur and sulphur free fuels at the beginning of 2005.

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



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



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

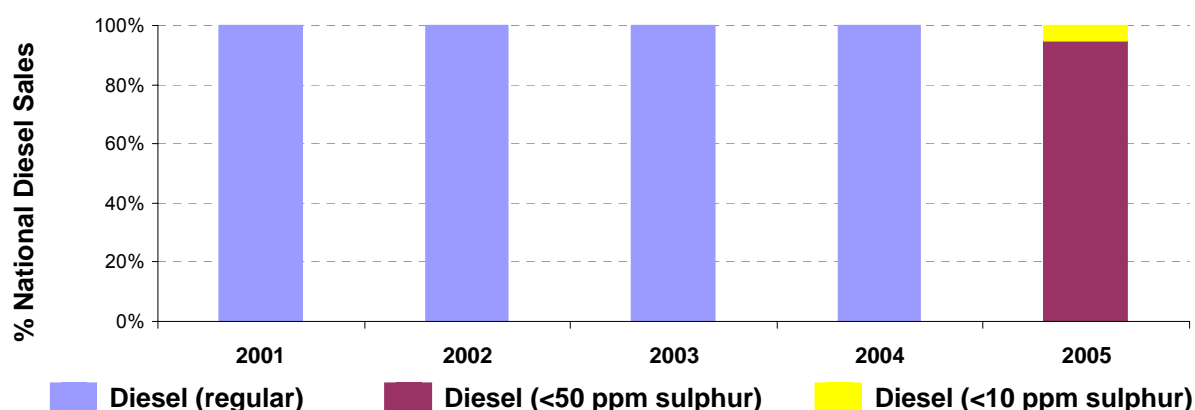
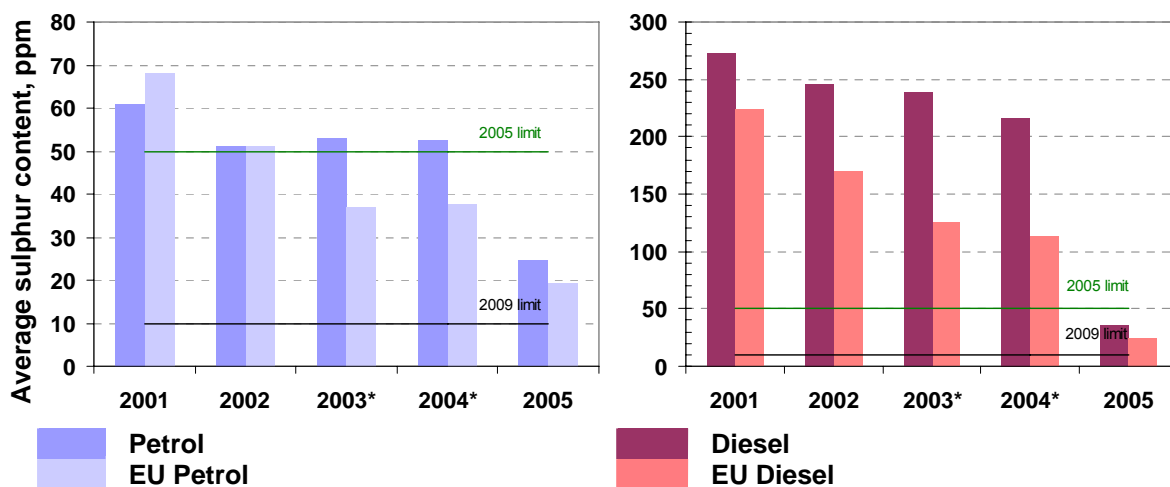


Figure 15.5 shows the trend in average sulphur content of petrol and diesel fuels in Italy compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average.

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



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

## 15.4 Key Areas for Improvement

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

### Key Areas for Improvement

- None obvious.

# 16 Latvia

## 16.1 Fuel Availability 2005

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

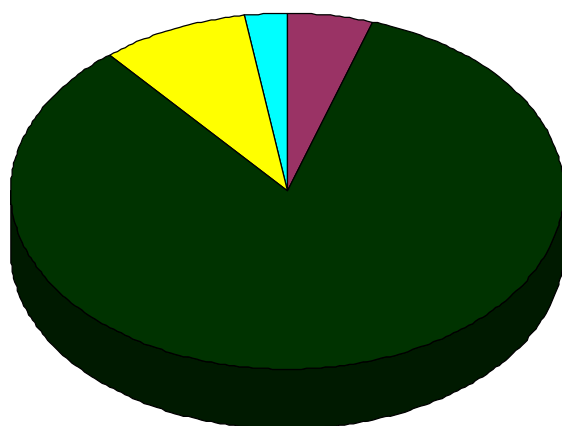
Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	Petrol 92	2
5	RON 95	<50 ppm	Petrol 95	5
11	RON 98	<50 ppm	Petrol 98	11
12	RON 98	<10 ppm	Petrol 98	11
13	Diesel	<350 ppm	Diesel	14
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

### 16.1.1 Sales

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

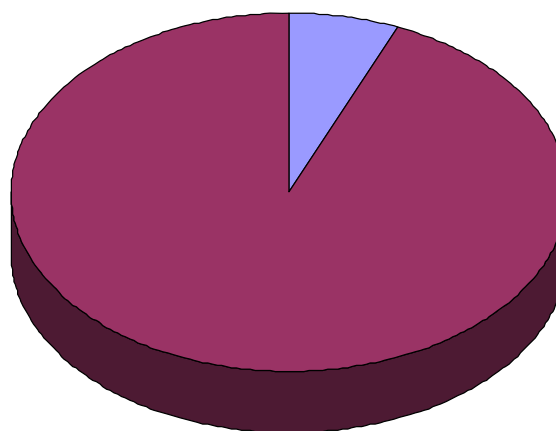
Petrol Sales

2005



Diesel Sales

2005



Fuel Type	%
1 Unleaded petrol min. RON=91	-
2 Unleaded petrol min. RON=91 (<50 ppm S)	5.1%
3 Unleaded petrol min. RON=91 (<10 ppm S)	-
4 Unleaded petrol min. RON=95	-
5 Unleaded petrol min. RON=95 (<50 ppm S)	83.7%
6 Unleaded petrol min. RON=95 (<10 ppm S)	-
7 Unleaded petrol 95=<RON<98	-
8 Unleaded petrol 95=<RON<98 (<50 ppm S)	-
9 Unleaded petrol 95=<RON<98 (<10 ppm S)	-
10 Unleaded petrol RON>=98	-
11 Unleaded petrol RON>=98 (<50 ppm S)	8.7%
12 Unleaded petrol RON>=98 (<10 ppm S)	2.4%

Fuel Type	%
13 Diesel	6.4%
14 Diesel (<50 ppm sulphur)	93.6%
15 Diesel (<10 ppm sulphur)	0.01%

Figure 16.1 shows that in 2005 there were low sulphur and sulphur-free fuel grades available. RON 95 petrol comprised the vast majority of sales (84%, compared to 90% in 2004), with the remainder being RON 91 (5%) and RON 98 (11%). Sulphur-free diesel was for the first time available in 2005, but sales were minimal, with the majority being low (<50 ppm) sulphur diesel (94%). It appears that quantises (over 6% annual sales) of regular diesel with sulphur <350ppm were still sold in the first part of 2005 in non-compliance with the <50ppm sulphur limit value in force since start 2005.

### 16.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None were available in 2004, however regulations were put in place to ensure the availability from the beginning of 2005. This requires that companies that own at least 30 filling stations shall ensure petrol and diesel fuel complying with the sulphur-free fuels is available in at least one filling station of their refuelling stations that are located near any of the main state roads.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 16.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

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

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

LV	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				66	25	19
<b>Diesel</b>				329	21	25

## 16.2 Fuel Quality Monitoring 2005

### 16.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:**



## 16.2.2 Sampling and reporting

Latvia was essentially compliant with the sampling and reporting requirements in 2005, however they have not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 16.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

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

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	5.1%	12	23	-	Yes	All of 18	
5	RON 95 <50 ppm S	5	83.7%	40	117	-	Yes	All of 18	
11	RON 98 <50 ppm S	11	8.7%	18	41	-	Yes	All of 18	
12	RON 98 <10 ppm S	11	2.4%	0	0	-			
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>70</b>	<b>181</b>	<b>-</b>	<b>Yes</b>	<b>All of 18</b>	
13	Diesel	14	6.4%	0	0	-			
14	Diesel <50 ppm S	14	93.6%	101	337	-	Yes	All of 5	(1)
15	Diesel <10 ppm S	14	0.0%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>101</b>	<b>337</b>	<b>-</b>	<b>Yes</b>	<b>All of 5</b>	<b>(1)</b>

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

- (1) Quantities of regular diesel <350ppm appear to have been sold in Latvia in early 2005, in non-compliance with the <50 ppm limit value mandatory from start 2005.
- (2) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

## 16.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

**Detail:** 1 sample exceeded the distillation at 100°C limit value (of min. 46 %v/v) with 41.8 %v/v .

**Statistical significance:** The tolerance limit for statistical significance is 43.6, so the sample was not compliant with the Directive.

**Member State's notes:** -

#### **RON 98 Petrol**

All samples tested were in compliance with Directive limit values, however 2 samples were not compliant the national minimum value for RON = 98.

#### **Diesel**

**Detail:** Cetane number and sulphur content limit values (of min. 51, max. 50 ppm) were not complied with by 1,8 samples respectively and with extremes of 41.7, 78-1560 ppm respectively for the parameters.

**Statistical significance:** The tolerance limits for statistical significance (48.5 for Cetane, 54.7ppm for sulphur) were exceeded. These samples were

therefore non-compliant with the Directive.

Member State's notes: -

### 16.3 Temporal trends

The following Figure 16.2 to Figure 16.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Both petrol and diesel sales increased from 2004 to 2005 by 46% and 67% respectively.

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

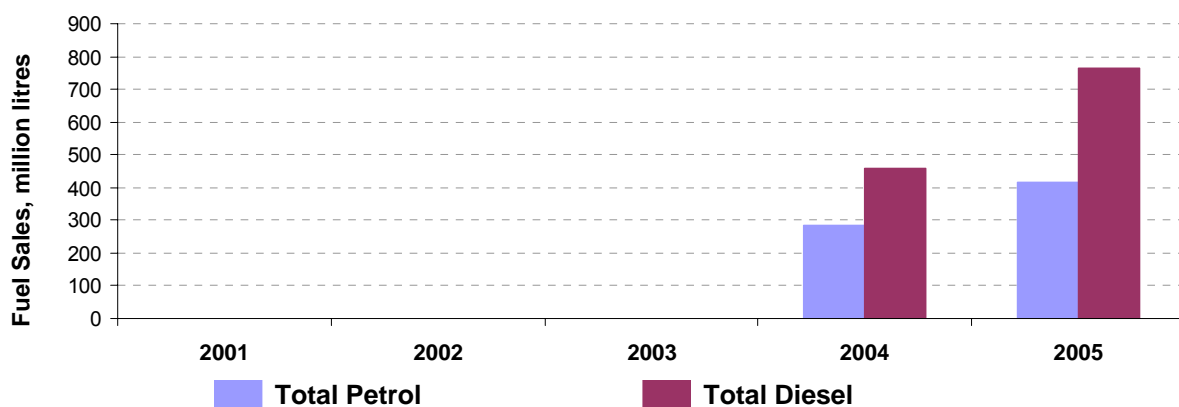


Figure 16.3: Temporal trends in national sales of low sulphur petrol (%)

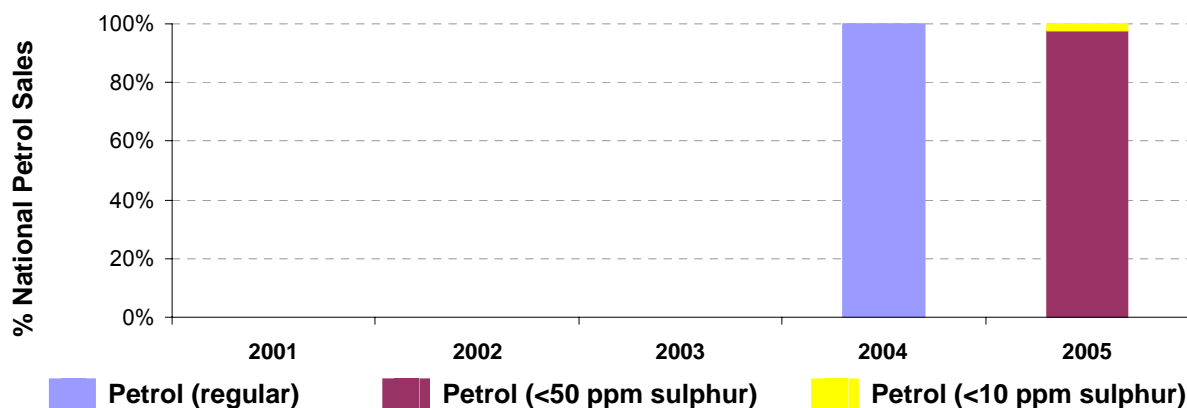


Figure 16.4: Temporal trends in national sales of low sulphur diesel (%)

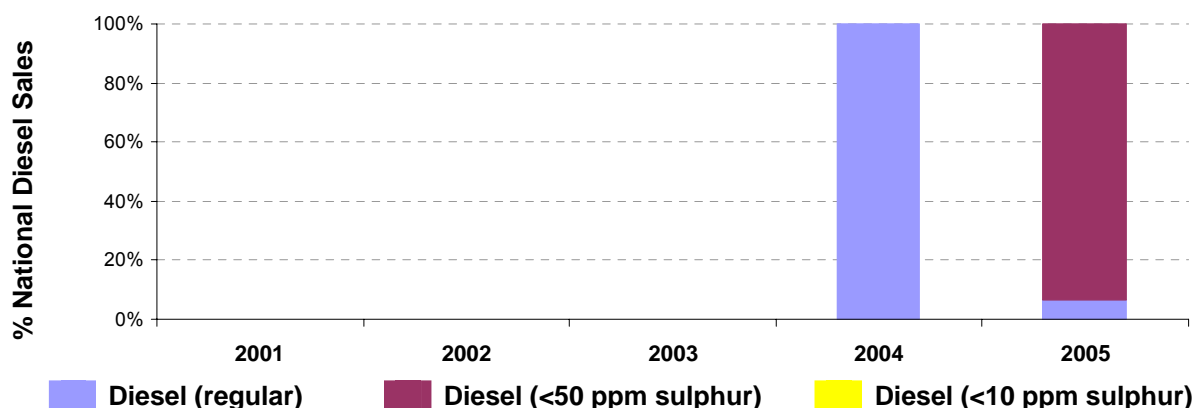
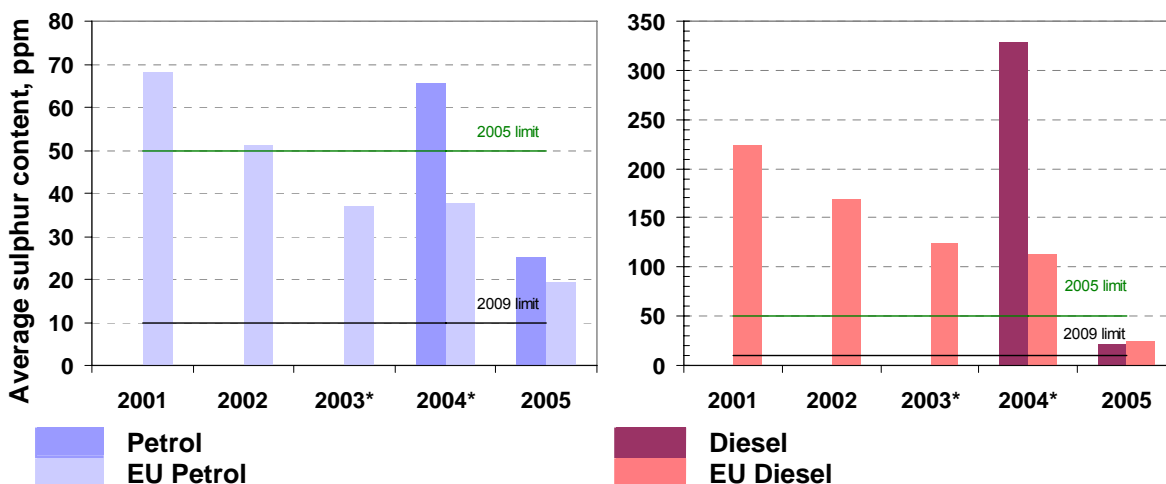


Figure 16.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average for petrol.

**Figure 16.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 16.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Latvia was almost 1 month late in submitting its report
- Latvia appears to have reported significant sales (6%) of regular diesel not compliant with the new 2005 sulphur limit of 50 ppm. More information has been requested on this apparent non-compliance.
- Latvia has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard.
- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle.

# 17 Lithuania

## 17.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	A-92 (RON 92)	2
5	RON 95	<50 ppm	A-95 (RON 95)	5
6	RON 95	<10 ppm	A-95 (RON 95)	6
11	RON 98	<50 ppm	A-98 (RON 98)	11
12	RON 98	<10 ppm	A-98 (RON 98)	12
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	15

### 17.1.1 Sales

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

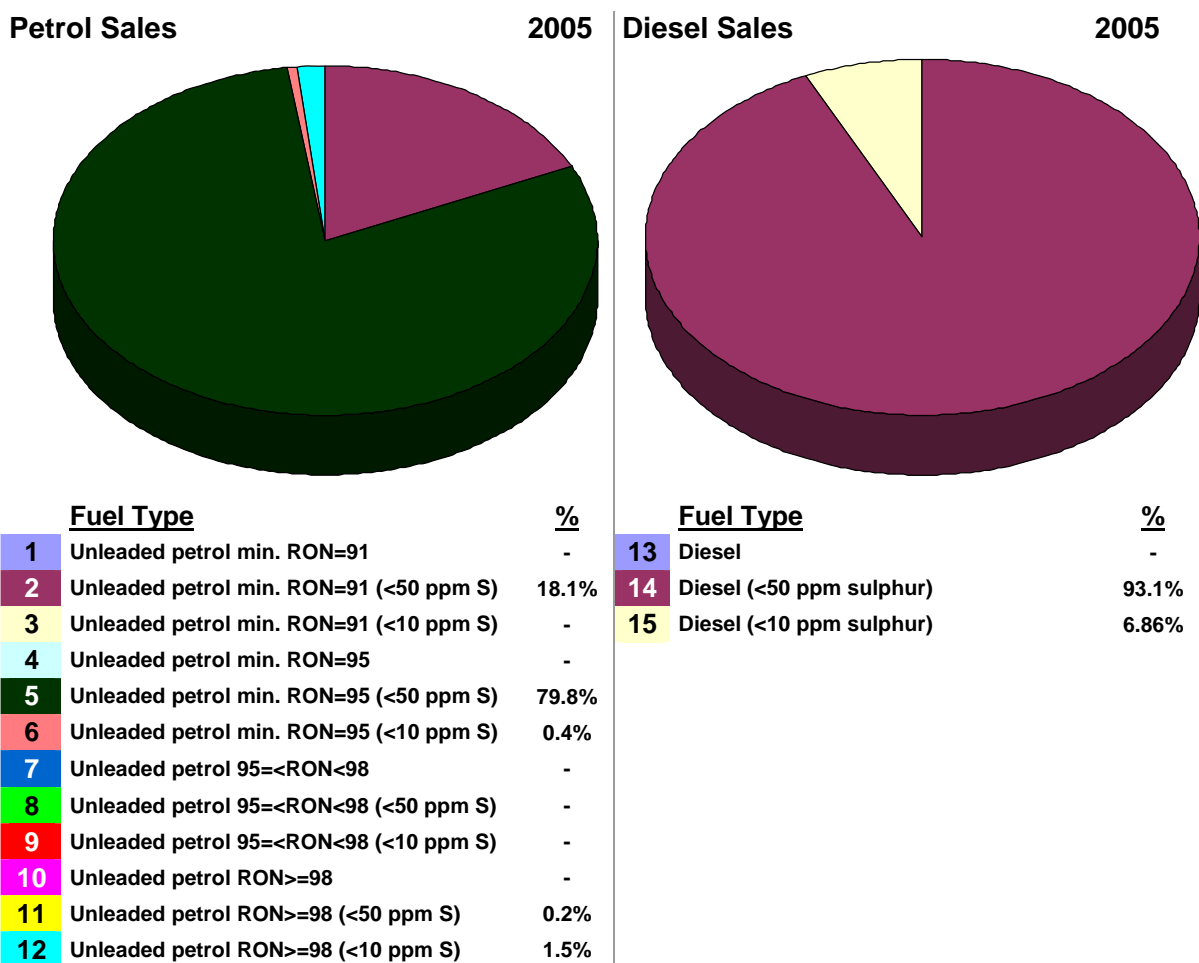


Figure 17.1 shows that the majority of fuel sold in 2005 was RON 95 grade (80%), with RON 91 and RON 98 fuels comprising of approximately 18% and 2% respectively. Only small amounts of sulphur-free petrol (2%) and sulphur-free diesel (7%) were sold.

### 17.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur-free petrol and diesel is marketed all over the national territory in around 20 refuelling stations.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 17.1 shows the average content of fuel sold in relation to the EU25 average.

**Additional information:**

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

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

LT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<i>Petrol</i>				39	21	19
<i>Diesel</i>				104	29	25

## 17.2 Fuel Quality Monitoring 2005

### 17.2.1 Description of system

**Responsible organisation(s):** State Non Food Products Inspectorate under the Ministry of Economy is responsible for fuel quality sampling and analysis. The Ministry of Environment is responsible for reporting under the Directive 98/70/EC.

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

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

**Summer Period:** 1st May to 30th September, although the national limit for DVPE is 70kPa implying a period of 1st June to 31st August (arctic or severe weather conditions)

**Location(s) of sampling:** Refuelling stations and terminals/depots. 198 petrol and 263 diesel samples were carried out at the refuelling stations.

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

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

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

## 17.2.2 Sampling and reporting

Lithuania was non-compliant with the sampling/analysis number requirements in 2005, but compliant with other aspects of reporting. The following Table 17.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 17.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	18.1%	35	19	100	Yes	All of 18	(1)
5	RON 95 <50 ppm S	5	79.8%	54	34	100	Yes	All of 18	(1)
6	RON 95 <10 ppm S	6	0.4%	5	15	1	Yes	All of 18	(1)
11	RON 98 <50 ppm S	11	0.2%	6	3	1	Yes	All of 18	(1)
12	RON 98 <10 ppm S	12	1.5%	8	13	2	Yes	All of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>108</b>	<b>84</b>	<b>204</b>	<b>Yes</b>	<b>All of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	93.1%	150	82	100	Yes	All of 5	(2)
15	Diesel <10 ppm S	15	6.9%	0	36	7	Yes	All of 5	(2)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>150</b>	<b>118</b>	<b>107</b>	<b>Yes</b>	<b>All of 5</b>	<b>(2)</b>

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

- (1) The exact numbers of non-compliant samples were not provided.  
 (2) The exact numbers of non-compliant samples were not provided.

## 17.2.3 Compliance with fuel quality limit values

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

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

#### **RON 92 Petrol**

*Detail:* Sulphur content limit (50 ppm) was exceeded by 1 sample with 60.7ppm.

*Statistical significance:* The value was beyond the tolerance limit for the test method and therefore non-compliant with the Directive.

*Member State's notes:* -

#### **RON 95 Petrol**

*Detail:* 2 samples exceeded the limit value for aromatics (35 %v/v) with values of 39 and 37 %v/v.

*Statistical significance:* The values were beyond the tolerance limit for the test method used and therefore non-compliant with the Directive.

*Member State's notes:* -

#### **RON 98 Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

*Detail:* 19 samples were below the minimum limit for Cetane number (51), with a minimum of 48.2. 1 sample was above the limit value for

sulphur content (50 ppm) with 849.4.

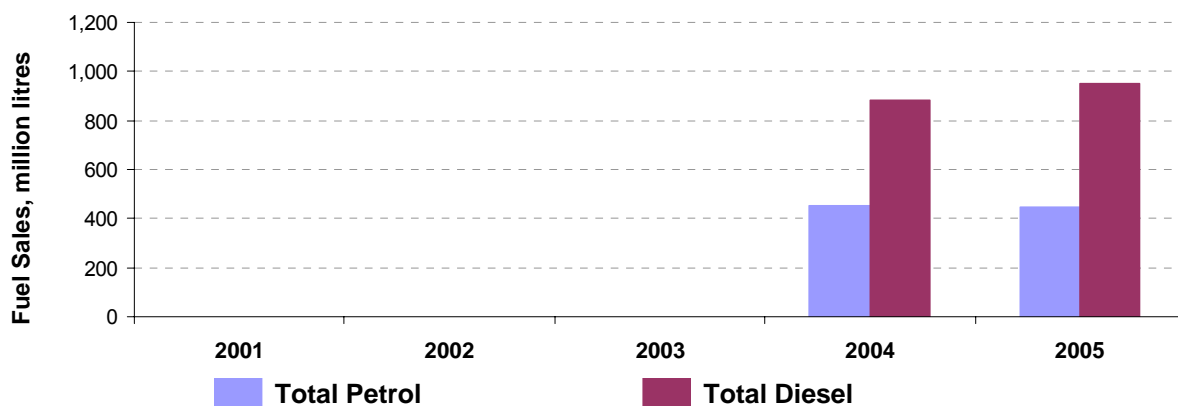
*Statistical significance:* All samples were beyond the tolerance limits for the respective test methods and therefore non-compliant with the Directive.

*Member State's notes:* Lithuania has stated they have a national winter limit value for Cetane of 48, however this is not in accordance with the Directive requirements.

## 17.3 Temporal trends

The following Figure 17.2 to Figure 17.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Both petrol and diesel sales increased from 2004 to 2005 by 46% and 67% respectively. The sales of sulphur free diesel reduced by 59% in the same period.

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



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

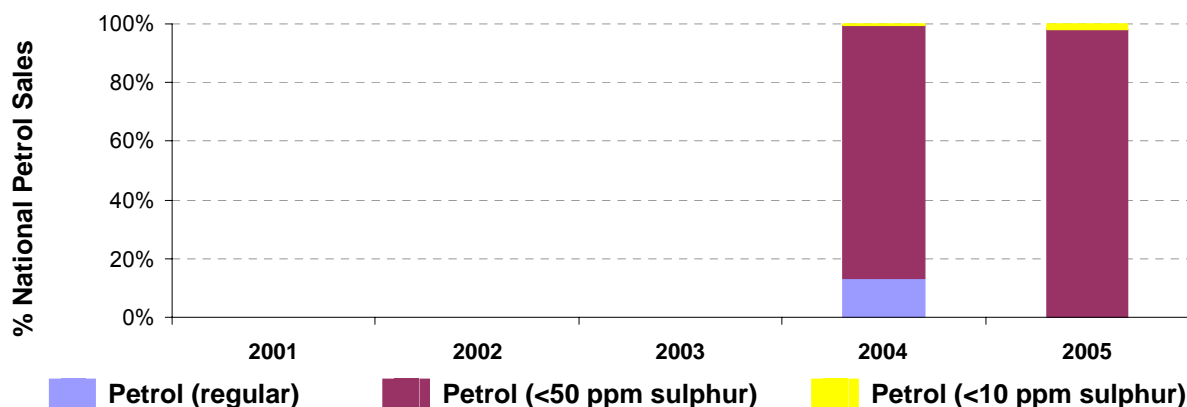


Figure 17.4: Temporal trends in national sales of low sulphur diesel (%)

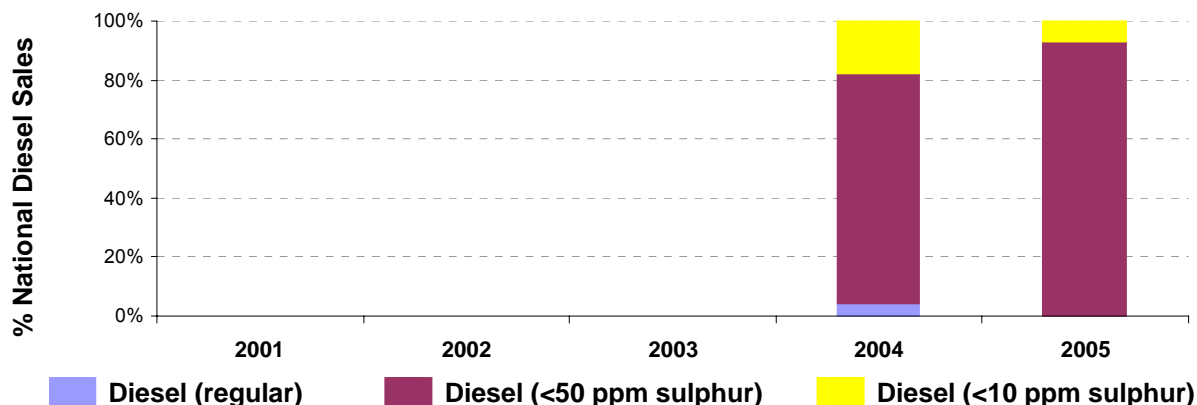
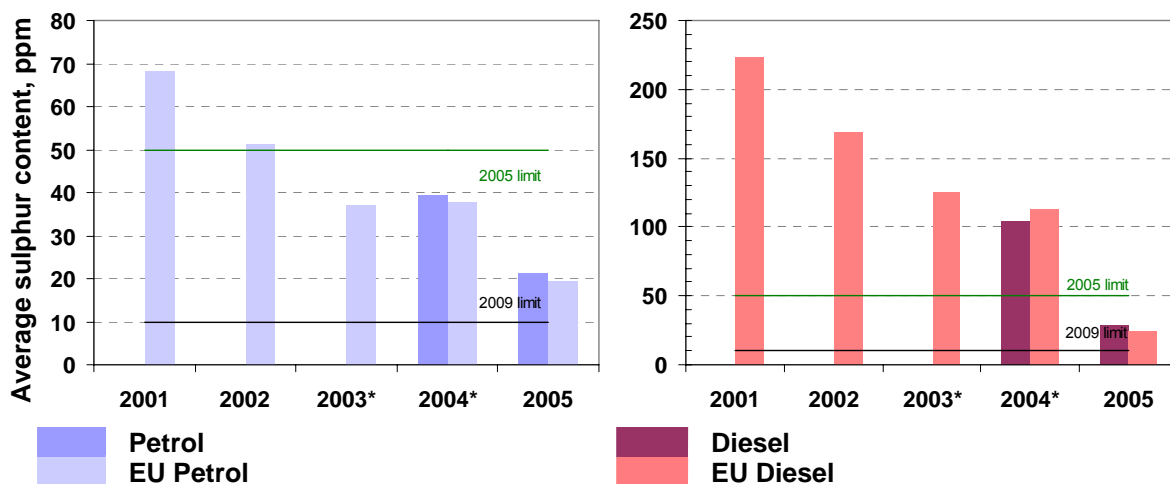


Figure 17.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) but above the EU average.

Figure 17.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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

## 17.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Lithuania is not taking sufficient samples to comply fully with Statistical Model C for all fuels.



## 18 Luxembourg

### 18.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	Normal	No data
5	RON 95	<50 ppm	Eurosuper	5
11	RON 98	<50 ppm	Super+ 50S	11
14	Diesel	<50 ppm	Diesel 50S	14

#### 18.1.1 Sales

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

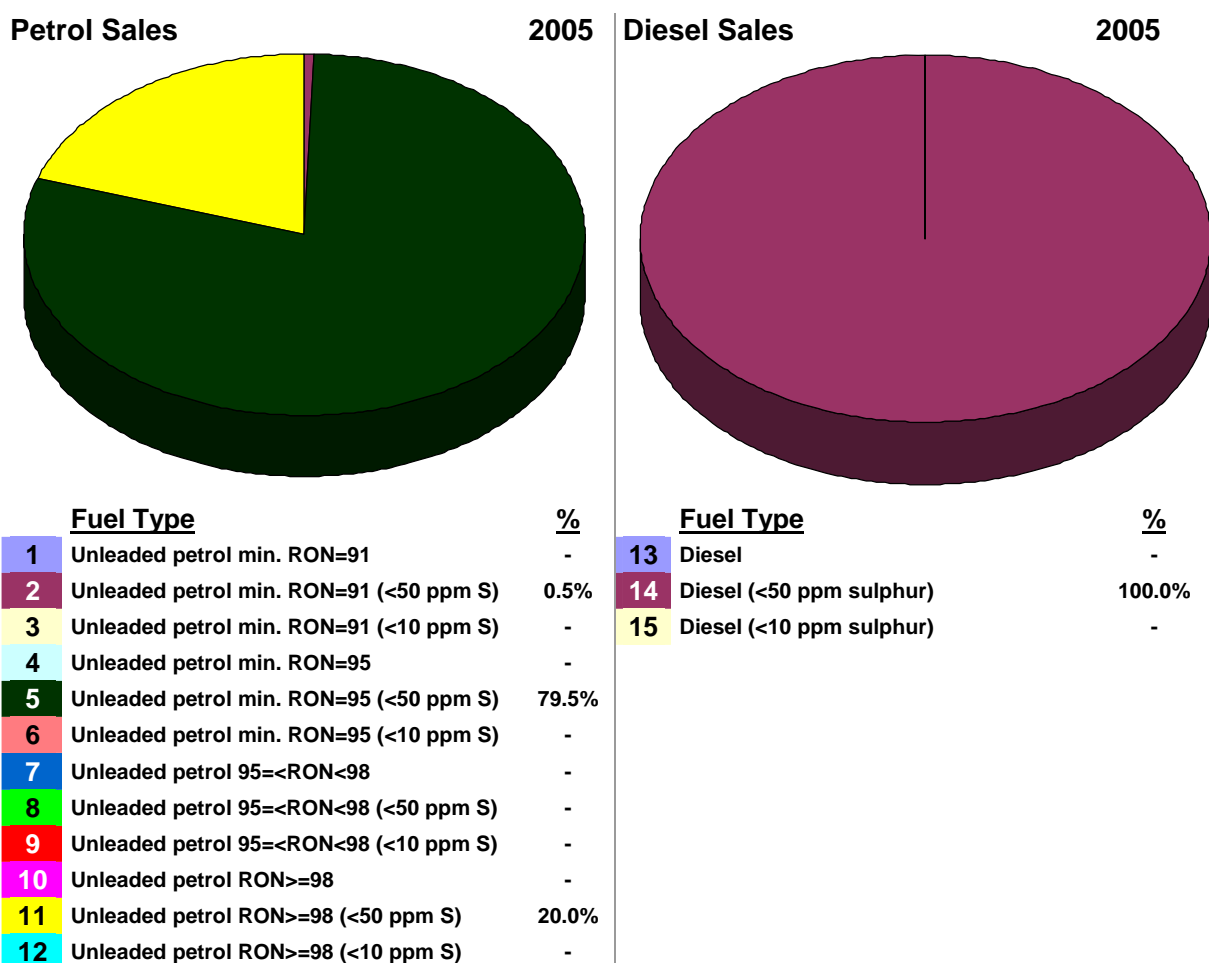


Figure 18.1 shows that the majority (79.5%) of Luxembourg's petrol sales in 2005 were of RON 95 grade (compared to 67% in 2001), with the remainder comprising of RON 91 (0.5%, compared to 4% in 2001) and RON>98 <50 ppm sulphur (20%, compared to 22% in 2004,

24% in 2003, 27% in 2002 and 2% in 2001 with 27% regular sulphur grade). Luxembourg completely switched to low sulphur diesel grades from 2002.

### 18.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None on sale in 2005, although much of the fuel sold met this criterion.

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

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of petrol and diesel has fluctuated since 2001, see Table 18.1, however this may be as a result of the low number of samples taken (see 18.2).

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

Table 18.1: Annual trend in average sulphur content in petrol and diesel fuels

Fuel/Year	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2004
<b>Petrol</b>	18	38	44	31	11	19
<b>Diesel</b>	252	33	42	45	32	25

## 18.2 Fuel Quality Monitoring 2005

### 18.2.1 Description of system

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

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

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

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

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

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

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

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

**Other details:** Data for RON 91 data was presented in 2004 for the first time, however unfortunately no data was presented in 2005.

## 18.2.2 Sampling and reporting

Luxembourg was partially compliant with the sampling and reporting requirements in 2005, however sampling numbers were again low (although double previous years). The following Table 18.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 18.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
2	RON 91 <50ppm S	2	0.5%	0	0	-	-	None	(1)
5	RON 95 <50 ppm S	5	79.5%	6	9	-	No	All of 18	
11	RON 98 <50 ppm S	11	20.0%	6	14	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>12</b>	<b>23</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	6	11	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>6</b>	<b>11</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

(1) No analysis data were reported for RON91

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

## 18.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

All samples tested were in compliance with limit values.

## 18.3 Temporal trends

The following Figure 18.2 to Figure 18.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2005, total petrol sales decreased 13% (only 1% in 2004) and diesel sales rose by 71% (56% in 2004). There was complete transfer of sales regular sulphur petrol to low-sulphur petrol (<50 ppm) and complete transfer to low-sulphur diesel in the same time period.

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

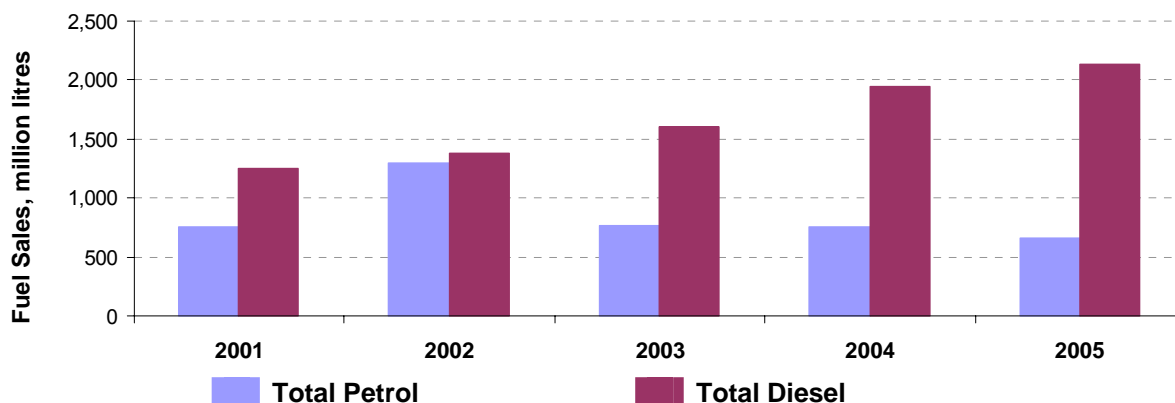


Figure 18.3: Temporal trends in national sales of low sulphur petrol (%)

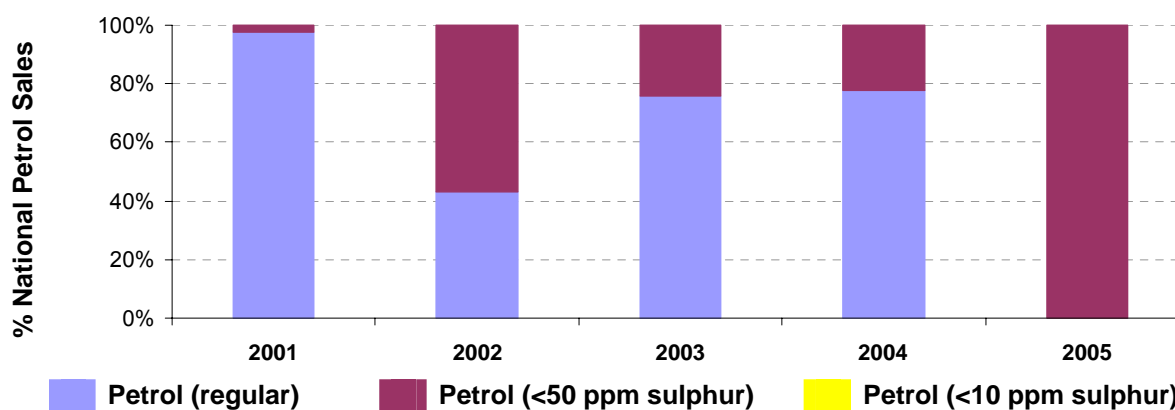


Figure 18.4: Temporal trends in national sales of low sulphur diesel (%)

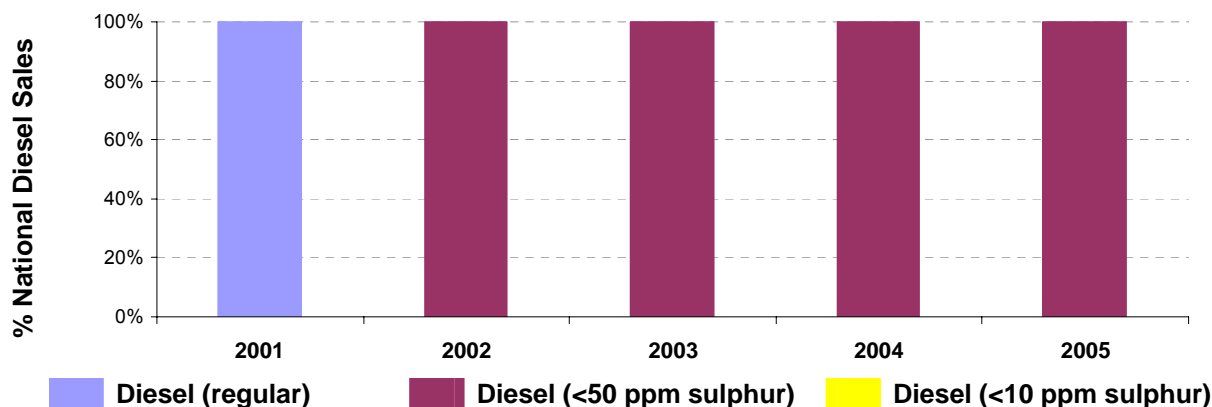
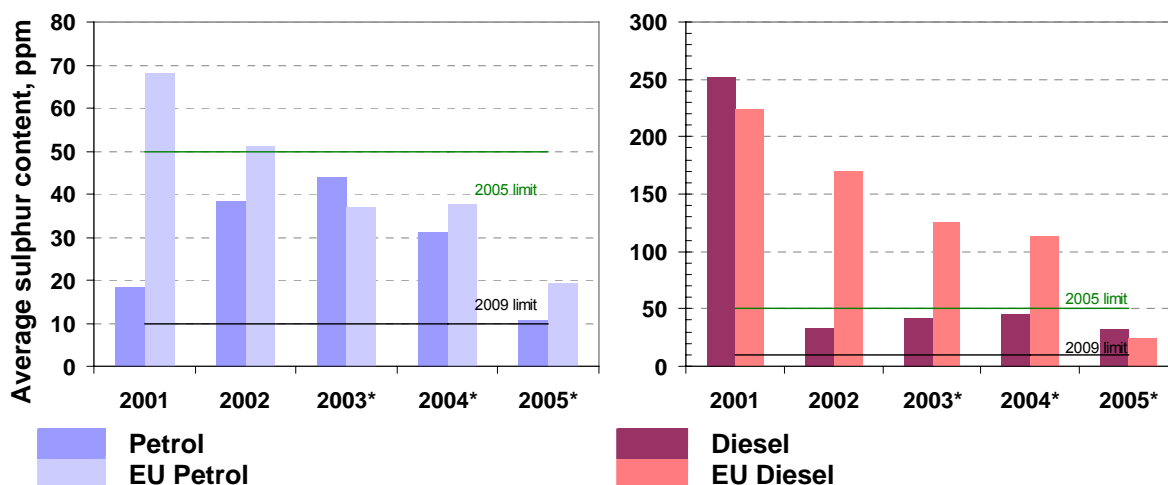


Figure 18.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). In 2005, with full market conversion to <50ppm fuels, the average sulphur content of petrol was a third of the 2004 values and significantly reduced for diesel. For petrol the average sulphur content was below the 2005 limit (50ppm) and the EU average, almost achieving the 2009 limit (10ppm). At 32ppm the average sulphur content of diesel was above the EU average, but below the 2005 limit.

**Figure 18.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 18.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The report submission was received after the 30 June deadline - almost 6 months late.
- Sulphur-free fuels were not available in 2005 as required under the Directive, although petrol fuels meeting this limit appeared to be available, they were unmarked. No assessment of the geographical availability was provided either.
- Luxemburg has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard.
- Few samples of the fuel grades were taken (6 per grade in summer, 9-14 in winter) and no sample analyses were provided for RON91 again (2004 is the only year such data was provided). The minimum no of samples to be taken according to statistical model C of EN14274 is 50 per fuel grade and in each of the summer and winter periods - i.e. 100 per fuel grade per year. This might be excessive for such a small country, but without information on the number of supply points/sources, it is difficult to justify a lower sampling rate. Even giving the benefit of the doubt the number of samples still seems very low.
- Luxemburg also appears to be only carrying out sampling at refineries and depots. Samples should be taken from refuelling stations.

# 19 Malta

## 19.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Unleaded Petrol	5
8	95<RON<98	<50 ppm	Lead Replacement Petrol (LRP)	8
14	Diesel	<50 ppm	Diesel	14

### 19.1.1 Sales

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

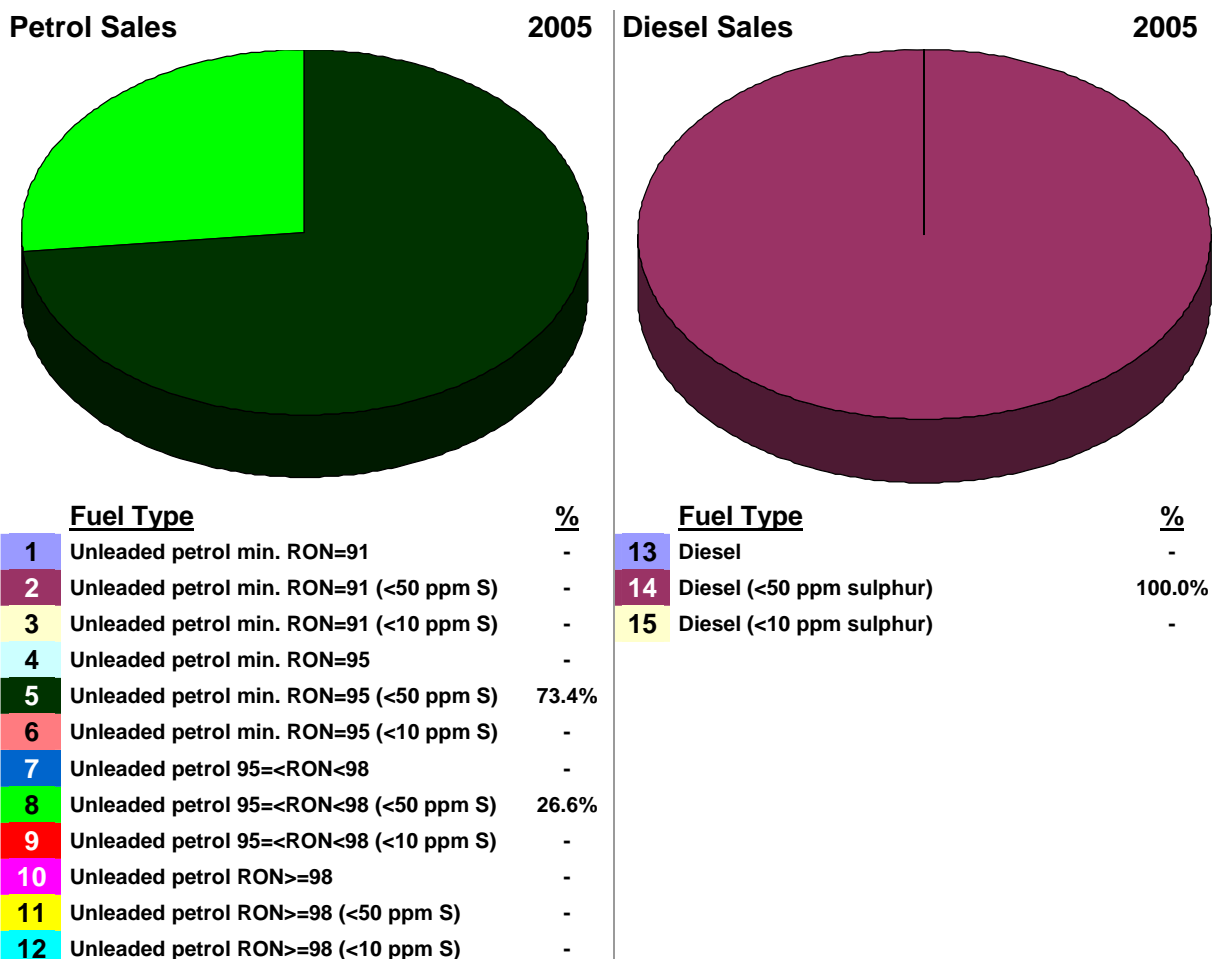


Figure 19.1 shows that no sulphur-free (<10ppm) fuel grades were available in Malta in 2005. As in 2004 the majority of petrol sales were of RON 95 grade (73.4%, compared with 69.3% in 2004) with the remainder being RON 95-98.

## 19.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** None available in 2005.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 19.1 shows the average content of fuel sold in 2005 in relation to the EU25 average.

**Additional information:**

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

Table 19.1: Annual trend in average sulphur content in petrol and diesel fuels

MT	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				78	37	19
<b>Diesel</b>				322	114	25

## 19.2 Fuel Quality Monitoring 2005

### 19.2.1 Description of system

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

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

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

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

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

**Time/frequency of sampling:** Across each month of the year except June.

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

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

**Other details:** EneMalta Corporation was the sole importer of petrol and diesel fuels for use in Malta in 2005. Deliveries are made periodically by ship to the EneMalta terminal. Each fuel delivery is accompanied by a quality certificate issued by a recognised fuel analysis organization. For every fuel shipment, a sample is also taken and analysed by a separate independent analytical laboratory. Malta currently has 85 refuelling stations which have been geographically divided into four districts. Every month, a randomly selected refuelling station from one district is sampled for each fuel type available (thus each district is sampled 3 times per year) and the necessary analytical testing carried out by an independent analytical laboratory. Based on fuel sales for the year 2005, this system gives an overall sample to sales ratio of 439 samples per billion litres of unleaded gasoline, 921 samples per billion litres of LRP and 268 samples per billion litres of diesel. This system will also ensure full coverage of the fuels used in Maltese territory.

## 19.2.2 Sampling and reporting

Malta was in most respects compliant with the sampling and reporting requirements in 2005. However Cetane index (ASTM D976) was measured and reported for diesel rather than Cetane number, as specified in the Directive. ASTM test methods D2622 and D4052 were used for sulphur content and diesel density respectively and are equivalent to the allowed methods EN 14596 and EN 12185. The following Table 19.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 19.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
5	RON 95 <50 ppm S	5	73.4%	13	16	-	Yes	All of 18	
8	95<RON<98 <50 ppm S	8	26.6%	12	10	-	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>25</b>	<b>26</b>	<b>-</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	15	16	-	Yes	All of 5	(1)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>15</b>	<b>16</b>	<b>-</b>	<b>Yes</b>	<b>All of 5</b>	<b>(1)</b>

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

(1) Cetane index has been measured instead of Cetane number

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

## 19.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

**Detail:** Research Octane Number (RON) limit value (95) was not complied with by 1 sample (94.4), Motor Octane Number (MON) limit value (85) was not complied with by 1 sample (84.1), the olefins limit value (21.0% v/v) was exceeded by 2 samples (21.6, 21.9), the aromatics limit value (35.0% v/v) was exceeded by 3 samples (42.0, 40.7, 44.4), and the sulphur limit value (50ppm) was exceeded by 1 sample (60).

**Statistical significance:** All of the above samples fell outside the relevant tolerance limits for statistical significance, namely: 94.6 (RON), 84.5 (MON), 20.7% v/v (olefins), 37.2% v/v (aromatics), 60ppm (sulphur). Therefore these samples were not compliant with the Directive.

**Member State's notes:** For RON: Exceedance found in sample from market, no exceedances were found in import samples.

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

**Detail:** Motor Octane Number (MON) limit value (85) was not complied with by 1 sample (84.4), the olefins limit value (21.0% v/v) was exceeded by 2 samples (22.0, 31.9), and the aromatics limit value (35.0% v/v) was exceeded by 2 samples (44.5, 46.4).



*Statistical significance:* All of the above samples fell outside the relevant tolerance limits for statistical significance, namely: 84.5 (MON), 20.7% v/v (olefins), and 37.2% v/v (aromatics). Therefore these samples were not compliant with the Directive.

*Member State's notes:* For MON: LRP is blended locally from imported unleaded petrol, with the addition of additives. The importer re-calibrated the additive injection pump to increase the amount of octane booster added to counteract the weak response previously encountered during blending due to the nature of additives already present in the fuel in its imported state.

### **Diesel**

*Detail:* The sulphur content (50ppm) limit value were exceeded by 23 samples, with a range of 63 to 430ppm.

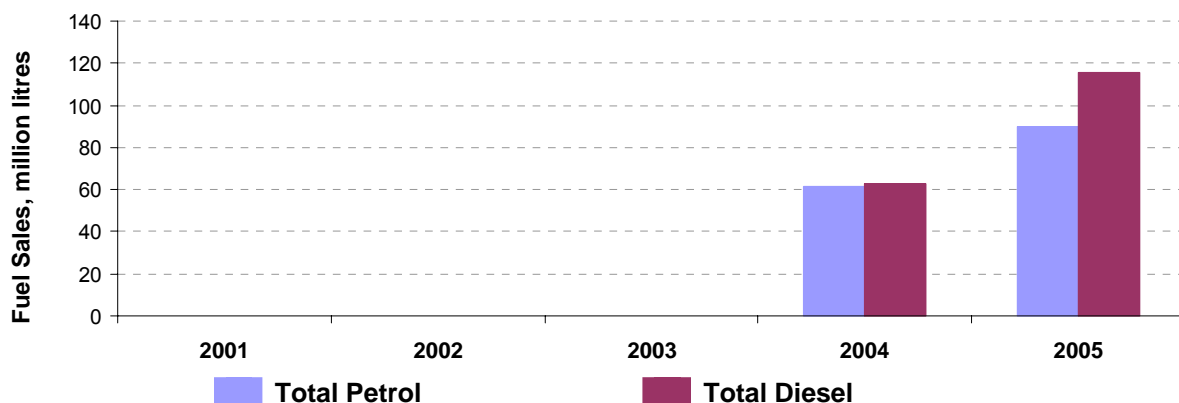
*Statistical significance:* The tolerance limit for statistical significance of sulphur (57.4ppm) was exceeded and therefore the samples were non-compliant with the Directive.

*Member State's notes:* High S content in market samples found. The highest exceedances values were reported for the early months of 2005. This could be due to: a) the release of high S content fuel during early 2005 derived from last imports made in late 2004 (still bought on the basis of maximum 350mg/kg S content specification); b) contamination on the market of low S fuel with high S fuel from 2004 deliveries; c) contamination during procedures for transfer of fuels from the main storage site to the tanker (for eventual distribution to service stations) filling site. This procedure is carried out by barge, which is also utilised for the transfer of 0.2% gas oil for power plant utilisation, thus leading to possible contaminations. Changes in the system for transferring of fuel have been made, principally the utilisation of better pipeline 'rinsing' procedures and the use of a much larger barge which allows for dilution of the effect of any residues of gas oil still present. These changes in work practices have already given positive results in late 2005 and early 2006.

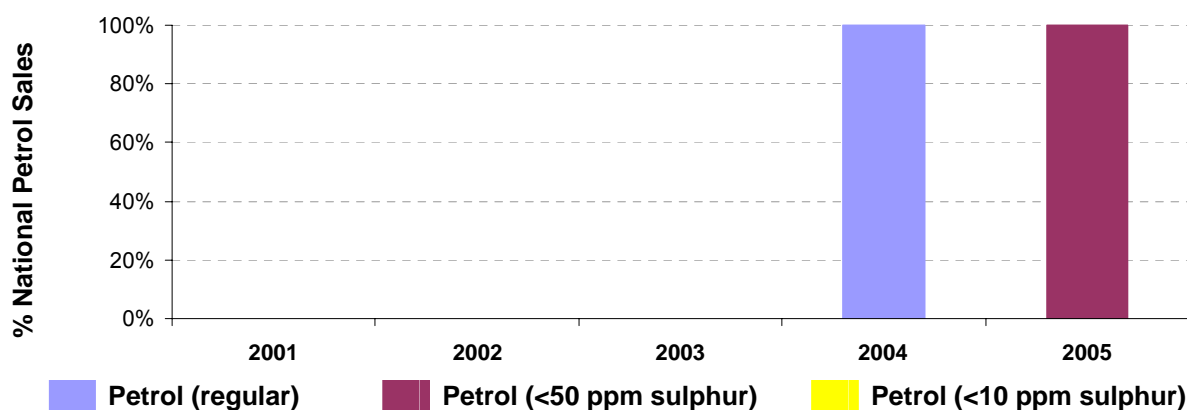
## **19.3 Temporal trends**

The following Figure 19.2 to Figure 19.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Total sales of petrol and diesel have both increased, by 46% and 85% respectively, from 2004 to 2005. In 2005 there was a complete switch from 'regular' to low sulphur (<50ppm) petrol and diesel. No sulphur-free (<10ppm) fuel was available.

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



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



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

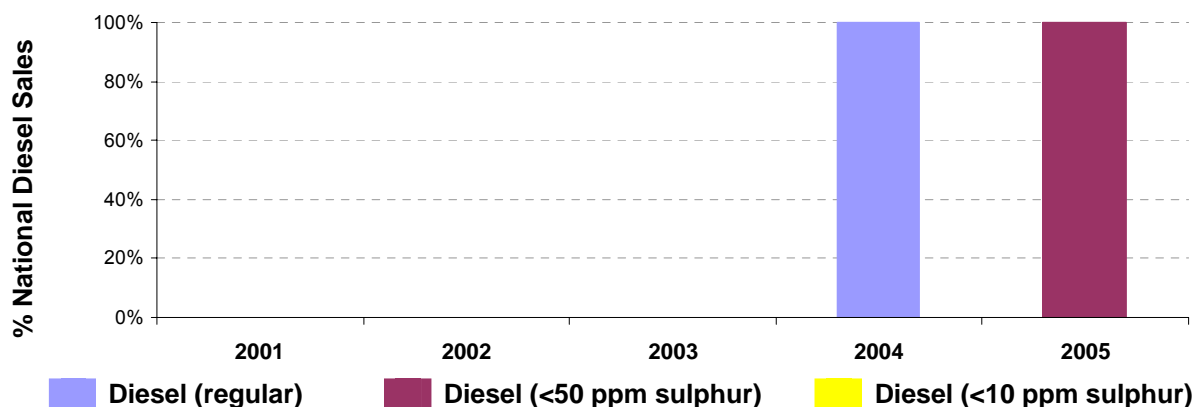
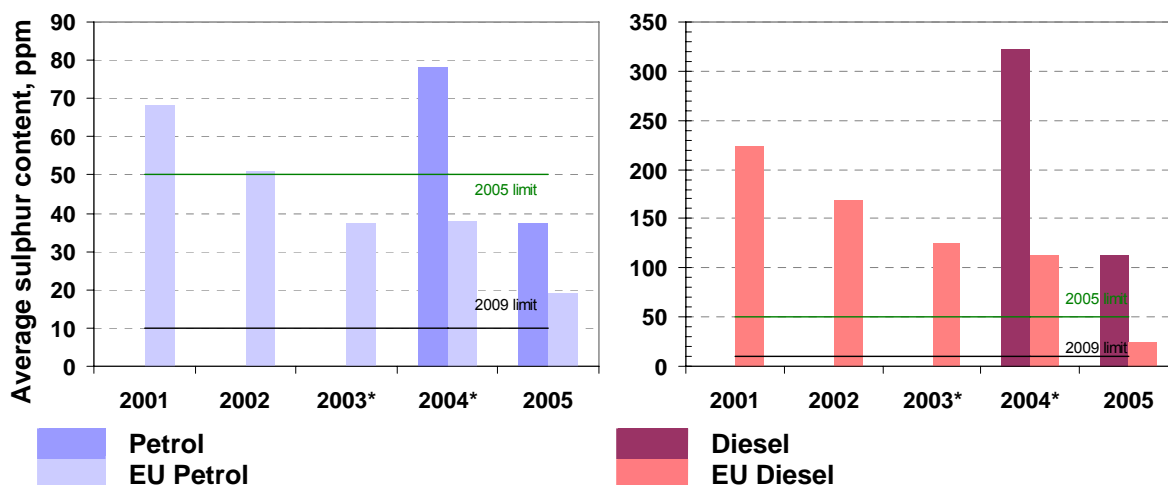


Figure 19.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). In 2005, with full market conversion to <50ppm fuels, the average sulphur content of both petrol and diesel was less than half of the 2004 values. For petrol the average sulphur content was below the 2005 limit (50ppm) but above the EU average, while at 114ppm the average sulphur content of diesel was well above the limit and the EU average.

**Figure 19.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 19.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The report submission was received after the 30 June deadline - up to 5 months late.
- Sulphur-free fuels were not available in 2005 as required under the Directive.
- Malta has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard.
- Few samples of the fuel grades were taken, particularly for diesel (15 in summer, 16 in winter). However, Malta is a small island market with only one terminal, so lower sampling rates may be acceptable to achieve a similar confidence to other, larger countries with more complex supply and distribution infrastructure.
- A significant number of exceedances of limit (tolerance) values were reported. In particular, nearly 75% of diesel samples did not comply with the sulphur limit.

## 20 Netherlands

### 20.1 Fuel Availability 2005

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

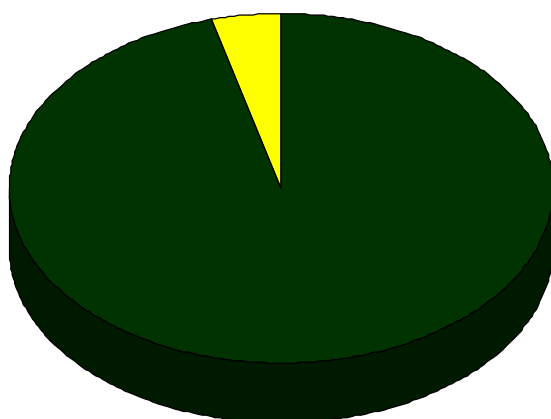
Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Ongelode benzine (RON = 95)	5
11	RON 98	<50 ppm	Ongelode benzine (RON = 98)	-
12	RON 98	<10 ppm	Ongelode benzine (RON = 98 & < 10 ppm zwavel)	-
14	Diesel	<50 ppm	Diesel < 50 ppm zwavel	14

#### 20.1.1 Sales

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

##### Petrol Sales

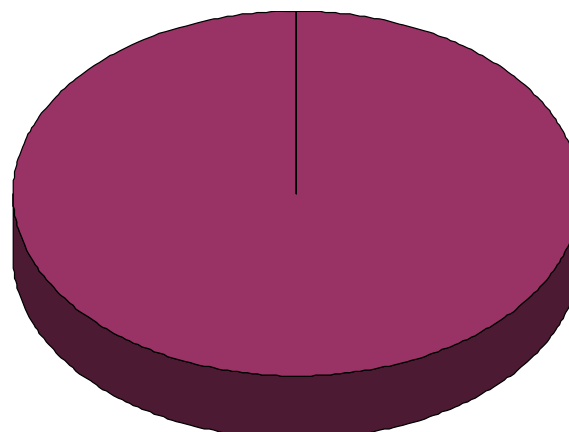
2005



Fuel Type	%
1 Unleaded petrol min. RON=91	-
2 Unleaded petrol min. RON=91 (<50 ppm S)	-
3 Unleaded petrol min. RON=91 (<10 ppm S)	-
4 Unleaded petrol min. RON=95	-
5 Unleaded petrol min. RON=95 (<50 ppm S)	95.8%
6 Unleaded petrol min. RON=95 (<10 ppm S)	-
7 Unleaded petrol 95=<RON<98	-
8 Unleaded petrol 95=<RON<98 (<50 ppm S)	-
9 Unleaded petrol 95=<RON<98 (<10 ppm S)	-
10 Unleaded petrol RON>=98	-
11 Unleaded petrol RON>=98 (<50 ppm S)	4.2%
12 Unleaded petrol RON>=98 (<10 ppm S)	0.01%

##### Diesel Sales

2005



Fuel Type	%
13 Diesel	-
14 Diesel (<50 ppm sulphur)	100.0%
15 Diesel (<10 ppm sulphur)	-

Figure 20.1 shows that 96% of petrol sold in The Netherlands in 2005 was of regular RON 95 grade. The RON>98 comprised the remaining sales, with very small sales of the newly available <10ppm grade. Although 100% of diesel sales were of low sulphur grades, as for

2003 and 2004 (81% in 2002). No separate sulphur-free diesel grade was available, however due to fiscal incentives introduced at the start of 2005 the majority of fuel sold met this criterion.

## 20.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Fuel was stated in the report to be sold across the whole of the Netherlands in 2005, how no detail was provided in support of this statement.

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

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

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 20.1. No separate sulphur-free diesel grade was available, however due to fiscal incentives introduced at the start of 2005 the majority of fuel sold met this criterion.

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

Table 20.1: Annual trend in average sulphur content in petrol and diesel fuels

NL	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	51	60	26	29	19	19
<b>Diesel</b>	42	34	31	34	8	25

## 20.2 Fuel Quality Monitoring 2005

### 20.2.1 Description of system

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

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

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

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

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

**Time/frequency of sampling:** Sampling was carried out in July, August, October, November and December 2005.

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

**Collection of sales data:** In the report the VROM-Inspectorate receives from the laboratory, the sales invoices are included.

**Other details:** The Netherlands has 12 provinces. It was decided that samples would be taken from petrol stations in each province that sell fuel originating from diverse petrol companies. Furthermore, the number of inhabitants in each province was studied and a petrol station visit strategy was prepared, which resulted in 100 test checks (to be done) in

total, spread over the summer and winter periods. The Netherlands aimed to meet the European Standard EN 14274:2003 Statistical Model A (small country).

## 20.2.2 Sampling and reporting

The Netherlands was compliant in 2005 with the sampling and reporting requirements for all fuels except RON98 fuel, for which no samples were taken for analysis and also summer and winter results were not reported separately. The following Table 20.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 20.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1)</sup>			
5	RON 95 <50 ppm S	5	95.8%	54	52	100	No	All of 18	
11	RON 98 <50 ppm S	11	4.2%	0	0	6			
12	RON 98 <10 ppm S	11	0.01%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>54</b>	<b>52</b>	<b>100</b>	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	54	52	100	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>54</b>	<b>52</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	

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

## 20.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol**

**Detail:** 5 samples were not compliant with the RON limit (95) and 19 were not compliant with the MON limit (min 85). The limit value for aromatics (35%v/v) was exceeded by one sample with a maximum value of 39.9%v/v.

**Statistical significance:** All samples were within the zone of tolerance for RON and MON and therefore were compliant with the Directive.

The tolerance limit for aromatics is 37.2%v/v so the sample was not compliant with the Directive.

**Member State's notes:** -

#### **Diesel**

**Detail:** 4 samples were not compliant with the limit for cetane number (51.0), and 1 sample exceeded the maximum limit for distillation 95% point (360°C).

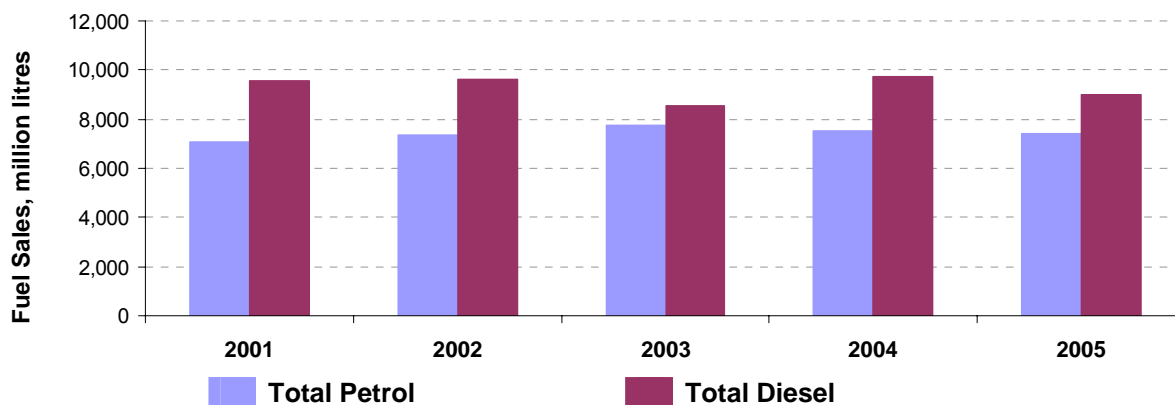
**Statistical significance:** No samples were outside of the zone of tolerance for these parameters' test methods (min. 48.5 for Cetane, and 365.9 calculated from CEN average test reproducibility data). They were therefore compliant with the Directive.

**Member State's notes:** -

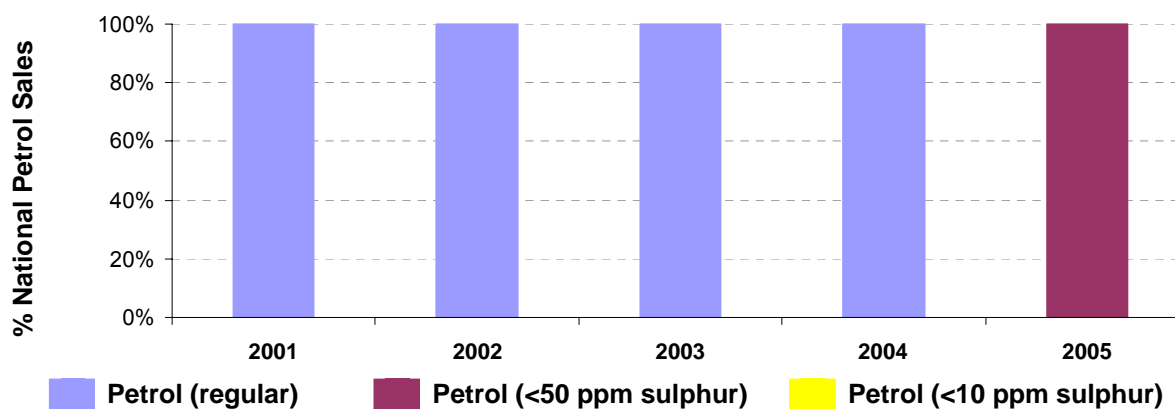
## 20.3 Temporal trends

The following Figure 20.2 to Figure 20.4 show the trend in total fuel sales and low sulphur fuel (<50 ppm) sales as a proportion of total sales. From 2001 to 2005 petrol sales increased by 4% and diesel sales decreased by 6%. From 2003, low-sulphur diesel has comprised 100% of diesel sales.

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



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



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

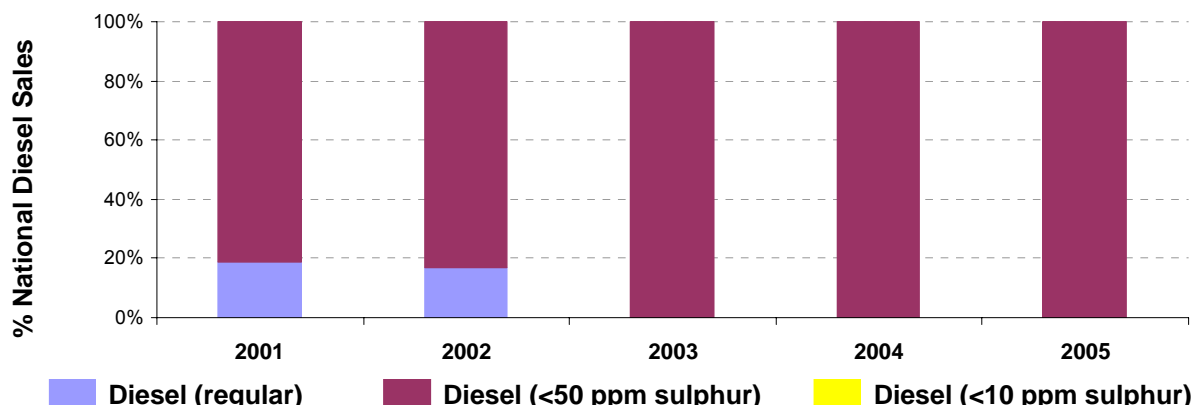
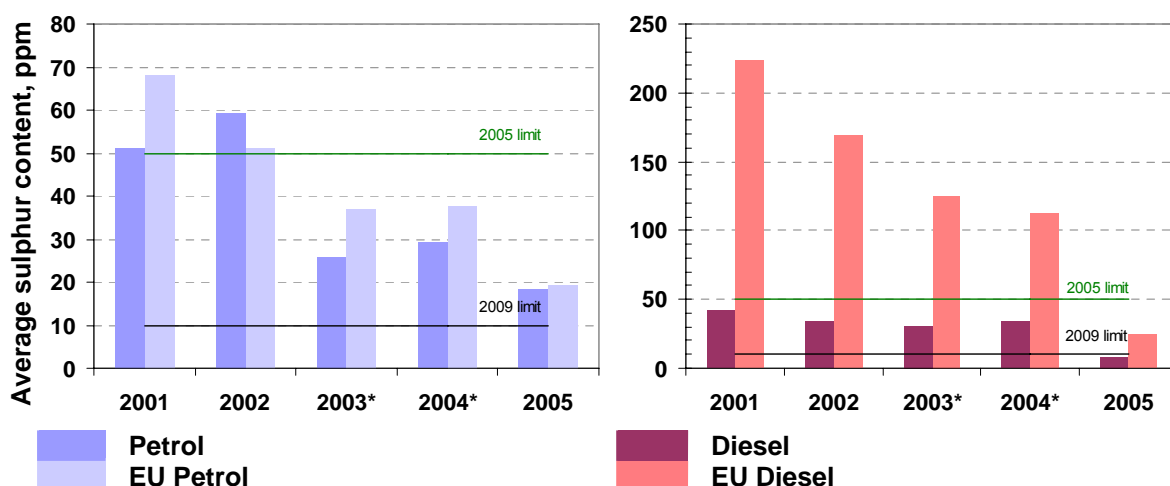


Figure 20.5 shows the trend in average sulphur content of petrol and diesel fuels in the Netherlands compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) and the EU average. The average sulphur content for diesel was also below the 2009 limit.

**Figure 20.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 20.4 Key Areas for Improvement

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

### Key Areas for Improvement

- MS was partially compliant with sampling and reporting requirements:
  - no samples of RON98 fuel were taken;
  - summer and winter results should be reported separately;
- The MS has provided no detail on the assessment of the geographical availability of sulphur-free fuels in its territory, or their labelling.



## 21 Poland

### 21.1 Fuel Availability 2005

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

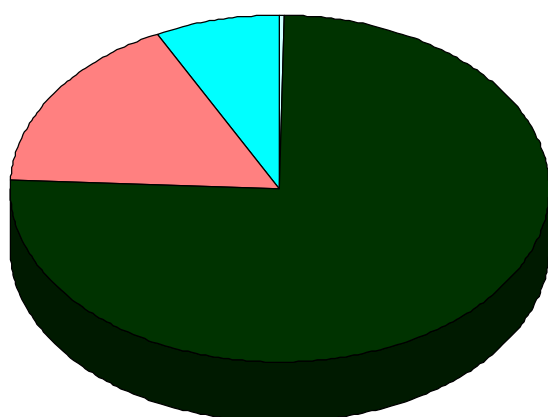
Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
4	RON 95	<150 ppm	95 octane gasoline	5
5	RON 95	<50 ppm	Lead-free petrol 95, <50ppm sulphur	5
6	RON 95	<10 ppm	Lead-free petrol 95, <10ppm sulphur	5
12	RON 98	<10 ppm	Lead-free petrol 98, <10ppm sulphur	12
13	Diesel	<350 ppm	Diesel	14
14	Diesel	<50 ppm	Diesel oil containing up to 50 mg/kg sulphur	14
15	Diesel	<10 ppm	Diesel oil containing up to 10 mg/kg sulphur	14

#### 21.1.1 Sales

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

##### Petrol Sales

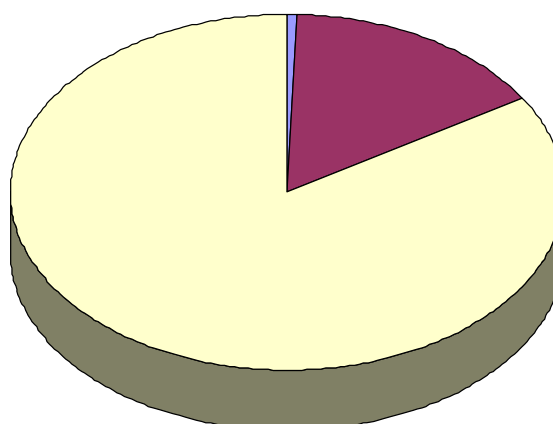
2005



Fuel Type	%
1 Unleaded petrol min. RON=91	-
2 Unleaded petrol min. RON=91 (<50 ppm S)	-
3 Unleaded petrol min. RON=91 (<10 ppm S)	-
4 Fuel components	0.2%
5 Unleaded petrol min. RON=95 (<50 ppm S)	75.7%
6 Unleaded petrol min. RON=95 (<10 ppm S)	16.7%
7 Unleaded petrol 95=<RON<98	-
8 Unleaded petrol 95=<RON<98 (<50 ppm S)	-
9 Unleaded petrol 95=<RON<98 (<10 ppm S)	-
10 Unleaded petrol RON>=98	-
11 Unleaded petrol RON>=98 (<50 ppm S)	-
12 Unleaded petrol RON>=98 (<10 ppm S)	7.4%

##### Diesel Sales

2005



Fuel Type	%
13 Others	0.5%
14 Diesel (<50 ppm sulphur)	15.5%
15 Diesel (<10 ppm sulphur)	83.91%

Figure 21.1 shows that low sulphur and sulphur-free sulphur fuel grades were available for the first time in 2005. The majority of petrol sold was of RON 95 grade 92.4 (in 2004 there was a similar consumption of this fuel, 93,1%) and including sulphur free fuel 16.7% total sales, with the remainder being sulphur free RON 98. The majority of diesel sales were of sulphur free fuel (84%), however small quantities of fuel categorised as ‘Others’ were also sold – it is not clear whether this fuel complied with the <50ppm limit value. Sales information was only based on fuel from Polish refineries and does not include imports (which account for 14% of petrol and 28% diesel consumption nationally)

### 21.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Duty to ensure the geographical availability of fuels with sulphur content of up to 10 mg/kg became legally binding from 1 January 2005, as stated in the Ordinance by the Minister of Economic Affairs and Labour dated 16 August 2004, regarding the quality requirements for liquid fuels. In 2005 the total domestic production of fuel containing up to 10 mg/kg sulphur was 6,069.7 thousand tonnes, amongst them:

- Production of motor fuels containing up to 10 mg/kg sulphur was 1,262.0 thousand tonnes.
- Production of diesel oils containing up to 10 mg/kg was 4 807.7 thousand tonnes.

The total quantity of petrol with a sulphur content not exceeding 10 mg/kg in the domestic fuel consumption amounted to 838.5 thousand tonnes, equivalent to approximately 21% of the total consumption of petrol, while the overall quantity of diesel fuel with a sulphur-free content was 4,128.2 thousand tonnes, i.e. approximately 60% of the total diesel fuel consumption. The majority of fuels included in the supplementary imports are other than those containing up to 10 mg/kg sulphur.

With regard to the geographical availability of fuels at sulphur-free level - the chains of stations belonging to the biggest national retailers (PKN Orlen, Lotos Group, Shell BP, Statoil) sell sulphur-free petrol under the brand names of: Verva, Ultimate or Suprema. Diesel oil containing up to 10 mg/kg sulphur is uniformly available throughout the country, sold under the brand names of: Verva ON, Ultimate Diesel, Supradiesel.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 21.1 shows the average content of fuel sold in 2004 in relation to the EU25 average. The high average sulphur level for 2005 (above the 50 ppm limit) is due to a significant number of samples with very high sulphur levels (up to 2734 ppm) due to contamination/substitution with gas oil/other fuels in 2005.

**Additional information:** -

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

**Table 21.1: Annual trend in average sulphur content in petrol and diesel fuels**

PL	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				60	27	19
<b>Diesel</b>				124	53	25

## 21.2 Fuel Quality Monitoring 2005

### 21.2.1 Description of system

**Responsible organisation(s):** The system for monitoring and controlling the quality of liquid fuels and liquid biofuels is administered by the President of the Office for Competition and Consumer Protection. The tasks associated with its administration are performed with the aid of the Trade Inspectorate, which inspects the quality of fuels. The analyses of fuel quality are carried out by laboratories accredited by the Polish Centre for Accreditation as authorised to test fuels using the methods stipulated in the regulations.

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

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

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

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

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

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

**Collection of sales data:** Ministry of Economic Affairs.

**Other details:** The inspections covered the entire territory of Poland. In accordance with the regulations concerning the monitoring methods, the territory of Poland was divided up according to the administrative divisions of the country – with the inspection regions corresponding to those of the provinces.

### 21.2.2 Sampling and reporting

Poland was essentially fully compliant with the sampling and reporting requirements in 2005. Although no information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274, sample numbers appeared consistent with those required under EN 14274. The following Table 21.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 21.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement			
4	RON 95	5	0.2%	0	0	-			
5	RON 95 <50 ppm S	5	75.7%	100	135	-	No	All of 18	
6	RON 95 <10 ppm S	5	16.7%	0	0	-			
12	RON 98 <10 ppm S	12	7.4%	100	57	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>200</b>	<b>192</b>	<b>-</b>	<b>No</b>	<b>All of 18</b>	
13	Diesel	14	0.5%	0	0	-			
14	Diesel <50 ppm S	14	15.5%	100	104	-	No	All of 5	
15	Diesel <10 ppm S	14	83.9%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>100</b>	<b>104</b>	<b>-</b>	<b>No</b>	<b>All of 5</b>	

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

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

### 21.2.3 Compliance with fuel quality limit values

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

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

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

*Detail:* RON, MON, summer vapour pressure, distillation at 100°C, distillation at 150°C, aromatics, benzene content, ethers and sulphur content limit values (of 95, 85, 60 kPa, 46.0%v/v, 75.0 %v/v, 35.0%v/v, 1.0%v/v, 15 %v/v and 50 ppm) were exceeded by 6, 4, 1, 1, 1, 2, 2, 1, and 6 samples respectively. Values, by parameter, reached extremes of 87.8, 80.2, 68.2 kPa, 42.8%v/v, 72.4%v/v, 38.6 %v/v, 2.6%v/v, 20.5%v/v and 276 ppm. In total, 13 samples of RON95 were non-compliant.

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

*Member State's notes:* In every case of non-compliance the Trade Inspection delivers the information to the Prosecutor's Office – in accordance with the Act on the Fuel Quality Monitoring and Scrutinizing System (which transposes the Directive 98/70/EC). After the proceeding conducted by the prosecutor's office the case is the subject to the legal proceeding that ends with imposing fines by courts.

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

*Detail:* Summer vapour pressure and aromatics (of 60 and 35.0%v/v ) were exceeded by 3 and 1 samples respectively. Values, by parameter, reached extremes of 69.6 and 36.8%v/v.

*Statistical significance:* In total, 3 samples of RON98 were non-compliant with the Directive (aromatics were in tolerance of measurement). The tolerance limits for statistical significance for the parameters' test methods were exceeded for these samples.

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

##### **Diesel**

*Detail:* Cetane number, density, distillation 95% point and sulphur content limit values (of 51, 845, 360°C and 50 ppm) were exceeded by 1, 1, 4 and 14 samples. Values, by parameter, reached extremes of 47.4, 846, 400°C and 2734 ppm. In total, 15 samples of diesel were non-compliant.

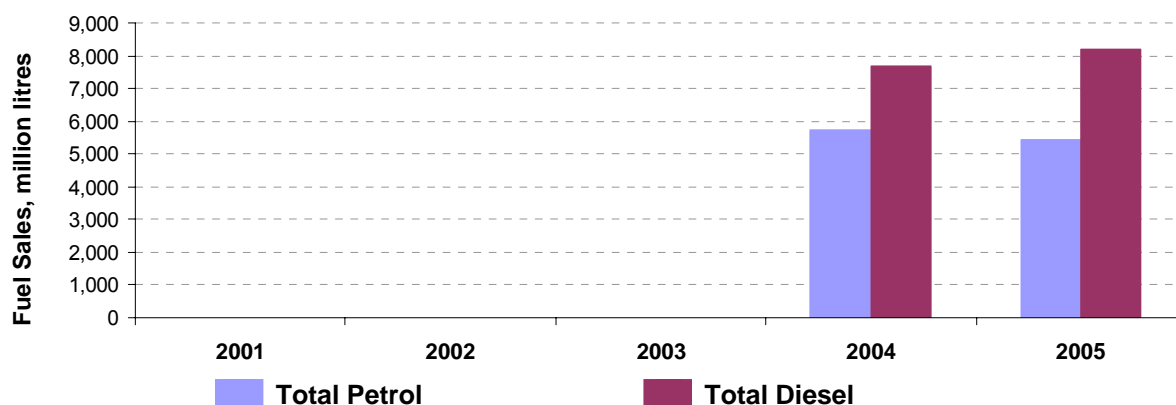
*Statistical significance:* The tolerance limits for statistical significance for the parameters' test methods were exceeded and therefore the samples were non-compliant with the Directive.

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

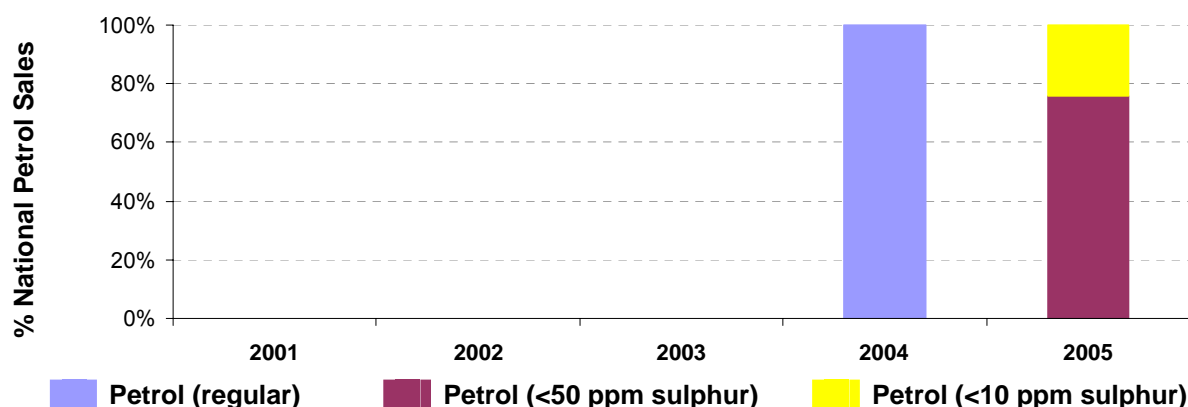
## 21.3 Temporal trends

The following Figure 21.2 to Figure 21.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Note that in the new Member States, 2005 was the first full year of reporting and 2004 data was from May to December. In Poland, petrol sales decreased from 2004 to 2005, by 5% and diesel sales increased by 7% (by volume). Low-sulphur and sulphur-free fuels were marketed for the first time in 2005.

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



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



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

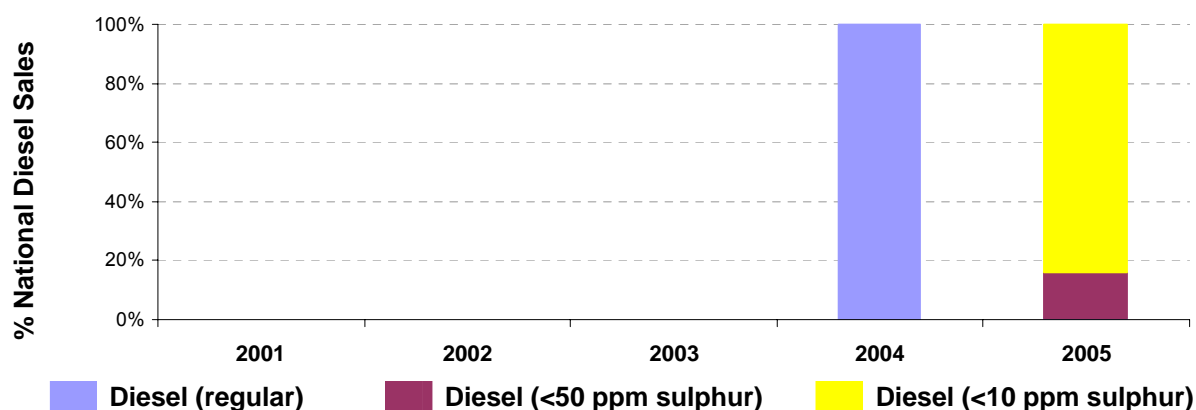
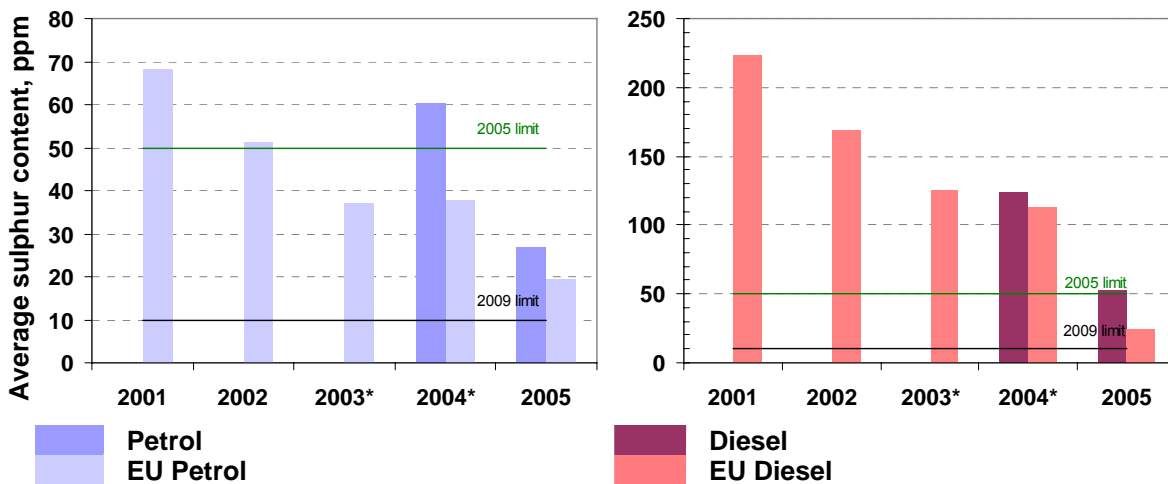


Figure 21.5 shows the shift to low-sulphur and sulphur-free fuels resulted in a significant reduction in sulphur content from 2004 to 2005. The average sulphur content of petrol was

well below the 2005 limit of 50ppm while the average sulphur content was slightly above the 2005 limit.

**Figure 21.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 21.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Poland has not outlined whether the national monitoring system is equivalent in confidence with the requirements of EN 14274.
- Poland has again reported a very significant number of exceedances of limit (tolerance) values for both petrol and diesel. The average sulphur content was considerably above the 2005 limit of 50ppm (which may be due to non-compliant sales in the diesel 'Others' category from early 2005). Action is taken on each identification of fuel not complying with limit values, however clearly there is still some work to be done in ensuring reliable fuel quality at refuelling stations across Poland.

## 22 Portugal

### 22.1 Fuel Availability 2005

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

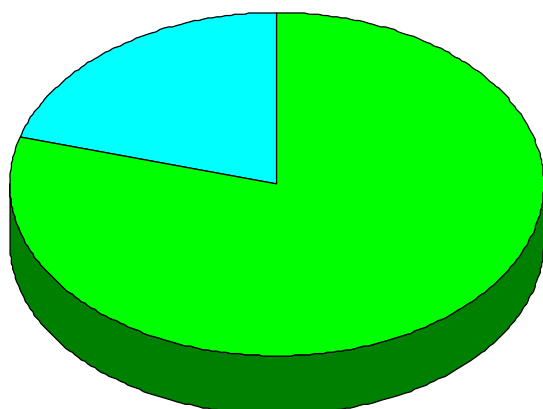
Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
8	95<RON<98	<50 ppm	Euro super	8
12	RON 98	<10 ppm	Super plus	12
14	Diesel	<50 ppm	Gasóleo	14
15	Diesel	<10 ppm	Gasóleo	14

#### 22.1.1 Sales

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

##### Petrol Sales

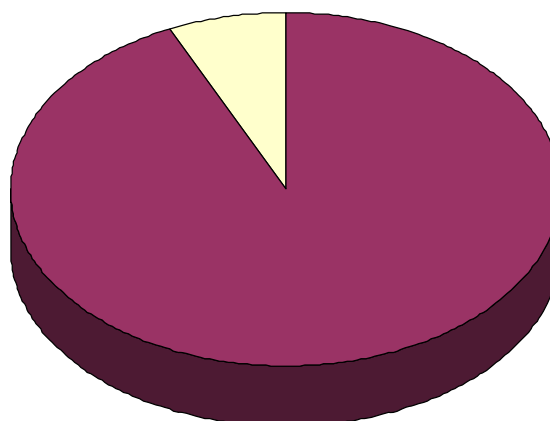
2005



Fuel Type	%
1 Unleaded petrol min. RON=91	-
2 Unleaded petrol min. RON=91 (<50 ppm S)	-
3 Unleaded petrol min. RON=91 (<10 ppm S)	-
4 Unleaded petrol min. RON=95	-
5 Unleaded petrol min. RON=95 (<50 ppm S)	-
6 Unleaded petrol min. RON=95 (<10 ppm S)	-
7 Unleaded petrol 95=<RON<98	-
8 Unleaded petrol 95=<RON<98 (<50 ppm S)	79.5%
9 Unleaded petrol 95=<RON<98 (<10 ppm S)	-
10 Unleaded petrol RON>=98	-
11 Unleaded petrol RON>=98 (<50 ppm S)	-
12 Unleaded petrol RON>=98 (<10 ppm S)	20.5%

##### Diesel Sales

2005



Fuel Type	%
13 Diesel	-
14 Diesel (<50 ppm sulphur)	93.1%
15 Diesel (<10 ppm sulphur)	6.86%

Figure 22.1 shows that of the fuel marketed in 2005 in Portugal, the majority (79.5%) of petrol grades were RON 95-98 (up from 65% in 2001), with the remainder being sulphur-free RON>98. Sulphur-free diesel, introduced for the first time in 2005, comprised just under 7% of diesel sales.

## 22.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Unleaded petrol (minimum RON  $\geq$  98) with  $<10$  ppm sulphur is distributed all over the country. Diesel with  $<10$  ppm sulphur is distributed in approximately 200 highway/motorway refuelling stations and in almost all the urban retail sites.

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

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** Yes for petrol, no for diesel.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, with a significant reduction in 2005. See Table 22.1.

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

Table 22.1: Annual trend in average sulphur content in petrol and diesel fuels

<b>PT</b>	<b>Average Sulphur Content, ppm</b>					<b>EU25</b>
<b>Fuel/Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2005</b>
<b>Petrol</b>	447	57	61	71	16	19
<b>Diesel</b>	272	296	261	241	37	25

## 22.2 Fuel Quality Monitoring 2005

### 22.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** The companies themselves carry out tests, taking samples in the refineries and terminals, and randomly across the country in retail sites.

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

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

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

**Other details:** The EN 14274 statistical model is being implemented. There are two refineries that supply the market, one of them in the north and the other in the south.



## 22.2.2 Sampling and reporting

Portugal was in not compliant with the sampling and reporting requirements in 2005, with sampling numbers not sufficient to give equivalent confidence with EN 14274 and also no required sample analysis for lead content were reported. They are yet to implement a monitoring system in full compliance with the requirements of EN 14274. The following Table 22.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 22.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
8	95<RON<98 <50 ppm S	8	79.5%	10	13	-	No	11 of 18	(1)
12	RON 98 <10 ppm S	12	20.5%	9	15	-	No	11 of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>19</b>	<b>28</b>	<b>-</b>	<b>No</b>	<b>11 of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	93.1%	12	13	-	No	5 of 5	
15	Diesel <10 ppm S	14	6.9%	0	0	-			
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>12</b>	<b>13</b>	<b>-</b>	<b>No</b>	<b>5 of 5</b>	

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

- (1) Portugal carried out no analyses on lead content. Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenates test methods. However, the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear whether this has been carried out, however Portugal have stated no other oxygenates are added to the fuel. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.
- (2) The implementation of the EN 14274 is still in progress and changes in sampling methodologies are still being made.

## 22.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

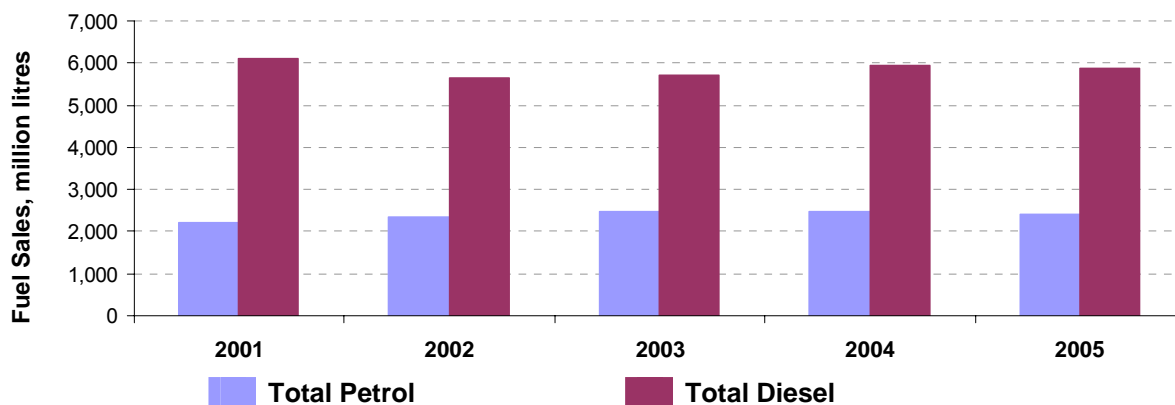
**Detail:** Density at 15°C (max value 845 kg/m<sup>3</sup>) was exceeded by at least one sample with a maximum of 845.3 kg/m<sup>3</sup>.

**Statistical significance:** The tolerance limit for statistical significance for the test method (845.3) was not exceeded for these samples, which were therefore compliant with the Directive.

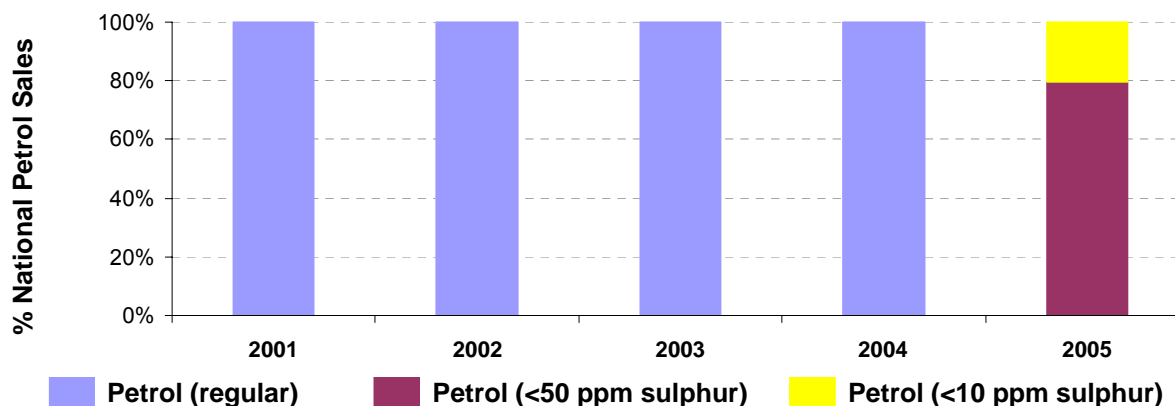
## 22.3 Temporal trends

The following Figure 22.2 to Figure 22.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. From 2001 to 2005, the sales of petrol increased by 9% (down 2% from 2004), while sales of diesel decreased by 4% (down 1% from 2004). There was a complete shift from ‘regular’ to low-sulphur and sulphur-free fuels in 2005.

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



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



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

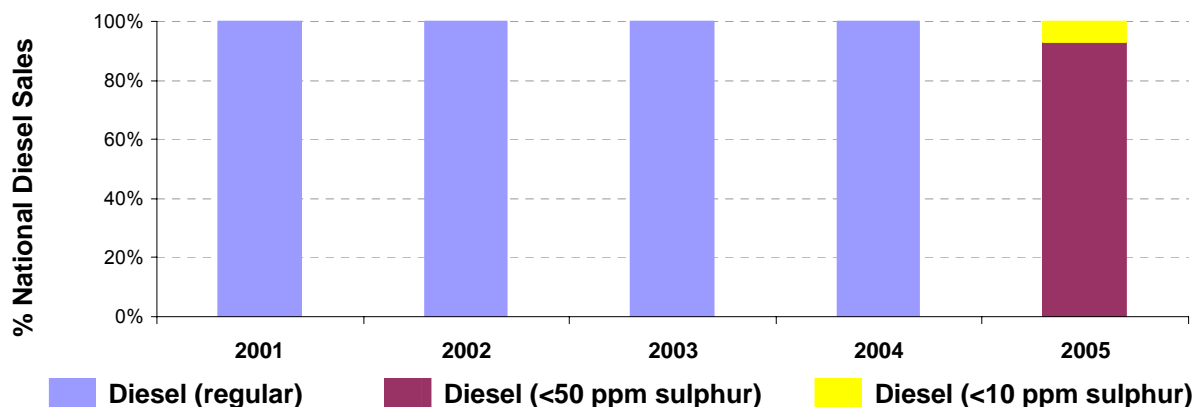
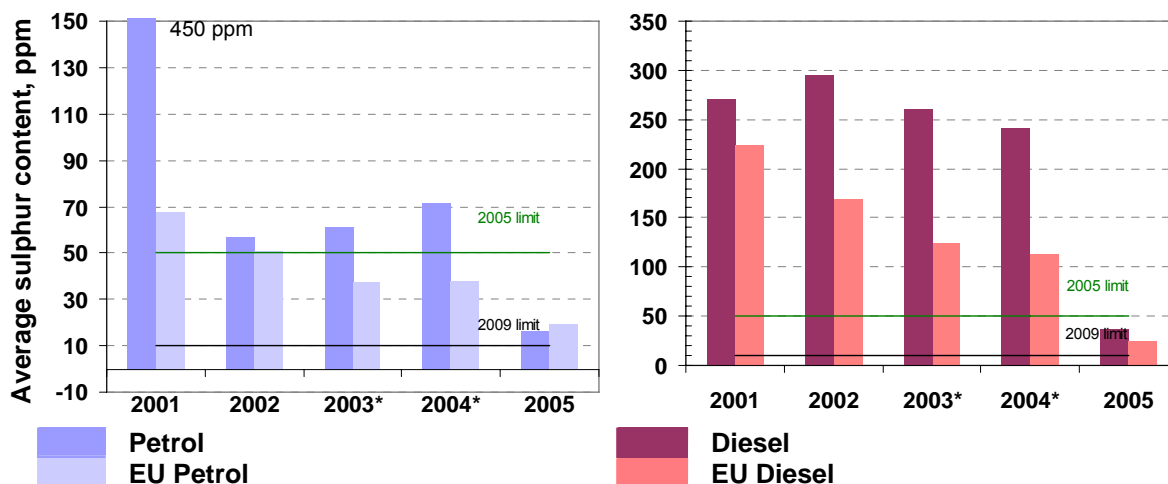


Figure 22.5 shows the trend in average sulphur content of petrol and diesel fuels in Portugal compared with the EU average. With the shift to low sulphur and sulphur-free fuels in 2005,

there was a significant reduction in sulphur content, to well below the 50ppm limit. The average sulphur content for petrol was below the EU average and for diesel was above the EU average.

**Figure 22.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 22.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Portugal's National FQMS does not appear to be equivalent in confidence with the requirements of EN 14274. A small number of samples were taken, and these were taken at refineries, terminals and refuelling stations. Portugal should indicate the number of samples taken at refuelling stations.
- Portugal was partially compliant with reporting requirements:
  - Summer and winter results should be reported separately;
  - No results were provided for the lead content petrol parameter.

## 23 Slovakia

### 23.1 Fuel Availability 2005

The following table lists the fuels that were reported to be available nationally in 2005 and the category (the reference number) under which sample analysis results were reported. However, the split of sulphur grades provided by Slovakia is based upon the results of the sample analysis and not actual marketed grades.

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
2	RON 91	<50 ppm	NORMAL 91	2
3	RON 91	<10 ppm	NORMAL 91	2
4	RON 95	<150 ppm	SUPER 95	5
5	RON 95	<50 ppm	SUPER 95	5
6	RON 95	<10 ppm	SUPER 95	5
11	RON 98	<50 ppm	SUPER PLUS 98	11
12	RON 98	<10 ppm	SUPER PLUS 98	11
13	Diesel	<350 ppm	Diesel	14
14	Diesel	<50 ppm	Diesel	14
15	Diesel	<10 ppm	Diesel	14

#### 23.1.1 Sales

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

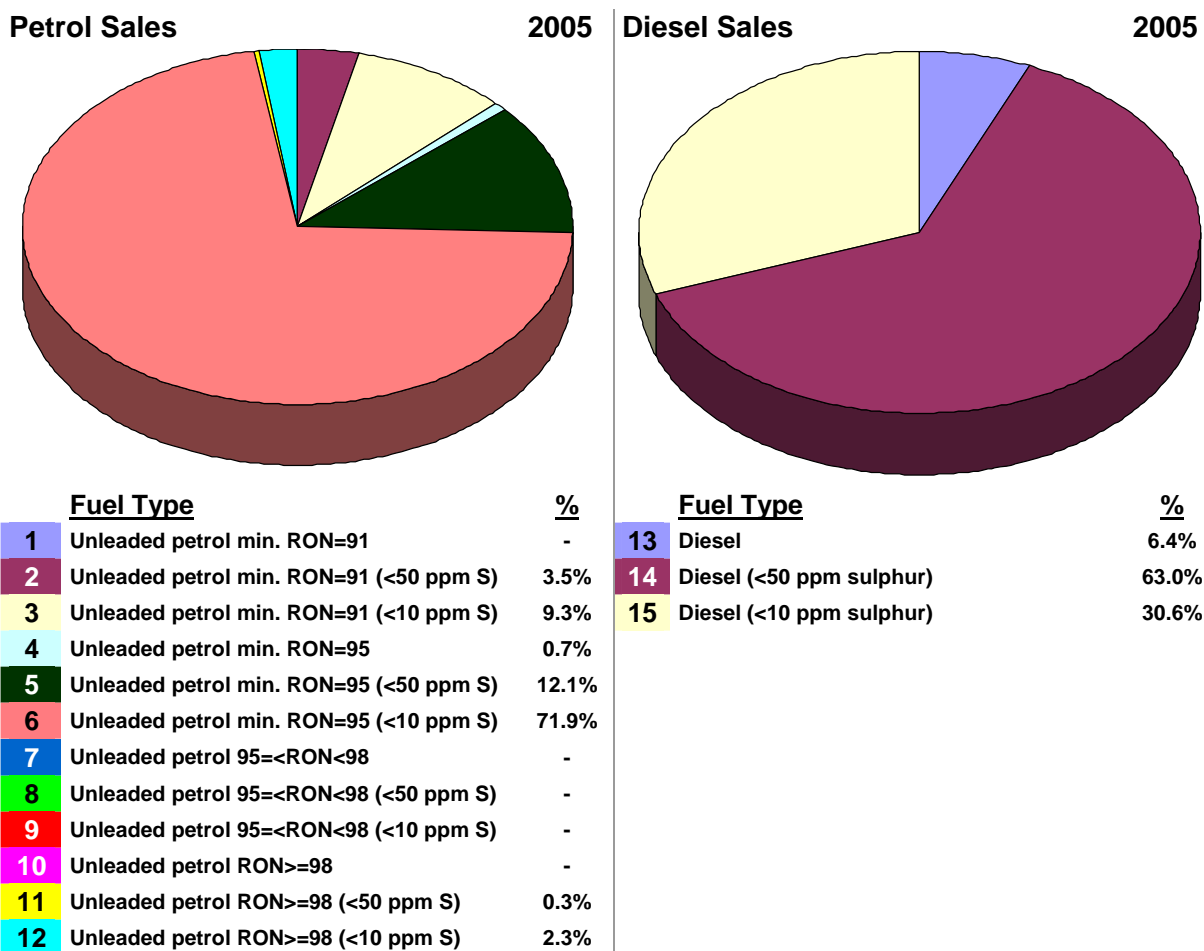


Figure 23.1 shows that significant quantities of zero sulphur petrol and diesel were available in 2005, but that small amounts of fuel not conforming to the <50ppm limit was still sold. The majority (85%) of petrol sold was of RON 95 grade (comprising of 1% regular grade, 12% low sulphur and 72% sulphur free). RON 91 and RON 98 grades comprised 12.5 % and 2.5% respectively. Total sales of petrol grades of sulphur-free quality accounted for 83.5% of national sales in 2005 (66% in 2004). Over 94% of the diesel fuel sold was low sulphur (63%) or sulphur-free (31.6%) quality. (N.B. there are actually only 4 official national grades, however Slovakia has provided estimated sales data for fuels complying with different sulphur levels).

### 23.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels were available in significant quantities for petrol and diesel across Slovakia in 2005.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 23.1 shows the average content of fuel sold in 2004-5 in relation to the EU25 average.

**Additional information:**

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

Table 23.1: Annual trend in average sulphur content in petrol and diesel fuels

SK	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				8	7	19
<b>Diesel</b>				117	13	25

## 23.2 Fuel Quality Monitoring 2005

### 23.2.1 Description of system

**Responsible organisation(s):** Slovak Inspectorate of the Environment. The analyses of samples were carried out by Slovnaft VURUP, a.s. (Testing laboratories accredited according to ISO/IEC 17025).

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

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

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

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

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

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

**Collection of sales data:** the Ministry of Environment of Slovak Republic is responsible for collection of data from motor fuel distributors/dealers.

## 23.2.2 Sampling and reporting

Slovakia was fully compliant with the sampling and reporting requirements in 2004. The following Table 23.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 23.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
1	RON 91	1	3.5%	53	61	100	Yes	All of 18	
3	RON 91 <10ppm S	1	11.4%	0	0				
4	RON 95	4	7.7%	56	58	100	Yes	All of 18	
5	RON 95 <50 ppm S	4	22.6%	0	0				
6	RON 95 <10 ppm S	4	51.4%	0	0				
10	RON 98	10	0.4%	3	7	4	Yes	All of 18	
12	RON 98 <10 ppm S	10	3.0%	0	0				
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>112</b>	<b>126</b>	<b>204</b>	<b>Yes</b>	<b>All of 18</b>	
13	Diesel	13	49.9%	57	50	100	Yes	All of 5	
14	Diesel <50 ppm S	13	31.3%	0	0				
15	Diesel <10 ppm S	13	18.8%	0	0				
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>57</b>	<b>50</b>	<b>100</b>	<b>Yes</b>	<b>All of 5</b>	

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

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

## 23.2.3 Compliance with fuel quality limit values

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

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

#### **RON 91 Petrol**

**Detail:** RON and summer vapour pressure limit values (of min. 95, max. 60 kPa) were exceeded by 1, 2 samples respectively, with values of 90.2 and 62.7, 63.6 kPa respectively.

**Statistical significance:** The tolerance limit for statistical significance for the RON test method is 90.6; therefore the sample was non-compliant with the Directive. The summer vapour pressure samples were also beyond the tolerance limit of 61.8 kPa and were therefore non-compliant.

**Member State's notes:** The dealers were penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

#### **RON 95 Petrol**

**Detail:** RON, benzene limit values (of min. 95, max. 1.0 %v/v) were exceeded by 3, 1 samples respectively, extremes of 94.4, 1.3 %v/v.

**Statistical significance:** The tolerance limit for statistical significance for the RON test

method is 94.6 and for benzene is 1.1 %v/v. Therefore these samples were non-compliant with the Directive.

*Member State's notes:* The dealers were penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

### **RON 98 Petrol**

*Detail:* Aromatics limit value (of max. 35.0 %v/v) was exceeded by 1 sample with 37.7 %v/v.

*Statistical significance:* The tolerance limit for statistical significance for the aromatics is 37.2 %v/v. Therefore this sample was non-compliant with the Directive.

*Member State's notes:* The dealer was penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

### **Diesel**

*Detail:* The sulphur content limit value (of max. 50 ppm) was exceeded by 1 sample, with value of 130.8 ppm.

*Statistical significance:* The tolerance limit for statistical significance for the sulphur content test method used (EN ISO 20846) is 54 ppm; therefore the sample was non-compliant with the Directive.

*Member State's notes:* The dealer was penalised by the Slovak Inspectorate of the Environment as a result of the non-compliance.

## **23.3 Temporal trends**

The following Figure 23.2 to Figure 23.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales decreased by 1% and diesel sales increased by 11% from 2004 to 2005. Proportions of fuel meeting the <10ppm criteria also increased by 25% and 81% for petrol and diesel respectively.

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

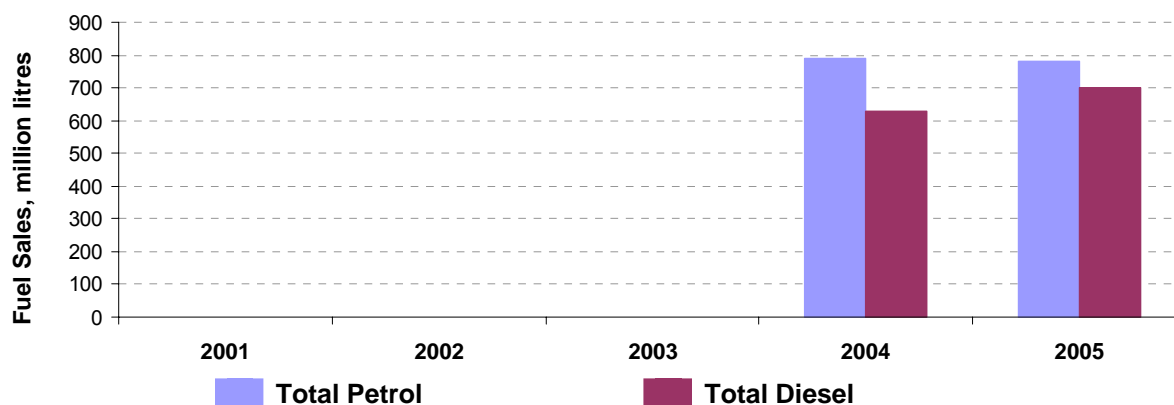


Figure 23.3: Temporal trends in national sales of low sulphur petrol (%)

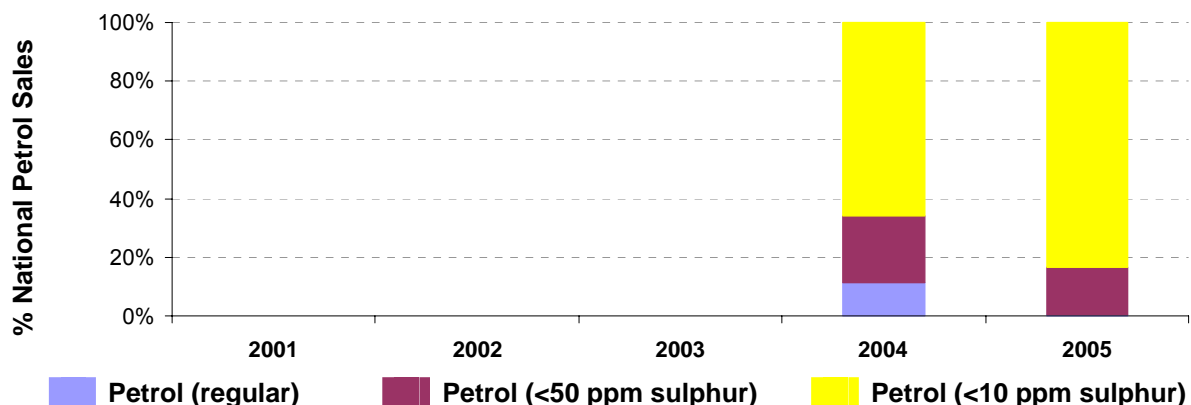


Figure 23.4: Temporal trends in national sales of low sulphur diesel (%)

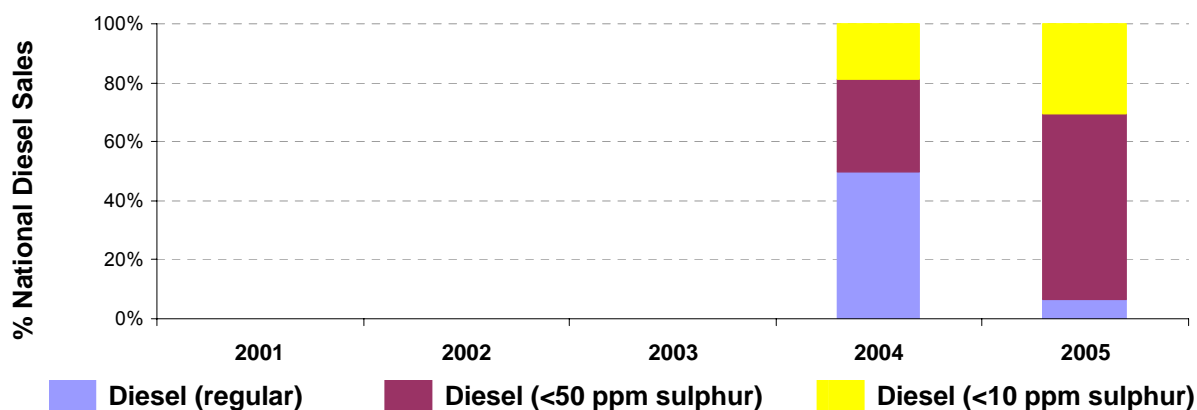
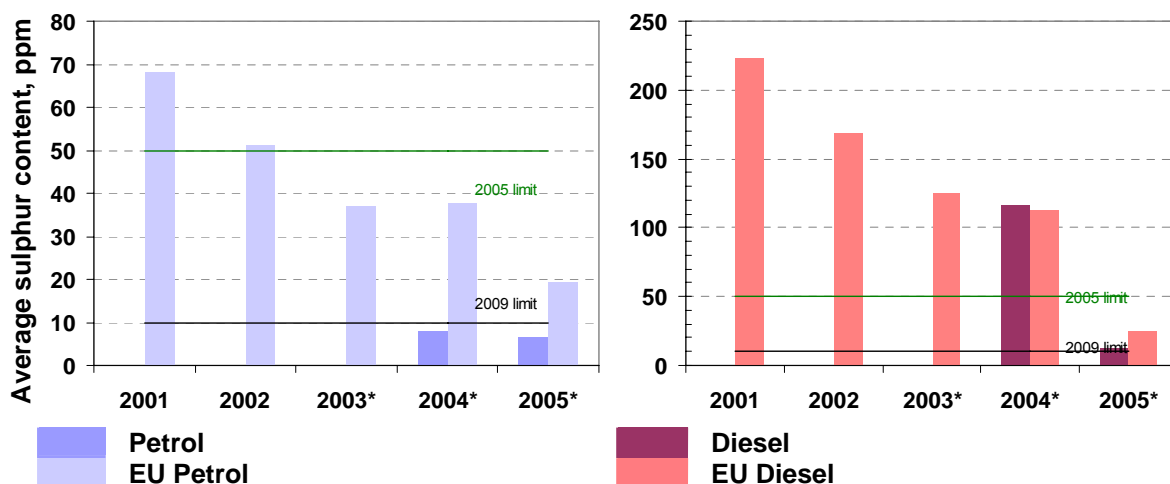


Figure 23.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was well below the 2005 limit (<50 ppm) and the EU average.

Figure 23.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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



## 23.4 Key Areas for Improvement

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

Key Areas for Improvement
<ul style="list-style-type: none"><li>• Slovakia was over 5 months late in submitting a full report complete with sales data (data on sample analysis was received on time).</li><li>• Slovakia has stated that it uses Statistical Model C, however this does not appear entirely consistent with the European Standard specification (discussed in section 2.2.2). Instead statistical Model A seems more appropriate on the basis of the NUTS regional classification, which would require further information to be reported on sample numbers in different regions. Slovakia should present a clear rationale for Model C use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions.</li></ul>

## 24 Slovenia

### 24.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
8	95<RON<98	<50 ppm	NMB 95 Euro Super	8
11	RON 98	<50 ppm	NMB 98 Super Plus	11
14	Diesel	<50 ppm	Euro Diesel	14

#### 24.1.1 Sales

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

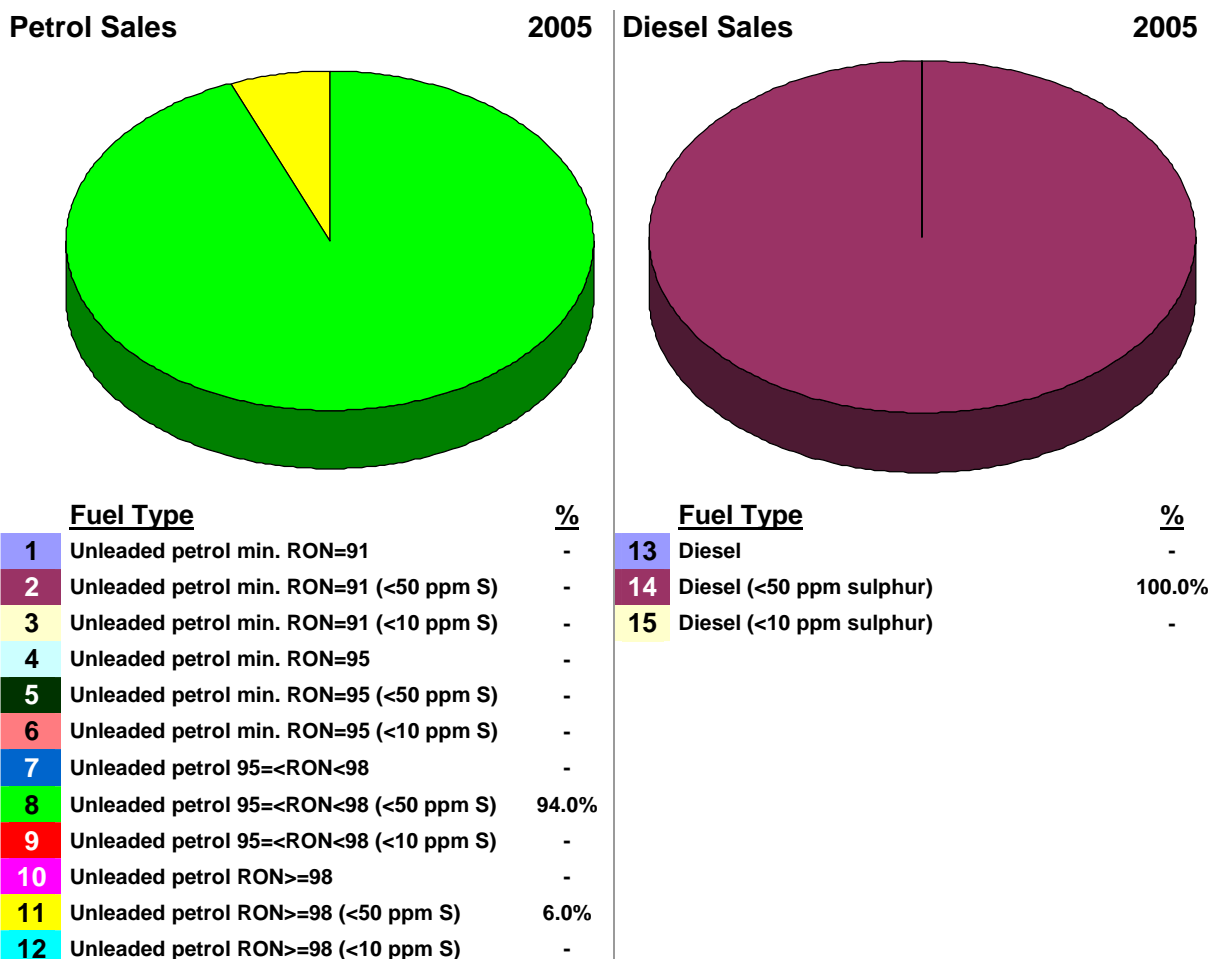


Figure 24.1 shows the majority of petrol sold was of RON 95-98 category again (94%, as in 2004), with the remainder being RON 98. Only one grade of diesel fuel was stated to be available, however Slovenia has stated that as a result of difficulties in supply of petroleum products from Mediterranean basin and change of national oil reserves, distributors were

allowed to place on a market for a period of three months (until 31.3.2005) diesel fuel with max sulphur content of 350 mg/kg. No separate figures for these sales were provided.

## 24.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur free fuels (<10 ppm sulphur) were available in small quantities in Slovenia since January 2005. There are no official statistics available concerning the volume and/or geographical extent to which sulphur free petrol or diesel fuels are marketed. According to the information obtained from distributors, sulphur free petrol represents about 5 % of total petrol and 4 % of total diesel sales in 2005. Sulphur free petrol availability is national-wide, with unleaded petrol NMB 98 SUPER PLUS (RON >=98) the most sulphur free fuel sold in 2005. Distribution of sulphur free diesel was limited on some district petrol stations.

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

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

**Average sulphur content of all petrol and diesel sold:** Table 24.1 shows the average content of fuel sold in relation to the EU25 average.

### **Additional information:**

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

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

SI	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>				39	27	19
<b>Diesel</b>				236	47	25

## 24.2 Fuel Quality Monitoring 2005

### 24.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** Samples of petrol were taken at refuelling stations each month across the winter and summer periods. Samples of diesel were taken at refuelling stations (96 samples) and depots (56 samples) each month throughout the year.

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

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

**Collection of sales data:** National sales data was taken from the statistics compiled and published by Statistical Office of the Republic of Slovenia.

## 24.2.2 Sampling and reporting

Slovenia was almost fully compliant with the sampling and reporting requirements in 2005. Separate data tables were not submitted for summer and winter sample analysis for diesel and the total number of samples taken from refuelling stations (96) was slightly below the number required (100). The following Table 24.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 24.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
8	95<RON<98 <50 ppm S	8	94.0%	57	54	100	Yes	All of 18	
11	RON 98 <50 ppm S	11	6.0%	14	11	6	Yes	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>71</b>	<b>65</b>	<b>106</b>	<b>Yes</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	79	73	100	No	All of 5	(1)
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>79</b>	<b>73</b>	<b>100</b>	<b>No</b>	<b>All of 5</b>	<b>(1)</b>

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

(1) Samples of diesel were taken at refuelling stations (96 samples) and depots (56 samples) each month throughout the year. The remainder were taken at depots.

## 24.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

**Detail:** Summer vapour pressure, aromatics and benzene limit values (of max. 60 kPa, 35 %v/v and 1.0 %v/v) were exceeded by 8, 2, 1 samples respectively, reaching extremes of 74.8 kPa, 36.9 %v/v and 1.44 %v/v.

**Statistical significance:** The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8 kPa, for benzene is 1.1 %v/v. The summer vapour pressure and benzene samples were outside the tolerance limits and therefore non-compliant with the Directive.

The tolerance limit for aromatics is 37.2 %v/v and therefore the sample was within the limit and compliant with the Directive.

**Member State's notes:** The information of the limit exceedance was delivered to the Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning. According to the national legislation that transposes the Directive 98/70/EC, and was amended in June 2006, the distributors will be penalised as a result of the exceedances.

#### **RON 98 Petrol**

**Detail:** Summer vapour pressure limit value (of 60 kPa) was exceeded by 10 samples, with values from 61.7 to 70.7 kPa.

**Statistical significance:** The tolerance limit for statistical significance for the summer vapour pressure test method is 61.8 kPa. 9 of the samples were therefore non-compliant with the Directive.

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

### **Diesel**

**Detail:** Cetane number limit value (of min. 51) was exceeded by 1 sample with a value of 48.3. 24 samples exceeded the limit value for sulphur of 50 ppm (19 were within the period Jan-March 2005) with maximum value of 183 ppm.

**Statistical significance:** The tolerance limit for statistical significance for the cetane number test method is 45.8 and this sample was therefore non-compliant with the Directive. 20 of the samples (18 in the period Jan-March 2005) exceeding the sulphur limit were also beyond the tolerance limit and therefore non-compliant with the Directive.

**Member State's notes:** Slovenia has stated that as a result of difficulties in supply of petroleum products from Mediterranean basin and change of national oil reserves, distributors were allowed to place on a market for a period of three months (until 31.3.2005) diesel fuel with max sulphur content of 350 mg/kg. No separate figures for these sales were provided. This resulted in 19 samples exceeding the 50 ppm limit value.

The information of the limit exceedance was delivered to the Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning. According to the national legislation that transposes the Directive 98/70/EC, and was amended in June 2006, the distributors will be penalised as a result of the exceedances.

## **24.3 Temporal trends**

The following Figure 24.2 to Figure 24.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales decreased from 2004 to 2005 by 1%, whilst and diesel sales increased by 13%.

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

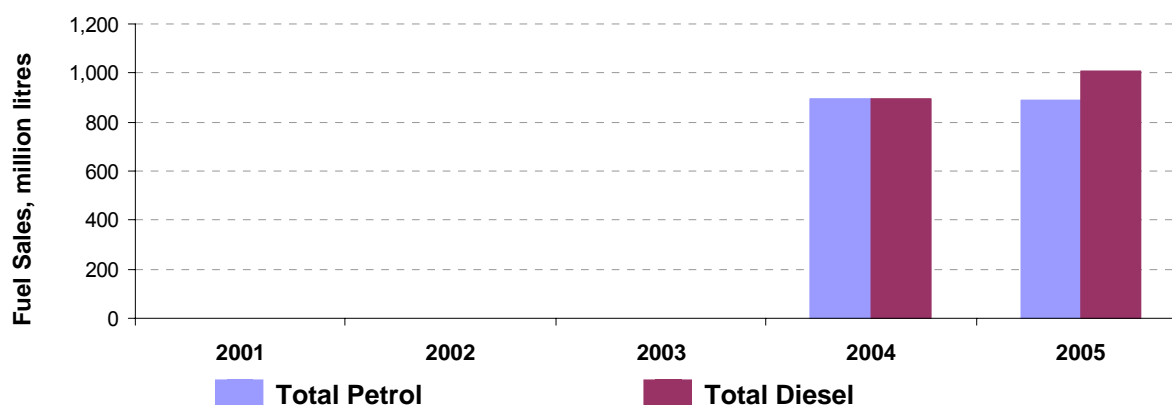


Figure 24.3: Temporal trends in national sales of low sulphur petrol (%)

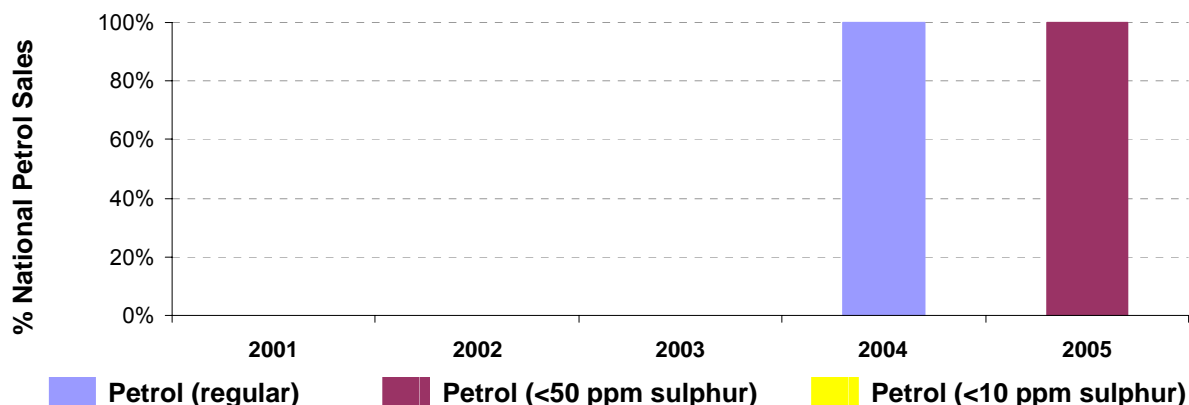


Figure 24.4: Temporal trends in national sales of low sulphur diesel (%)

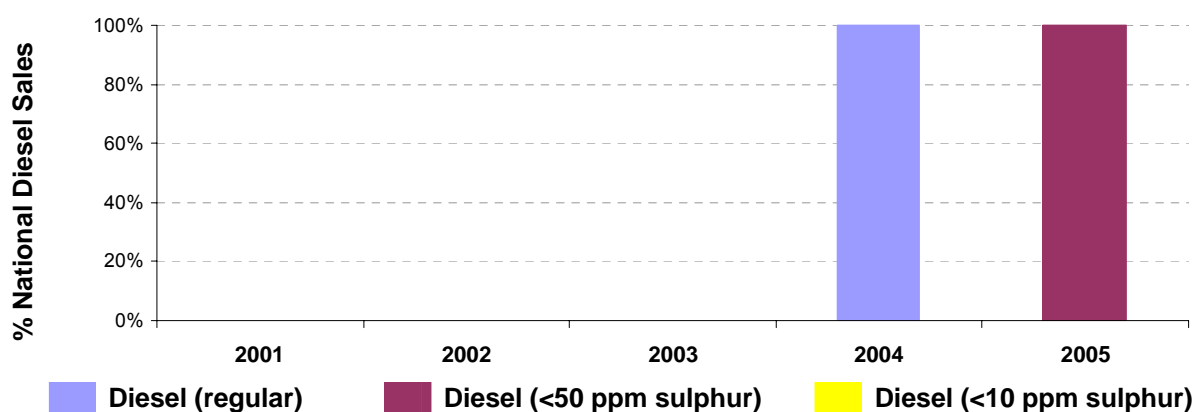
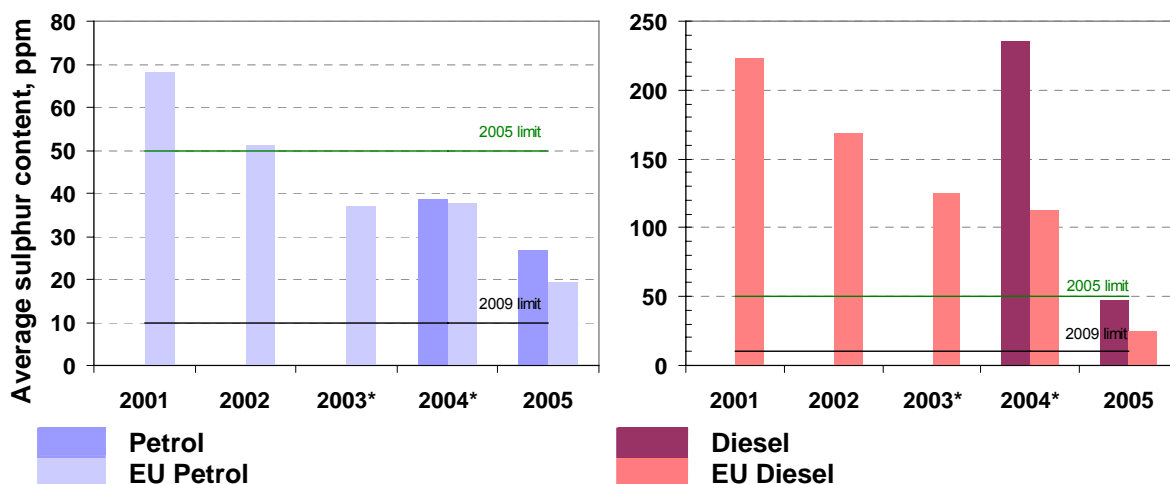


Figure 24.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average. The average sulphur content for both petrol and diesel was below the 2005 limit (<50 ppm) but above the EU average.

Figure 24.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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

## 24.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Separate data tables were not submitted for summer and winter sample analysis for diesel and the total number of samples taken from refuelling stations (96) was slightly below the number required (100) by EN 14274.
- Sulphur free fuels are not marked separately from regular grades, preventing consumers from choosing these fuels if required by their vehicle.
- Slovenia allowed the sale of petrol non-compliant with the new 50 ppm sulphur limit for diesel for the first 3 months of 2005.

## 25 Spain

### 25.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	GASOLINA I.O.95	5
8	95<RON<98	<50 ppm	GASOLINA I.O.97	8
12	RON 98	<10 ppm	GASOLINA I.O.98	12
14	Diesel	<50 ppm	GASÓLEO DE AUTOMOCIÓN	14

#### 25.1.1 Sales

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

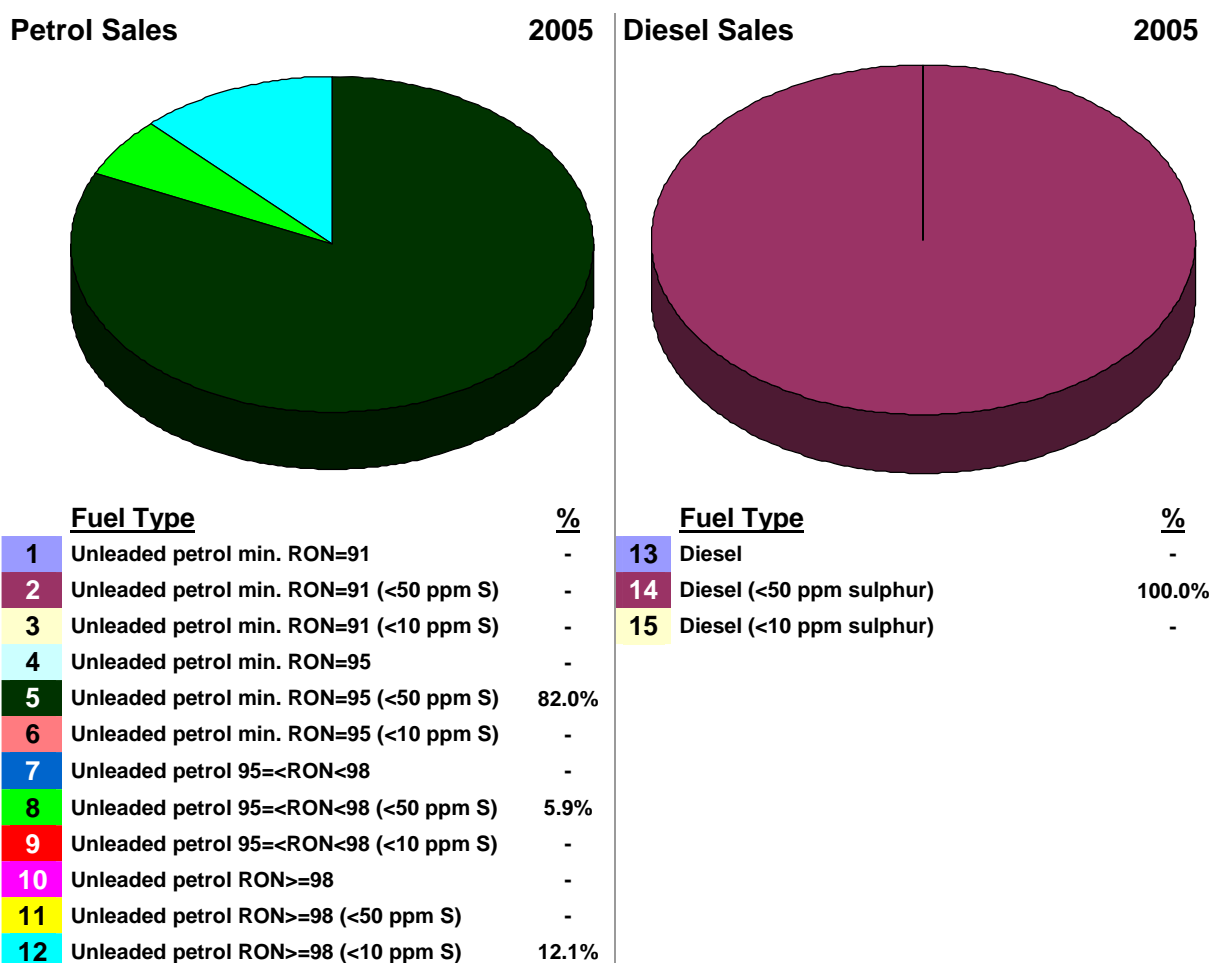


Figure 25.1 shows that the majority of fuel sold in Spain in 2005 was again RON 95 grade (82% compared to 64% in 2001), with the rest comprising of RON 95-98 (6% down from 26% in 2001) and RON>98 (12%, up from 9% in 2001). RON>98 fuel sales were entirely sulphur-free in 2005, however no sulphur-free diesel sales figures were available.



## 25.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Widely available across Spain as RON>98 grade in 2005.

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

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

**Average sulphur content of all petrol and diesel sold:** Average sulphur content of petrol and diesel in Spain has varied little between 2001 and 2004, but then decreased significantly with the introduction of the <50 ppm limit and <10ppm fuels in 2005 - see Table 25.1.

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

Table 25.1: Annual trend in average sulphur content in petrol and diesel fuels

<b>ES</b>	<b>Average Sulphur Content, ppm</b>					<b>EU25</b>
<b>Fuel/Year</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2005</b>
<b>Petrol</b>	96	103	103	100	23	19
<b>Diesel</b>	278	276	267	253	33	25

## 25.2 Fuel Quality Monitoring 2005

### 25.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** Refuelling stations, Terminals / Depots and Refineries

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

**Specification of test methods:** No information provided

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

**Other details:** There are nine refineries in Spain in total with a crude throughput of 65 MT/year. Imports of petrol and diesel for 2005 were 753 and 6,191 kT respectively. Exports of petrol and diesel in 2005 were 2,866 and 390 kT respectively.

### 25.2.2 Sampling and reporting

Spain was compliant with the sampling and reporting requirements in 2005, however they have not provided information on whether their national monitoring system is equivalent in confidence with the requirements of EN 14274. The following Table 25.2 provides a

summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 25.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>1</sup>			
5	RON 95 <50 ppm S	5	82.0%	99	159	-	Yes	All of 18	(1)
8	95<RON<98 <50 ppm S	8	5.9%	41	59	-	Yes	All of 18	(1)
12	RON 98 <10 ppm S	12	12.1%	90	151	-	Yes	All of 18	(1)
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>230</b>	<b>369</b>	<b>-</b>	<b>Yes</b>	<b>All of 18</b>	<b>(1)</b>
14	Diesel <50 ppm S	14	100.0%	100	167	-	Yes	All of 5	
15	Diesel <10 ppm S	15	0.0%	18	26	-	Yes	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>118</b>	<b>193</b>	<b>-</b>	<b>Yes</b>	<b>All of 5</b>	

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

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

### 25.2.3 Compliance with fuel quality limit values

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

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

#### **RON 95 Petrol**

All samples tested were in compliance with limit values.

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

*Detail:* Aromatics limit (35 %v/v) was exceeded by at least one sample (with 37.2%v/v).

*Statistical significance:* The tolerance limit for statistical significance for the test method (37.2%v/v) was not exceeded for these samples, which were therefore compliant with the Directive.

#### **RON 98 Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

All samples tested were in compliance with limit values.

## 25.3 Temporal trends

The following Figure 25.2 to Figure 25.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales at decreased by 14% between 2001 and 2005, with diesel sales increasing by 29%. Sulphur-free fuels were introduced for the first time in 2005.

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



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

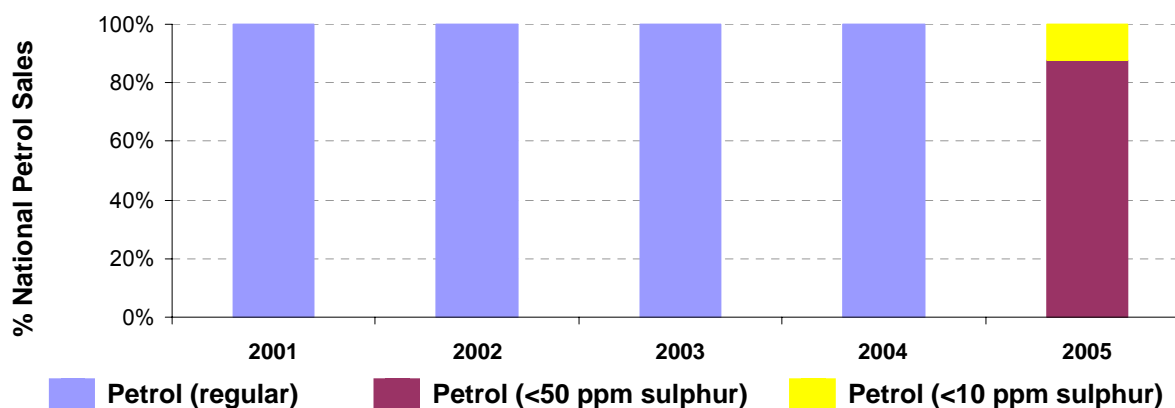


Figure 25.4: Temporal trends in national sales of low sulphur diesel (%)

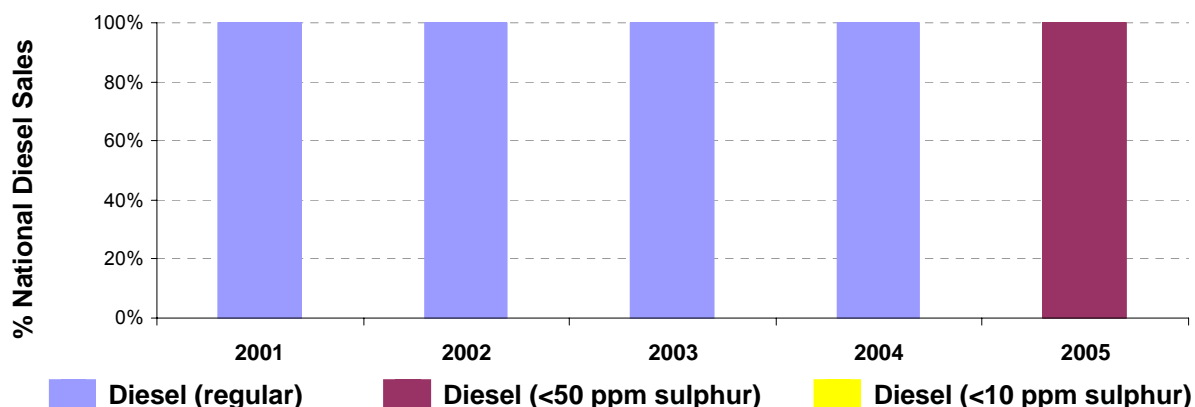
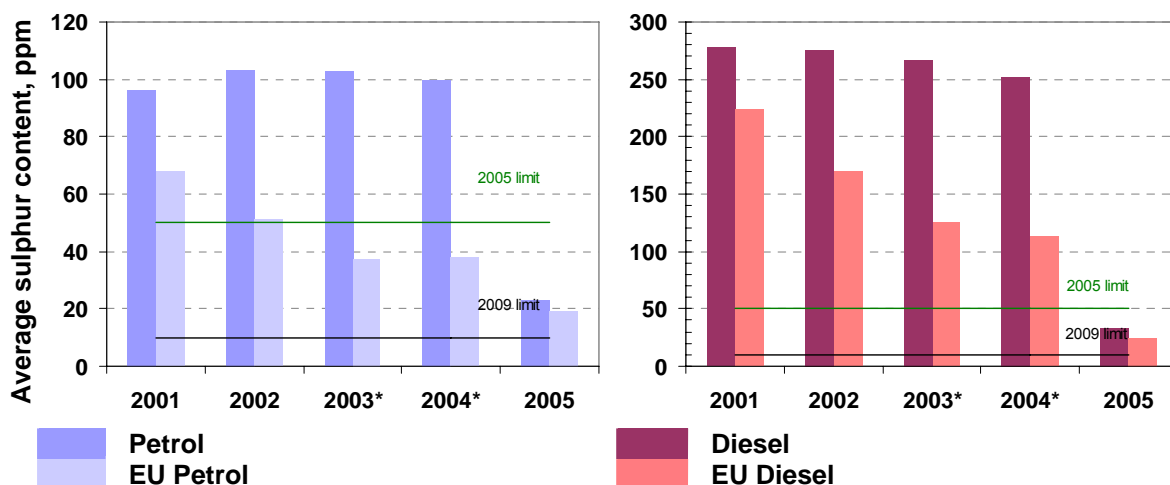


Figure 25.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased steadily since 2001, with a substantial decrease with the introduction of the mandatory limit of <50ppm and sulphur-free fuels in 2005. Average sulphur content is still above the EU average in 2005, however.

**Figure 25.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 25.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Spain has not provided information on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274.
- Spain is carrying out sampling at refineries and depots as well as refuelling stations. Information on sample numbers taken from refuelling stations would help assessment of its national FQMS comparability with EN 14274.
- Sales of sulphur free diesel are not provided and Spain has provided no assessment of the geographical availability of sulphur-free diesel in its territory
- Spain was 1 month late in submitting its report.

## 26 Sweden

### 26.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
6	RON 95	<10 ppm	Environmental Class 1 petrol, 95	6
12	RON 98	<10 ppm	Environmental Class 1 petrol, 98	12
15	Diesel	<10 ppm	EN 590 < 10 ppm S, and Environmental Class 1 diesel	15

#### 26.1.1 Sales

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

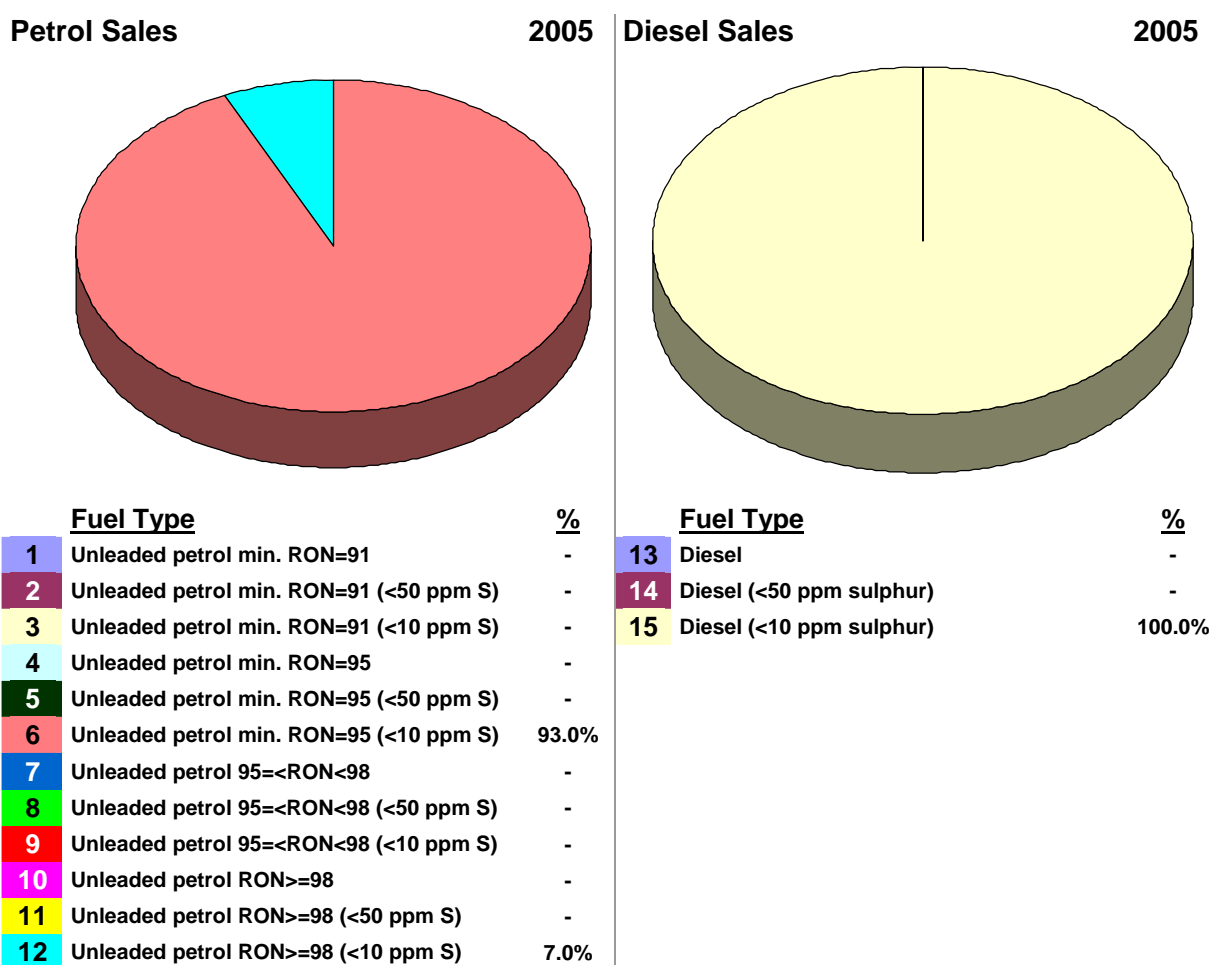


Figure 26.1 shows that all petrol sold in Sweden in 2005 was sulphur-free (<10 ppm), 93% being RON 95 (86% in 2001) and 7% RON 98. All diesel sold was sulphur-free grade (<10 ppm) in previous years.

## 26.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** Sulphur-free petrol and diesel fuel was available throughout the country in 2005. As early as 1996, 85% of all diesel fuel sold was sulphur-free and for the last 5 years virtually all diesel sold was sulphur-free.

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

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

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

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

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

SE	Average Sulphur Content, ppm					EU25
	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	21	17	13	9	4	19
<b>Diesel</b>	1	2	2	2	2	25

## 26.2 Fuel Quality Monitoring 2005

### 26.2.1 Description of system

**Responsible organisation(s):** The Swedish Road Administration

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

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

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

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

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

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

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

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

## 26.2.2 Sampling and reporting

Sweden was not compliant with the sampling and reporting requirements in 2005, as the national system does not involve sampling at refuelling stations, as required by EN 14274. Sampling at refuelling stations is a prerequisite criterion in establishing similar confidence to this standard. The following Table 26.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 26.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
6	RON 95 <10 ppm S	6	93.0%	168	502	-	No	12 of 18	
12	RON 98 <10 ppm S	12	7.0%	40	120	-	No	12 of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>208</b>	<b>622</b>	-	<b>No</b>	<b>12 of 18</b>	
15	Diesel <10 ppm S	15	100.0%	165	492	-	No	5 of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>165</b>	<b>492</b>	-	<b>No</b>	<b>5 of 5</b>	

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

- (1) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenates test methods. However, the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear whether this has been carried out. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.

## 26.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol**

All samples tested were in compliance with limit values.

#### **Diesel**

All samples tested were in compliance with limit values.

## 26.3 Temporal trends

The following Figure 26.2 to Figure 26.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Petrol sales increased by 1% between 2001 and 2005, with diesel sales increasing by 20%. All petrol sold in 2001 - 2004 was low sulphur (<50 ppm), with full market conversion to sulphur-free in 2005. All diesel was sulphur free (<10 ppm) 2001-2005.

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

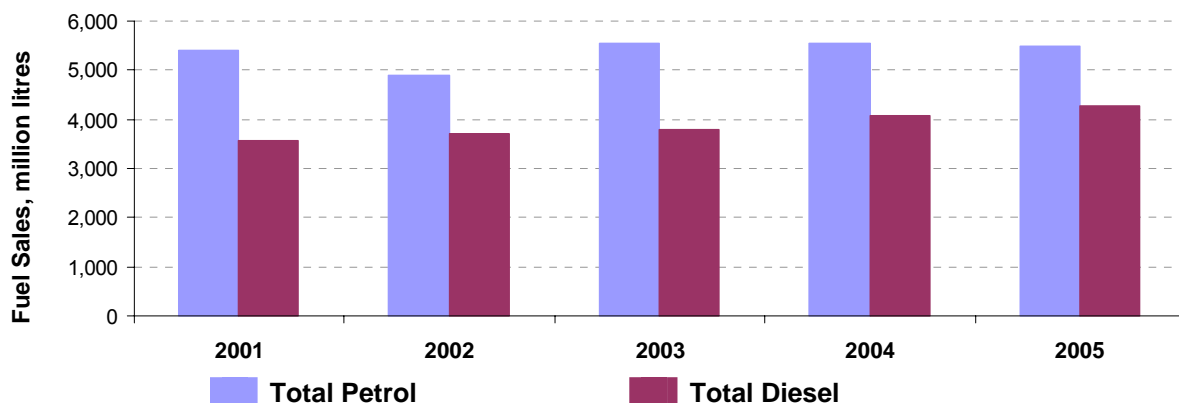


Figure 26.3: Temporal trends in national sales of low sulphur petrol (%)

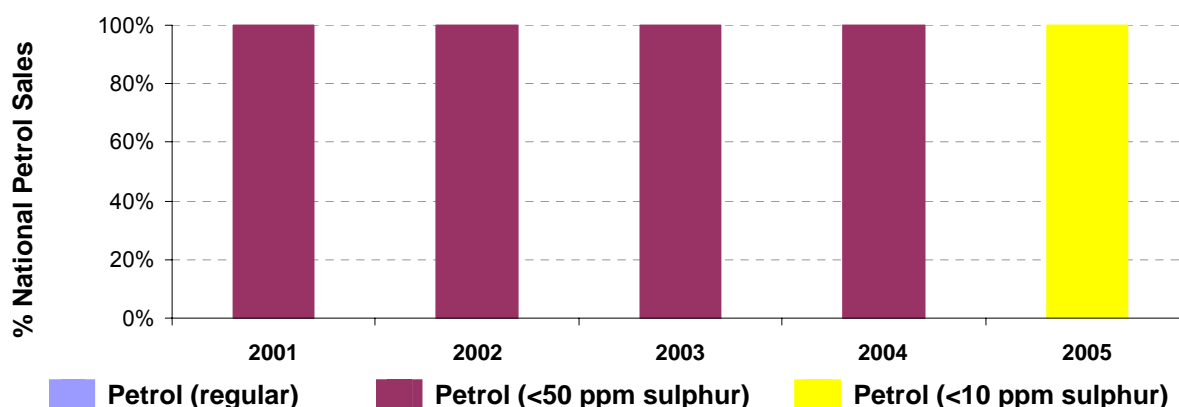


Figure 26.4: Temporal trends in national sales of low sulphur diesel (%)

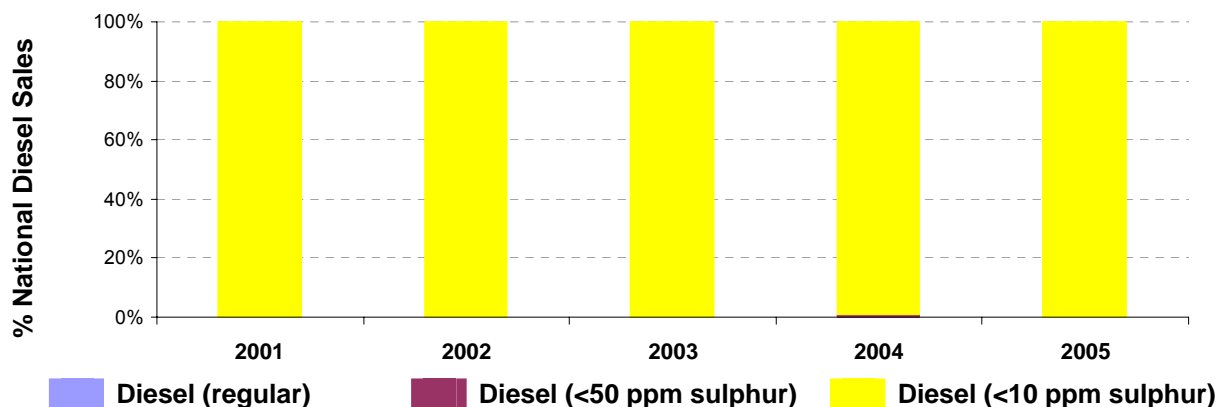
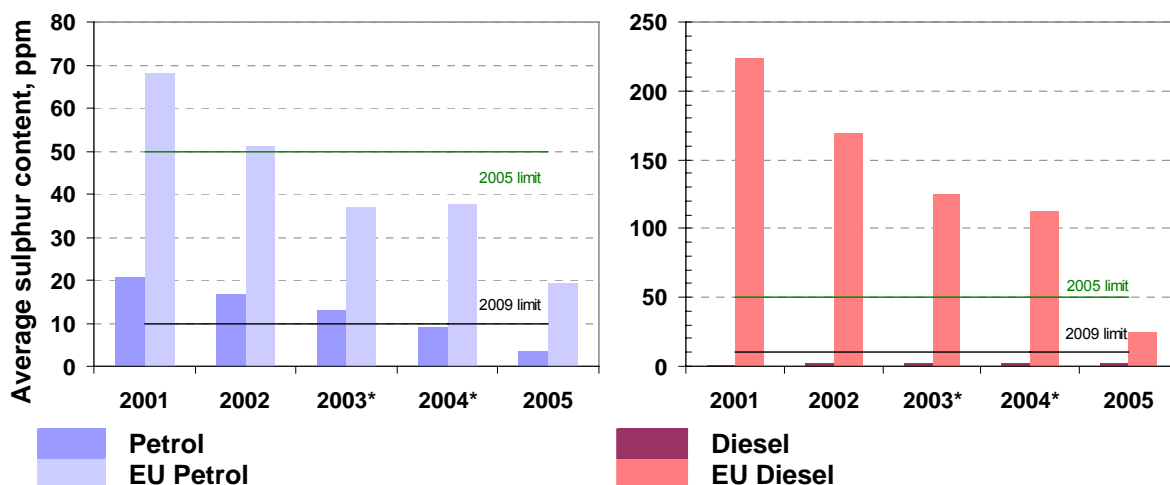


Figure 26.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased steadily since 2001 and are well below the mandatory <50ppm limits, the EU average and the 2009 <10 ppm limits.



**Figure 26.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring**



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

## 26.4 Key Areas for Improvement

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

### Key Areas for Improvement

- Sweden has not provided an explanation for utilising a national FQMS in place of the European Standard or its statistical equivalence to the standard. In fact Sweden is only carrying out sampling at refineries and depots, with no samples taken at fuel dispensing sites – which is a prerequisite requirement for statistical confidence comparable to EN 14274. Sweden’s current system therefore provides no assurance that fuel dispensed at the pumps has not been tampered with since it left the refinery/depot.

## 27 United Kingdom

### 27.1 Fuel Availability 2005

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

Reference Number	Fuel grade	Sulphur Content	National fuel grade	Reporting Category
5	RON 95	<50 ppm	Premium unleaded petrol	5
8	95<RON<98	<50 ppm	Super unleaded petrol	8
14	Diesel	<50 ppm	ULSD	14

#### 27.1.1 Sales

Figure 27.1: National fuel sales volume proportions by fuel type (%)

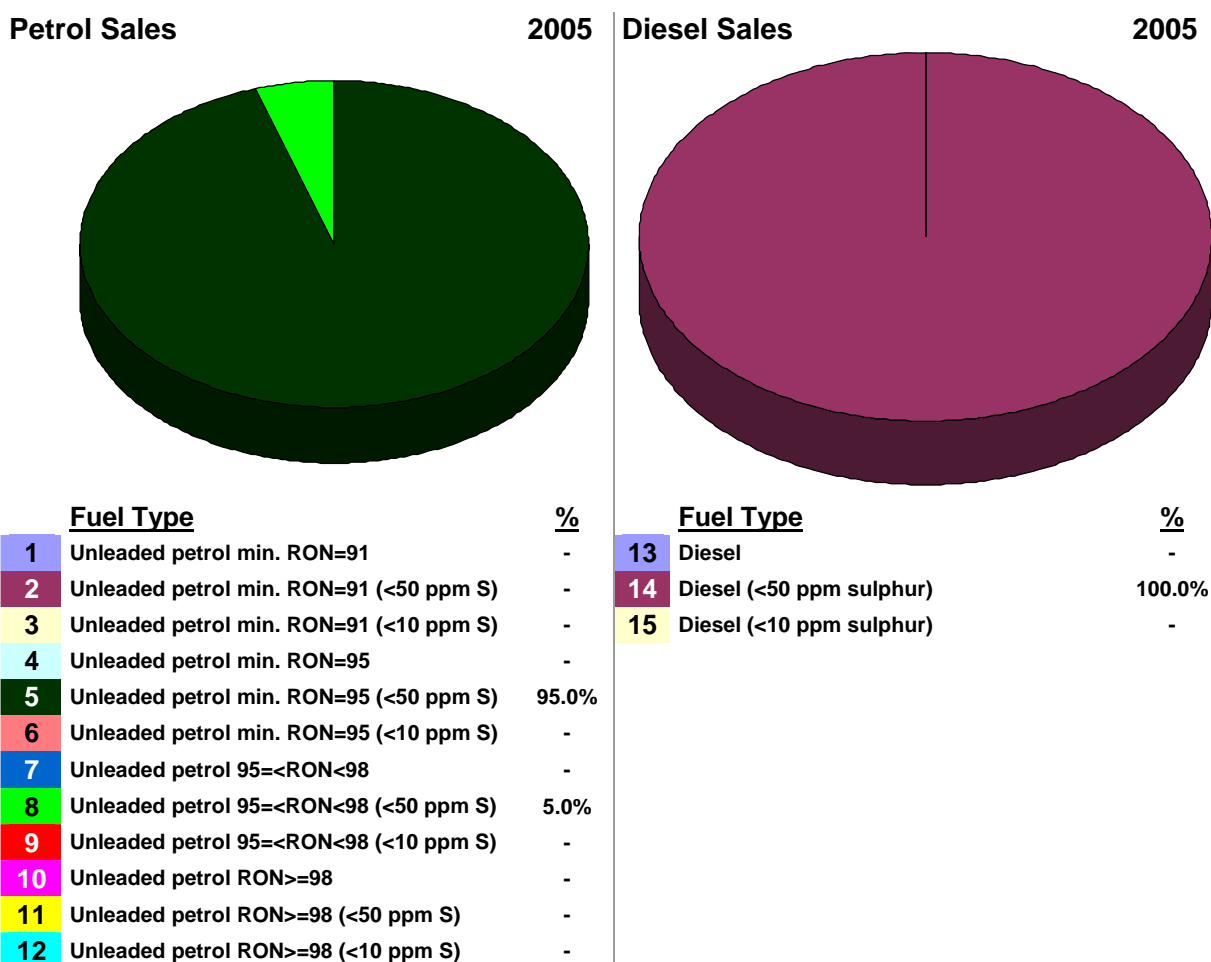


Figure 27.1 above shows the wide availability of low sulphur (<50 ppm) fuels on the UK market in 2005, with 100% of all petrol and diesel fuel sold being low sulphur, as in previous years. For petrol 95% of fuel sold is RON 95, similar to the 96% in 2002-4. The remaining 5% of fuel was accounted for by RON 98 fuel (includes LRP and Super Unleaded), down from 6% in 2001.

## 27.1.2 Sulphur content

**Geographical availability of sulphur-free fuels:** The UK had originally intended to introduce 10 ppm S fuels by fiscal means in September 2004, but, as reported last year, due to high oil prices had suspended all fuel duty increases. This, indirectly, included the introduction of 10 ppm S fuels. The measure was considered again early in 2005, however the continuing high oil price still prevented the use of such a fiscal measure. The UK government decided then that the safest option was to opt for a mandated introduction of 10 ppm S fuels. The intention was to achieve this by year-end 2005, however due to the necessary requirements for new regulation plus workloads, this was not achieved. It can be seen from the sampling data in annexes V & VI that there has been some availability of 10 ppm S grades, although these have not been differentiated and marketed as such. The UK refining industry was largely able to introduce these fuel grades, and customs data collected for other reasons has shown that the UK diesel market was at about 25% by volume of 10 ppm S diesel by the end of 2005. Such a revenue distinction does not exist for petrol grades and hence this similarly based data does not exist for petrol grades.

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

**Are the sample analysis results for sulphur content of sulphur-free grades reported separately?** None available.

**Average sulphur content of all petrol and diesel sold:** The average sulphur content of both petrol and diesel has decreased since 2001, see Table 27.1.

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

Table 27.1: Annual trend in average sulphur content in petrol and diesel fuels

UK	Average Sulphur Content, ppm					EU25
Fuel/Year	2001	2002	2003	2004	2005	2005
<b>Petrol</b>	49	41	37	37	33	19
<b>Diesel</b>	40	40	38	35	33	25

## 27.2 Fuel Quality Monitoring 2005

### 27.2.1 Description of system

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

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

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

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

**Location(s) of sampling:** Each UK refinery and import terminal tests all fuels prior to release into the UK market. Individual companies send results to the relevant trade organisation (UKPIA or AUKOI), which compiles and send it on to DTI. This is supplemented by separate retail site sampling.

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

**Specification of test methods:** Testing carried out in NAMAS or ISO 9000 accredited laboratories according to the Directive specifications.

**Collection of sales data:** Sales data is collected by industry and sent to DTI.

**Other details:** 9 refineries supply the market of the UK with fuel by the major international oil companies and this is supplemented by imports controlled by independent suppliers (<10% total fuels within UK). No product is released that does not meet the limit values in Directive 98/70/EC. The UK monitoring system uses a mixture of refinery and fuel depot out turn test results plus retail site sampling. When this system was first trialled the two data streams were run apart, with the retail site samples used to gain confidence in trusting refinery/terminal data. A very good correlation was found (using sulphur content as an indicator, deviation was typically <3 ppm). The overall basis for this approach is that the UK had switched in entirety to 2005 fuels Directive specification petrol and diesel (albeit with diesel density and T95 being tighter at 0.835 and 345 respectively), hence there is only one grade each of petrol and diesel going into the market. The refinery/terminal sampling does not allow for adulteration, however the UK customs department also action this separately, as mentioned in previous years reporting. To confirm that the fuel is not contaminated as it passes through the supply chain the oil marketers conduct surveys. These surveys consist of sampling their inland terminals plus their own and competitors' retail networks. The analytical data collected from these surveys has also been collated by the trade associations and included in the submission.

## 27.2.2 Sampling and reporting

The United Kingdom was compliant with the sampling and reporting requirements in 2005, and have provided information on the national monitoring system confidence level. The following Table 27.2 provides a summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC.

**Table 27.2: Summary of sampling and analyses carried out with respect to requirements of Directive 98/70/EC and EN 14274**

Fuel Category	Fuel Grade	Analysis Reported in Category	% Sales	Samples			Separate S & W Report	Parameters Measured	Notes
				S	W	Total EN 14274 Requirement <sup>(1)</sup>			
5	RON 95 <50 ppm S	5	95.0%	596	1737	-	No	All of 18	
8	95<RON<98 <50 ppm S	8	5.0%	83	238	-	No	All of 18	
<b>P</b>	<b>Total Petrol</b>		<b>100%</b>	<b>679</b>	<b>1975</b>	-	<b>No</b>	<b>All of 18</b>	
14	Diesel <50 ppm S	14	100.0%	539	1716	-	No	All of 5	
<b>D</b>	<b>Total Diesel</b>		<b>100%</b>	<b>539</b>	<b>1716</b>	-	<b>No</b>	<b>All of 5</b>	

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

## 27.2.3 Compliance with fuel quality limit values

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

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

#### **Petrol RON 95**

**Detail:** The aromatics limit (35 %v/v) and benzene limit (1.0 %v/v) were exceeded by some samples (with 37.2%v/v and 1.05 %v/v).

**Statistical significance:** The tolerance limits for statistical significance for the aromatics and benzene test methods (37.2%v/v and 1.1 %v/v) were not exceeded for these samples, so were therefore compliant with the Directive.

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

*Detail:* The aromatics limit (35 %v/v) and olefins limit (18.0 %v/v) were exceeded by some samples (with 37.1%v/v and 20.9 %v/v).

*Statistical significance:* The tolerance limits for statistical significance for the aromatics and olefins test methods (37.2%v/v and 21.8 %v/v) were not exceeded for these samples. The samples were therefore compliant with the Directive.

### **Diesel**

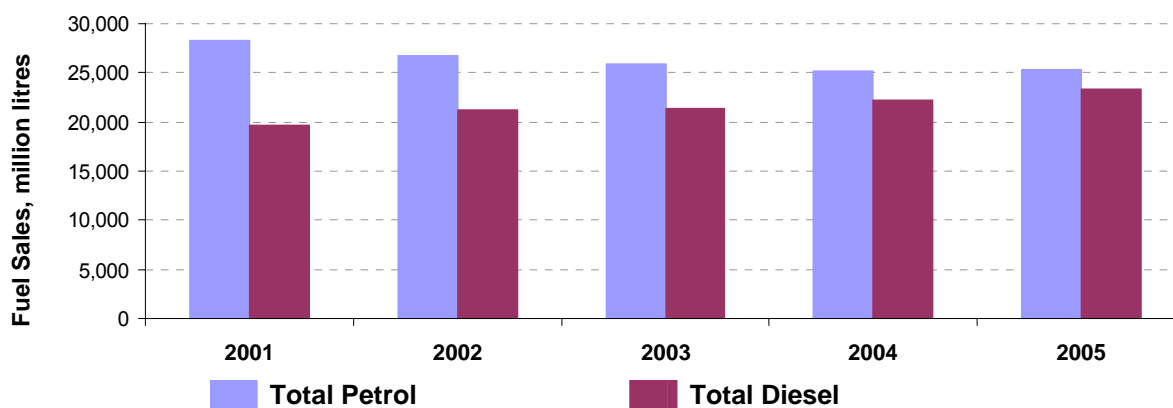
All samples tested were in compliance with limit values.

## **27.3 Temporal trends**

The following Figure 27.2 to Figure 27.4 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales. Between 2001 and 2005, total petrol sales fell by 11% and diesel sales rose by 19%. There was also significant transfer from standard petrol to low-sulphur petrol (<50 ppm), with a complete transfer to low-sulphur petrol in 2002.

Figure 27.5 shows the trend in average sulphur content of petrol and diesel fuels compared with the EU average (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased since 2001 with levels remaining at a similar level since 2003 for petrol and 2001 for diesel, as a result the UK average sulphur content of petrol and diesel fuels is now above the EU average.

**Figure 27.2: Temporal trends in national sales of petrol and diesel (million litres)**



**Figure 27.3: Temporal trends in national sales of low sulphur petrol (%)**

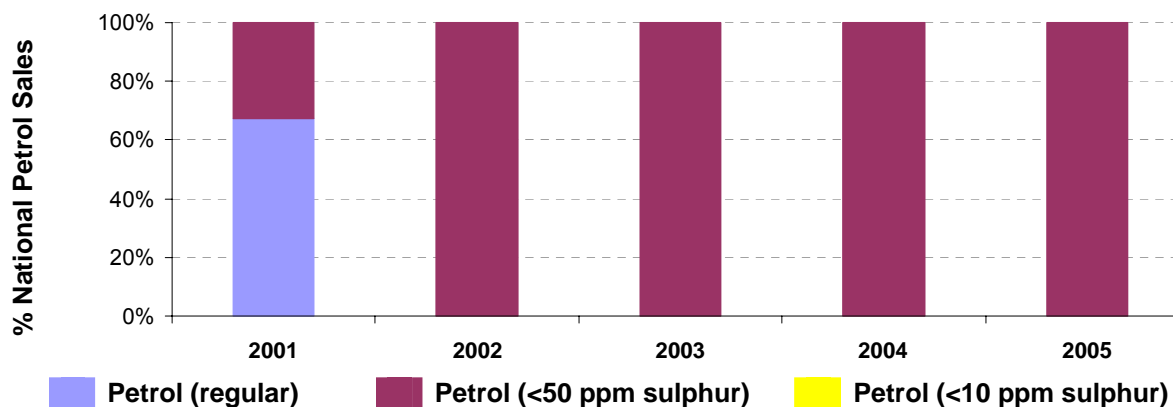


Figure 27.4: Temporal trends in national sales of low sulphur diesel (%)

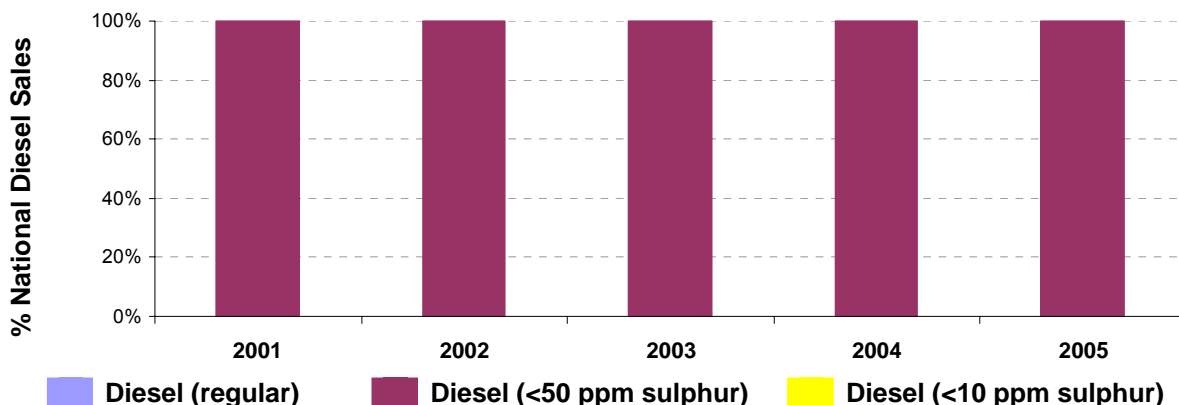
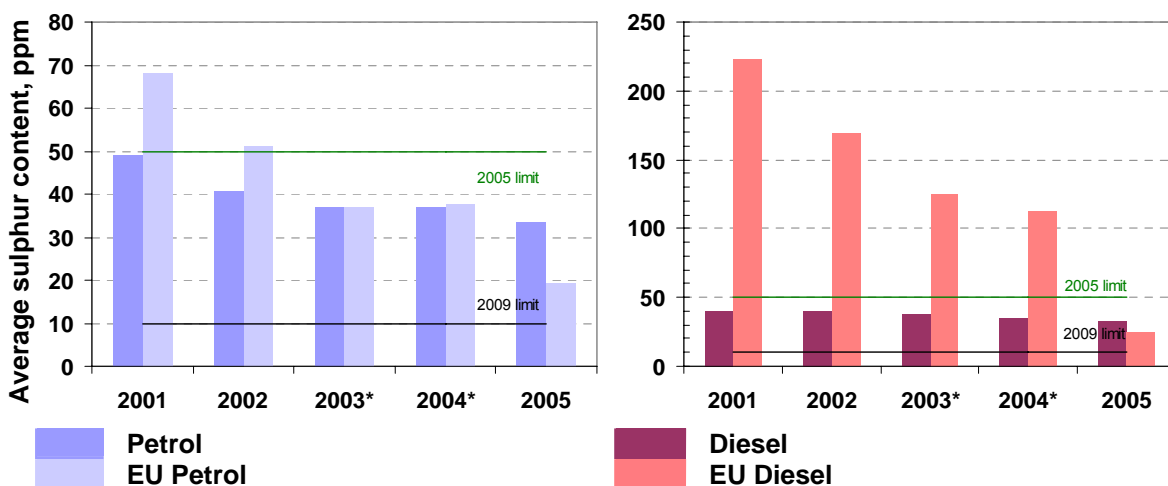


Figure 27.5: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



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

## 27.4 Key Areas for Improvement

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

### Key Areas for Improvement

- The UK was again almost 3 months late in submitting its report in 2006.
- Sulphur free fuels are not available at all, in breach of the Directive requirements.
- The UK has not provided the numbers of samples taken for analysis from refuelling stations this year.

## 28 EU Summary

### 28.1 Fuel Availability 2005

#### 28.1.1 Sales

Figure 28.1: EU Fuel sales proportions by fuel type (%)

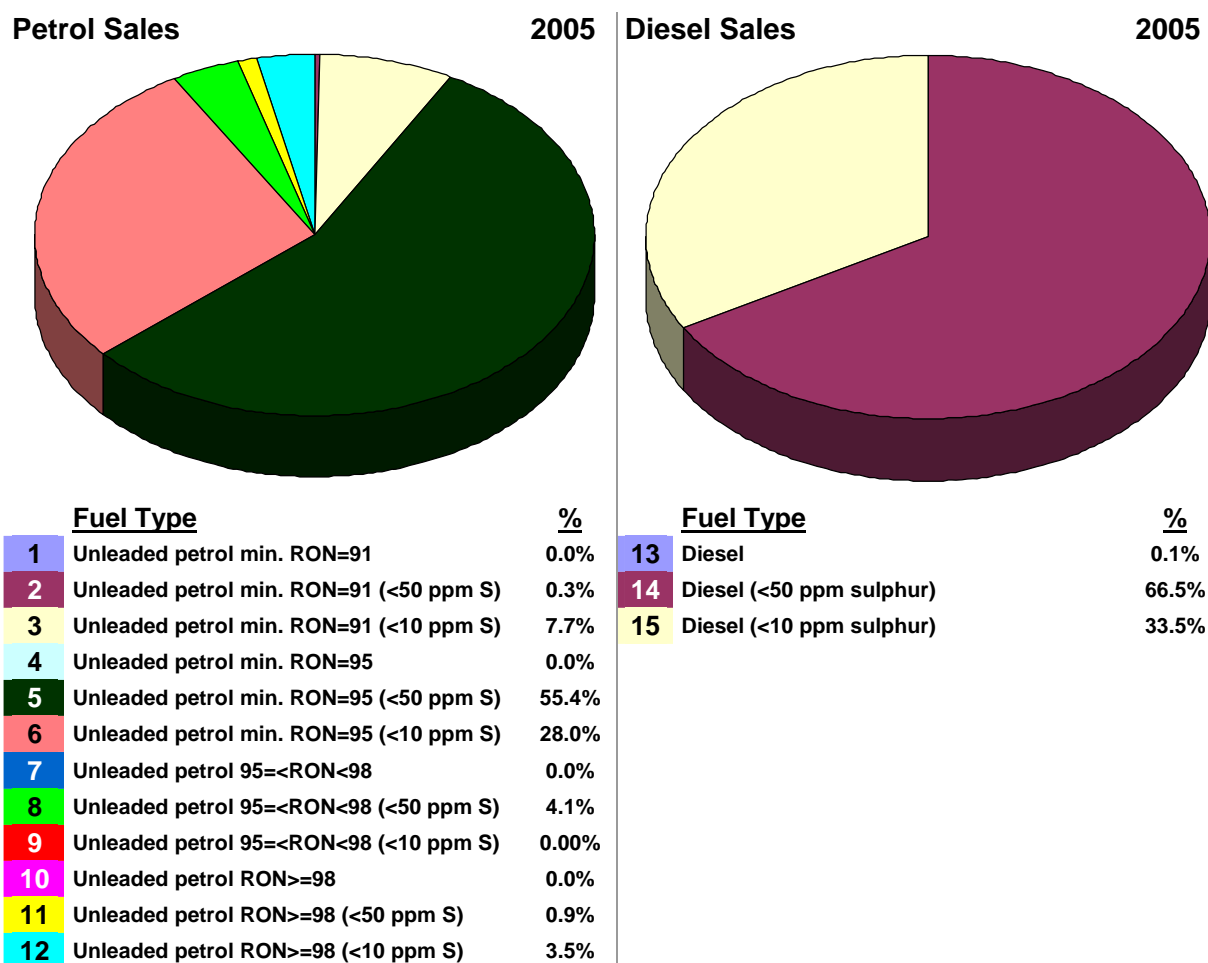


Figure 28.1 (see also Table 28.1) shows the 2005 data (excluding France who has again not submitted a report). The variety of RON and sulphur grade fuels available across the EU in 2005 has decreased with the new mandatory limit of <50ppm sulphur. The majority of sales still comprised RON 95 (84%, with 55.7% low sulphur and 28% sulphur free). Of all petrol sold, 61% was low sulphur (<50 ppm) and 39% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 67% and 33%. Compared to 2001 the quantities of <50 ppm and <10 ppm fuels have increased significantly. Sales from the new EU10 Member States comprised 10.5% and 11.3% of total petrol and diesel sales in the EU respectively (up slightly since 2004). Compared to the EU15, much lower proportions of sulphur-free petrol grades were sold in the EU10, with 15.5%, however a slightly higher proportion of sulphur-free diesel, 36%, was available.

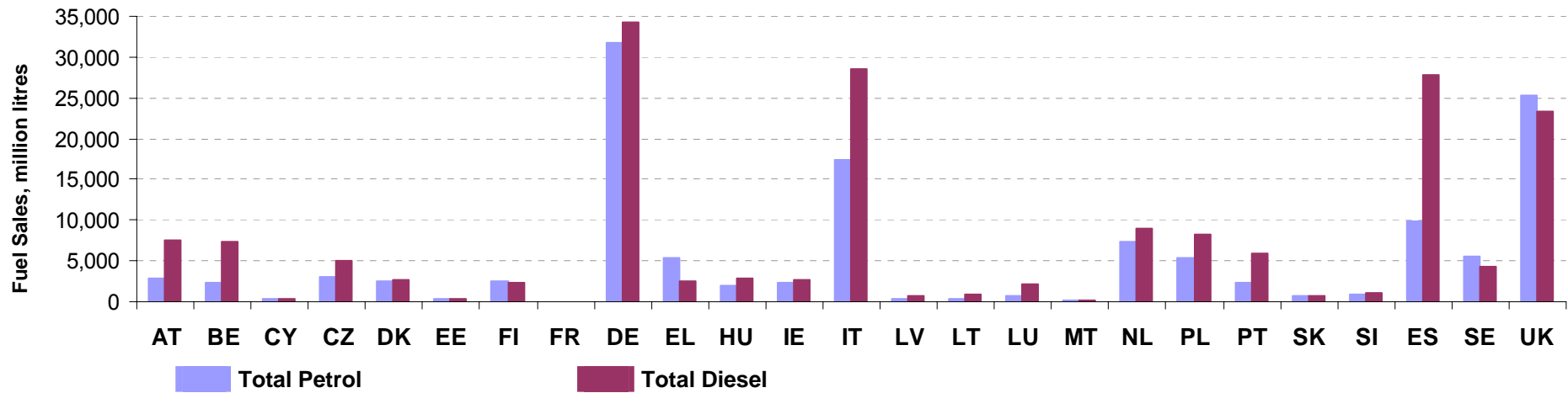
Table 28.1: 2005 EU fuel sales by fuel type (million litres) (Excludes France who again did not submit a report).

ID No.	Million litres Fuel grade	Austria AU	Belgium BE	Denmark DK	Finland FI	France FR	Germany DE	Greece EL	Ireland IE	Italy IT	Luxembourg LU	Netherlands NL	Portugal PT	Spain ES	Sweden SE	UK UK	EU15 EU15	EU15 % Total
1	Unleaded petrol min. RON=91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.0%
2	Unleaded petrol min. RON=91 (<50 ppm S)	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	0.0%
3	Unleaded petrol min. RON=91 (<10 ppm S)	738	-	525	-	-	8,884	-	-	-	-	-	-	-	-	-	10,147	8.6%
4	Unleaded petrol min. RON=95	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	0.0%
5	Unleaded petrol min. RON=95 (<50 ppm S)	-	1,055	-	-	-	-	4,229	1,646	16,461	524	7,089	-	8,066	-	24,082	63,151	53.4%
6	Unleaded petrol min. RON=95 (<10 ppm S)	1,986	659	1,951	2,232	-	21,849	-	669	979	-	-	-	-	5,104	-	35,429	30.0%
7	Unleaded petrol 95=<RON<98	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	0.0%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	-	-	-	-	-	-	735	-	-	-	-	1,919	575	-	1,273	4,502	3.8%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0.0%
10	Unleaded petrol RON>=98	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	0.0%
11	Unleaded petrol RON>=98 (<50 ppm S)	-	276	-	-	-	-	136	-	-	131	310	-	-	-	-	854	0.7%
12	Unleaded petrol RON>=98 (<10 ppm S)	83	395	16	269	-	992	268	-	-	-	1	495	1,190	384	-	4,094	3.5%
	<b>Petrol (regular)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.0%</b>
	<b>Petrol (&lt;50 ppm sulphur)</b>	<b>0</b>	<b>1,331</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,100</b>	<b>1,646</b>	<b>16,461</b>	<b>659</b>	<b>7,399</b>	<b>1,919</b>	<b>8,641</b>	<b>0</b>	<b>25,355</b>	<b>68,510</b>	<b>58.0%</b>
	<b>Petrol (&lt;10 ppm sulphur)</b>	<b>2,807</b>	<b>1,055</b>	<b>2,492</b>	<b>2,501</b>	<b>0</b>	<b>31,725</b>	<b>268</b>	<b>670</b>	<b>979</b>	<b>0</b>	<b>1</b>	<b>495</b>	<b>1,190</b>	<b>5,488</b>	<b>0</b>	<b>49,671</b>	<b>42.0%</b>
	<b>Total Petrol</b>	<b>2,807</b>	<b>2,386</b>	<b>2,492</b>	<b>2,501</b>	<b>0</b>	<b>31,725</b>	<b>5,369</b>	<b>2,315</b>	<b>17,440</b>	<b>659</b>	<b>7,400</b>	<b>2,413</b>	<b>9,831</b>	<b>5,488</b>	<b>25,355</b>	<b>118,181</b>	<b>100.0%</b>
13	Diesel	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	0.0%
14	Diesel (<50 ppm sulphur)	976	7,269	-	-	-	-	2,446	1,801	27,081	2,139	9,000	5,476	27,840	-	23,389	107,418	66.9%
15	Diesel (<10 ppm sulphur)	6,535	168	2,782	2,383	-	34,206	9	890	1,467	-	-	403	0	4,270	-	53,113	33.1%
	<b>Total Diesel</b>	<b>7,511</b>	<b>7,437</b>	<b>2,782</b>	<b>2,383</b>	<b>0</b>	<b>34,206</b>	<b>2,455</b>	<b>2,691</b>	<b>28,549</b>	<b>2,139</b>	<b>9,000</b>	<b>5,879</b>	<b>27,840</b>	<b>4,270</b>	<b>23,389</b>	<b>160,530</b>	<b>100.0%</b>

ID No.	Million litres Fuel grade	Cyprus CY	Czech Republic CZ	Estonia EE	Hungary HU	Latvia LV	Lithuania LT	Malta MT	Poland PL	Slovakia SK	Slovenia SI	EU10 EU10	EU10 % Total	European Union EU	European Union % Total
1	Unleaded petrol min. RON=91	-	-	-	-	-	-	-	-	-	-	0	0.0%	0	0.0%
2	Unleaded petrol min. RON=91 (<50 ppm S)	-	280	14	-	21	80	-	-	28	-	423	3.0%	426	0.3%
3	Unleaded petrol min. RON=91 (<10 ppm S)	-	-	5	-	-	-	-	-	73	-	78	0.6%	10,225	7.7%
4	Unleaded petrol min. RON=95	-	-	-	-	-	-	-	9	5	-	14	0.1%	14	0.0%
5	Unleaded petrol min. RON=95 (<50 ppm S)	355	2,762	176	1,801	350	355	66	4,130	94	-	10,088	72.4%	73,239	55.4%
6	Unleaded petrol min. RON=95 (<10 ppm S)	-	-	121	-	-	2	-	912	562	-	1,596	11.5%	37,025	28.0%
7	Unleaded petrol 95=<RON<98	-	-	-	-	-	-	-	-	-	-	0	0.0%	0	0.0%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	-	-	-	-	-	-	24	-	-	833	857	6.2%	5,359	4.1%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	-	-	-	-	-	-	-	-	-	-	0	0.0%	1	0.0%
10	Unleaded petrol RON>=98	-	-	-	-	-	-	-	-	-	-	0	0.0%	0	0.0%
11	Unleaded petrol RON>=98 (<50 ppm S)	55	27	43	175	36	1	-	-	2	53	393	2.8%	1,246	0.9%
12	Unleaded petrol RON>=98 (<10 ppm S)	-	-	36	4	10	7	-	404	18	-	478	3.4%	4,572	3.5%
	<b>Petrol (regular)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>5</b>	<b>0</b>	<b>14</b>	<b>0.1%</b>	<b>14</b>	<b>0.0%</b>
	<b>Petrol (&lt;50 ppm sulphur)</b>	<b>410</b>	<b>3,069</b>	<b>233</b>	<b>1,976</b>	<b>408</b>	<b>436</b>	<b>90</b>	<b>4,130</b>	<b>124</b>	<b>886</b>	<b>11,760</b>	<b>84.4%</b>	<b>80,270</b>	<b>60.8%</b>
	<b>Petrol (&lt;10 ppm sulphur)</b>	<b>0</b>	<b>0</b>	<b>162</b>	<b>4</b>	<b>10</b>	<b>9</b>	<b>0</b>	<b>1,316</b>	<b>652</b>	<b>0</b>	<b>2,152</b>	<b>15.5%</b>	<b>51,823</b>	<b>39.2%</b>
	<b>Total Petrol</b>	<b>410</b>	<b>3,069</b>	<b>394</b>	<b>1,980</b>	<b>418</b>	<b>444</b>	<b>90</b>	<b>5,455</b>	<b>781</b>	<b>886</b>	<b>13,927</b>	<b>100.0%</b>	<b>132,108</b>	<b>100.0%</b>
13	Diesel	-	-	-	-	49	-	-	45	45	-	139	0.7%	139	0.1%
14	Diesel (<50 ppm sulphur)	414	5,003	118	2,901	716	888	116	1,273	443	1,010	12,882	63.0%	120,299	66.5%
15	Diesel (<10 ppm sulphur)	-	-	227	59	0	65	-	6,875	215	-	7,441	36.4%	60,553	33.5%
	<b>Total Diesel</b>	<b>414</b>	<b>5,003</b>	<b>345</b>	<b>2,960</b>	<b>765</b>	<b>953</b>	<b>116</b>	<b>8,193</b>	<b>703</b>	<b>1,010</b>	<b>20,461</b>	<b>100.0%</b>	<b>180,991</b>	<b>100.0%</b>

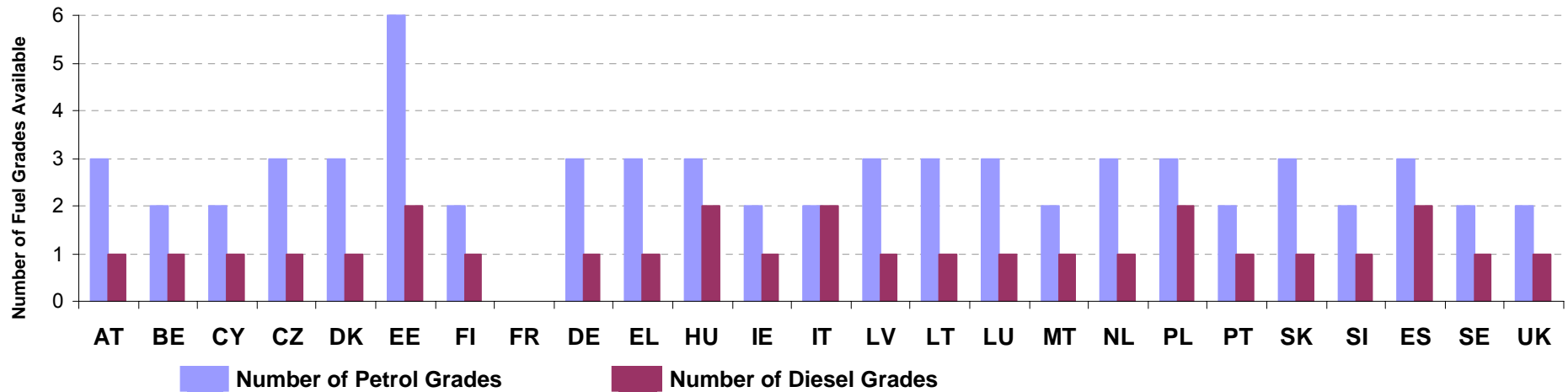


**Figure 28.2: National fuel sales by fuel type across the EU (million litres)\***



\* Excludes France who again did not submit a report

**Figure 28.3: Number of fuel grades available nationally by fuel type across the EU**



Similarly to 2001 - 2004, the largest total sales of fuels (of submissions received) in 2005 were made in Germany, Italy, Spain and the United Kingdom (Figure 28.2). Diesel sales are dominant in many Member States, however the relative sales of petrol and diesel vary.

Since 2001 there has been increased homogeneity in the number of grades of fuel reported to be available across the EU (Figure 28.3), in 2005 there are generally 2-3 petrol grades available, mainly a result of different octane levels (RON category), however separate sulphur-free grades are appearing in some cases (for example Estonia, which has a sulphur-free version of each fuel type). 10 EU15 Member States (only 1 in 2001) defined *national fuel grades* for sulphur free (<10 ppm) fuels in 2005 (in others fuel meeting the sulphur limit is available but unmarked at sale). 4 of the new EU10 Member States, who joined in May 2005, had separate (marked) national sulphur-free fuel grades in 2005.

### 28.1.2 Sulphur content

Already in 2001 - 2004 low sulphur fuels were available in many countries across the EU, even though mandatory introduction was not required until 2005 (see Figure 28.4 and Figure 28.5). Low sulphur (<50 ppm) grades were mandatory from 1 January 2005, as was the introduction of sulphur-free (<10 ppm) fuels, however several Member States are yet to introduce separately marketed (and labelled) sulphur free fuels, a few have not provided sufficient information to judge whether they are available “*on an appropriately balanced geographical basis*”, as required by the Directive, and Cyprus, Malta and the UK have not yet made them available at all.

Member States do not have to full switch to sulphur-free fuels until 2009. However, for petrol fuels in the EU15, 4 Member States (Austria, Finland, Germany and Sweden) had already fully moved over to sulphur free petrol in 2005. For diesel fuels in the EU15, 3 Member States (Finland, Germany and Sweden) had fully moved over sulphur free diesel fuel in 2005 (in Germany it has been available from 2003 and in Sweden virtually all diesel has been sulphur-free since 1999). None of the new Member States have yet fully switched to sulphur-free fuels.

As already mentioned, separate (or labelled) sulphur-free fuel grades, or separate sales figures were not available in 2005 in some Member States. However, fuels complying with the <10ppm sulphur criterion were available in many cases, e.g. the Netherlands. This can be seen in Figure 28.6, which presents the average sulphur content of petrol and diesel grades by Member State across the EU. (Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold). Table 28.2 demonstrates that the annual average sulphur content of petrol and diesel fuels sold in the EU is decreasing, and together with Figure 28.6 shows that much of the fuel sold in previous years already complied with the 2005 sulphur limit (<50 ppm sulphur) for petrol and diesel.

**Table 28.2: Annual trend in average sulphur content in petrol and diesel fuels**

EU	Average Sulphur Content, ppm					EU15 2005*	EU10 2005	EU15*	
	Fuel/Year	2001	2002	2003*	2004*			2005*	2001
<b>Petrol</b>	68	51	37	38	19	19	23	65	44
<b>Diesel</b>	223	169	125	113	25	24	37	207	136

\*Excludes France, who did not report in 2003 - 2005. New EU10 joined from 2004.

Figure 28.4: National sales of low sulphur petrol grades across the EU (%)

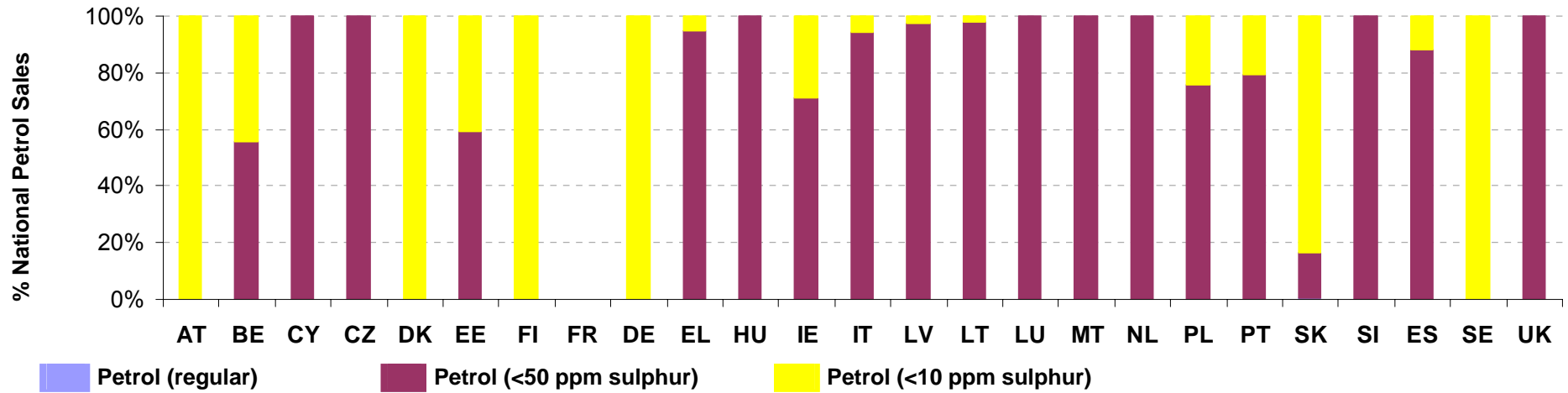


Figure 28.5: National sales of low sulphur diesel grades across the EU (%)

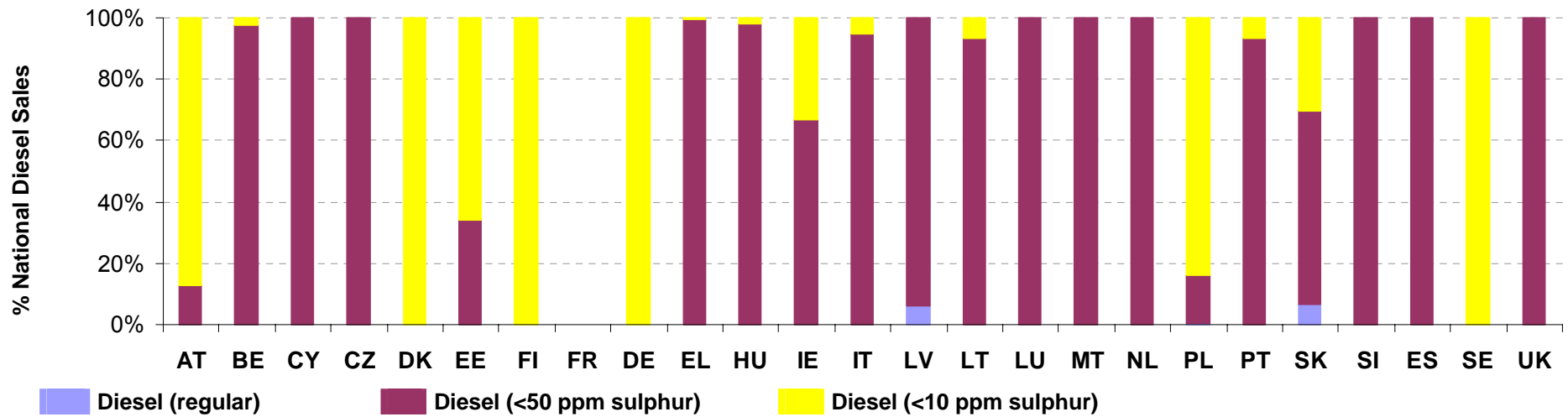
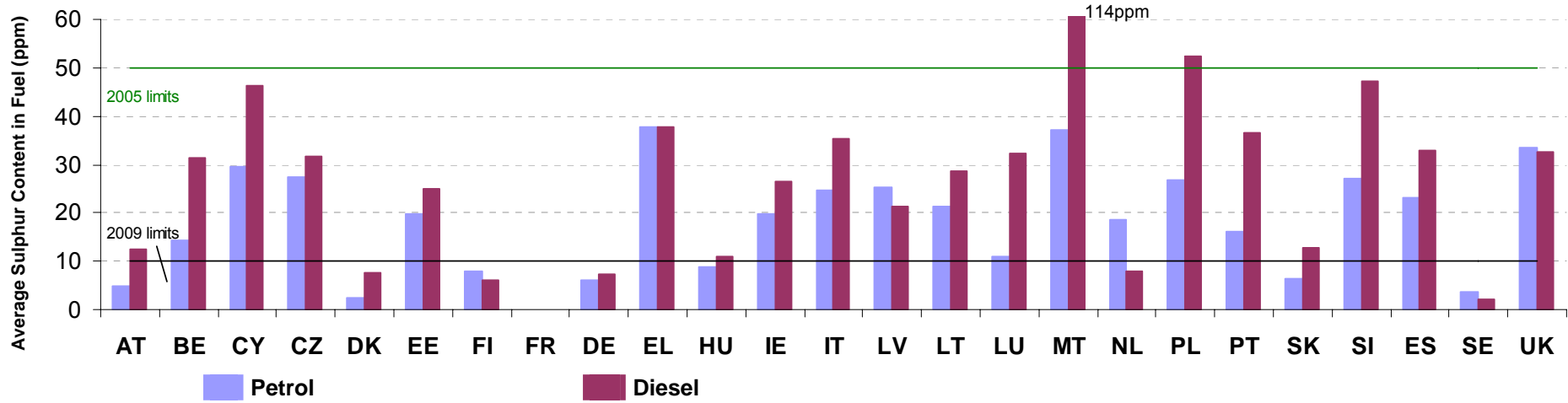


Figure 28.6: Average sulphur content of petrol and diesel grades across the EU (%)



Notes: A number of analysed samples of diesel in Malta (and some in Poland) were contaminated with gas oil and had very high sulphur content, which significantly raised the average for all samples.

## 28.2 Fuel Quality Monitoring 2005

### 28.2.1 Description of systems

A number of different approaches have been used to implement Fuel Quality Monitoring Systems (FQMS) across the EU. These range from those based on European Standard EN 14274<sup>21</sup> with sampling at a range of fuel retail stations through to national systems. For example, systems in Sweden and the UK integrate sampling and analysis of all refinery or imported batches into the requirements for distribution of fuels within the country. There is also random sampling across the distribution chain throughout the year. The systems active in several Member States were originally designed for other purposes, which explain some of the variations in coverage and application across the EU.

A greater degree of homogeneity was expected from 2004, when Member States are required to report in accordance with EN 14274. According to the amended Directive: *"Member States shall establish a fuel quality monitoring system in accordance with the requirements of the relevant European Standard"* (EN 14274 and EN 14275<sup>22</sup>) from 1 January 2004. (A discussion of the changes resulting from these new standards was provided in section 1.2.3). Since 2001 a significant number of changes have been made to Monitoring Systems. Austria, Finland, Greece, Ireland, Italy and the Netherlands have now moved their systems to ones based upon EN 14274 (as have 6 of the new EU10 Member States). Portugal has stated it is still in the process of changing its system to comply with EN 14274 (it also stated this in 2004 reporting).

Of those reporting for 2005, 9 Member States in total are still using National Systems. Alternative monitoring systems may be permitted by the Directive, provided such systems ensure the results are of an equivalent confidence, although the criteria for assessing this are not specified. It is therefore not clear whether the existing systems not based on EN 14274 meet this criterion and only Cyprus, Denmark and Malta have provided information justifying their use of National Systems with reduced sampling. The UK has also provided information on the statistical confidence of its system.

### 28.2.2 Sampling and reporting

There was still a wide range of sampling intensities across the EU in 2005 (Figure 28.7), as for previous years. There are requirements in EN 14274 on the numbers and locations of samples taken in their FQMS. EN 14274 lists a number of useful factors to take into account in assessing the sampling regime, such as the number of refineries supplying the market, the number of fuel grades available and the number of different imported fuel grades and sources. The standard specifies minimum number of samples per fuel grade (in each of the winter and summer periods), as discussed in the introductory section 2.2.2.

Figure 28.7 and Table 28.3 show that many Member States appear to satisfy the specifications for sampling numbers. However, it should be noted that the standard specifies individual samples taken at separate refuelling stations. In many reports from Member States using National Systems, sampling from separate refuelling sites is not always

<sup>21</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

<sup>22</sup> EN 14275:2003 - Automotive fuels - Assessment of petrol and diesel fuel quality - Sampling from retail site station pumps and commercial site fuel dispensers.

specified and in some cases sampling also takes place at other points of the distribution chain. For example, the systems of Luxembourg and Sweden (and in Greece for 2005 only) only take samples from refineries and/or terminals, which is clearly not sufficient to achieve the confidence required by the European Standard, as there is no method of assurance that the fuel is not contaminated/tampered with between the refineries/depots and the retail outlets. In contrast, Finland, Ireland, Portugal, Spain and the UK take samples from across the entire distribution chain. In such cases reports do not always provide information on the number/proportion of samples that were for refuelling stations.

In terms of design and sample numbers (from refuelling stations), the monitoring systems in Austria, Finland, Italy, Lithuania, Slovakia and possibly Spain (although it used its own system) can be stated to fully comply with EN 14274. The Czech Republic, Germany, Hungary, the Netherlands, Poland, Slovenia and the UK were consistent with the sample number and essentially with other criteria too, but did not report summer and winter sample analysis separately, as indicated in EN 14274. The reason for this dual reporting is that there are differences between summer and winter fuel grades.

However, where EN 14274 is used, in terms of selecting the suitable statistical model as discussed in the introductory section 2.2.2, there are still issues to resolve. Several small-sized Member States are still indicating that they are using Model C in 2005, despite having clearly defined separate regions according to the NUTS classification system<sup>23</sup> at Level 2 (800,000 – 3 million people). These include Austria (10 NUTS Level 2 regions), Czech Republic (8 NUTS Level 2 regions), Hungary (7 NUTS Level 2 regions), Ireland (3 NUTS Level 2 regions) and Slovakia (4 NUTS Level 2 regions). In some of these countries it is clear that there is also more than one source/supply point for petrol and diesel fuels, suggesting that Model C may not be appropriate and that possibly either Model A or B should be used instead (e.g. Model A may be more appropriate for Austria). Where Model C is used, Member States should in future present a clear rationale for its use on the basis of both number of fuel sources/supply points and size/possibility of division of the territory into regions.

Assessing other countries utilising their own National Systems is difficult without additional information from the Member States on the statistical confidence of their system and details on the fuel supply situation in their country. However, it seems likely that in certain countries the national system does not match the same level of confidence as EN 14274. Portugal appears to have insufficient samples to achieve the same confidence, and Sweden's system does not involve sampling at refuelling stations at all, so is clearly not able to establish confidence that the quality of the fuel at the pump is the same as at the refinery/terminal. In 2005 only, Greece has also only sampled at the refinery, although it is understood this is a temporary measure.

In general, however, significant progress seems to have been made again by all countries in improving monitoring system methodologies, increasing the number of samples taken and analysed and in the reporting aspects. Figure 28.7 illustrates this, showing improvements in sampling rate in 2005 of EU15 countries in contrast to the 2001 sampling in Figure 28.8 – notably in Greece, Ireland and the Netherlands. The number of diesel samples taken by Portugal has *decreased* by around 70%, however. Sampling numbers are also up significantly in the new EU10 Member States.

---

<sup>23</sup> The Nomenclature of Territorial Units for Statistics (NUTS) is a three-level hierarchical classification, established by Eurostat more than 25 years ago in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the EU. Additional information on NUTS may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

**Table 28.3: Summary of Member State sampling and reporting in relation to the requirements of Directive 98/70/EC and of European Standard EN 14274**

	FQMS Model	Size Cat.	Separate Summer and Winter reporting		Sampling Location	EN 14274 Samples per grade per period <sup>(4)</sup>	Calc. EN 14274 Sample Total Req. <sup>(5)</sup>		Samples Taken		Compliance with EN 14274 Sampling No.		Notes
			Petrol	Diesel			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	
	(1)	(2)			(3)								
AT	C	Small	Yes	Yes	S	50	203	100	205	100	Yes	Yes	
BE	N	Small	No	No	S	-	-	-	4957	3748	-	-	
CY	N	Small	No	No	S, T	-	-	-	149	155	-	-	
CZ	C	Small	No	No	S	50	83	75	1381	1653	Yes	Yes	
DK	N	Small	No	No	S	-	-	-	40	20	-	-	
EE	C	Small	No	Yes	S	50	228	150	300	114	Yes	No	
FI	A	Small	Yes	Yes	S (T, R)	50	200	100	257	141	Yes	Yes	
FR			Yes	Yes	0								
DE	N	Large	No	No	S	-	-	-	543	240	-	-	(d)
EL	A	Small	Yes	No	R	50	208	100	289	89	Yes	No	(a)
HU	C	Small	Yes	Yes	S	50	83	77	120	120	Yes	Yes	
IE	C	Small	No	No	S, T, R	50	100	100	118	95	Yes	No	
IT	A	Large	Yes	Yes	S	100	212	211	318	309	Yes	Yes	
LV	N	Small	Yes	Yes	S, T	-	-	-	251	438	-	-	(d)
LT	C	Small	Yes	Yes	S, T	50	153	80	192	268	Yes	Yes	
LU	N	Small	No	No	T	-	-	-	35	17	-	-	(b) (d)
MT	N	Small	Yes	Yes	S, T	-	-	-	51	31	-	-	(d)
NL	A	Small	No	No	S	50	106	100	106	106	Yes	Yes	
PL	N	Small	No	No	S	-	-	-	392	204	-	-	(d)
PT	N	Small	No	No	S, T, R	-	-	-	47	25	-	-	(c)
SK	C	Small	Yes	Yes	S	50	86	5	236	102	Yes	Yes	
SI	C	Small	Yes	No	S	50	80	75	136	152	Yes	Yes	(e)
ES	N	Large	Yes	Yes	S, T, R	-	-	-	599	311	-	-	(d)
SE	N	Small	No	No	T, R	-	-	-	830	657	-	-	
UK	N	Large	No	No	S, T, R	-	-	-	2654	2255	-	-	

**Notes:**

- (1) N = National Fuel Quality Monitoring System (FQMS);  
A, B or C = FQMS based on EN 14274 Statistical Model A, B or C
- (2) Small countries are defined in EN 14274 as with less than 15 million tonnes automotive fuel dispensed per year.
- (3) S = Refuelling Stations; T = Terminals / Depots; R = Refinery
- (4) There are reduced sampling requirements for grades comprising of less than 10% total sales
- (5) For the new EU10 joining in May 2004, the sampling requirement is reduced to 9 / 12 (months)
- (a) The FQMS has been designed, but it has not been fully applied for the year 2005 due to technical reasons. This report concerns the results of the samples that are taken at refineries.
- (b) No sample analyses were provided for RON91
- (c) The EN 14274 statistical model is being implemented. Meanwhile we will follow the same methodology used in precedent reports
- (d) No information was provided on whether the national monitoring system is equivalent in confidence with the requirements of EN 14274

Figure 28.7: Fuel Quality Monitoring sampling rate across the EU in 2005 (average number of samples per fuel grade)

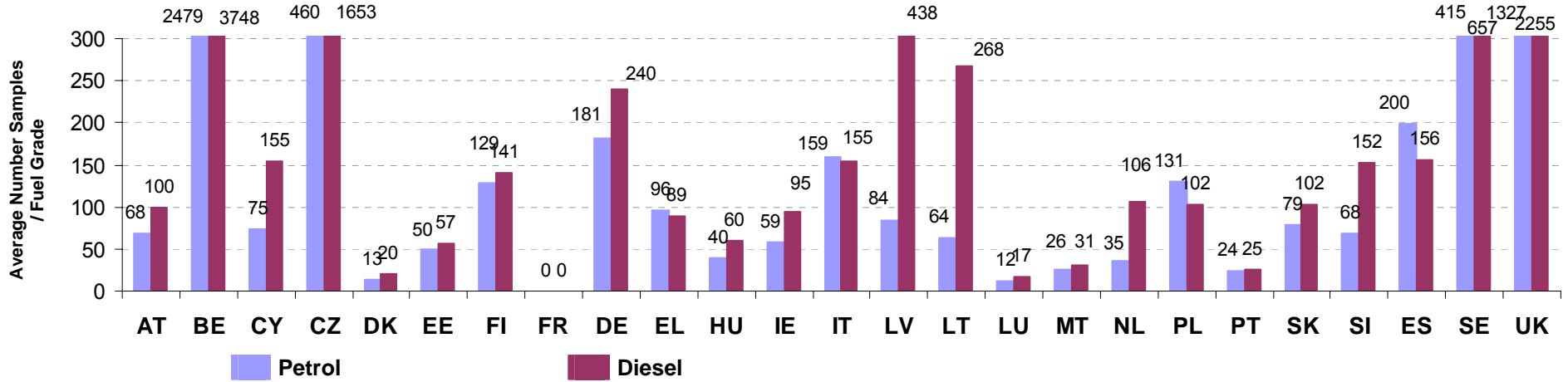
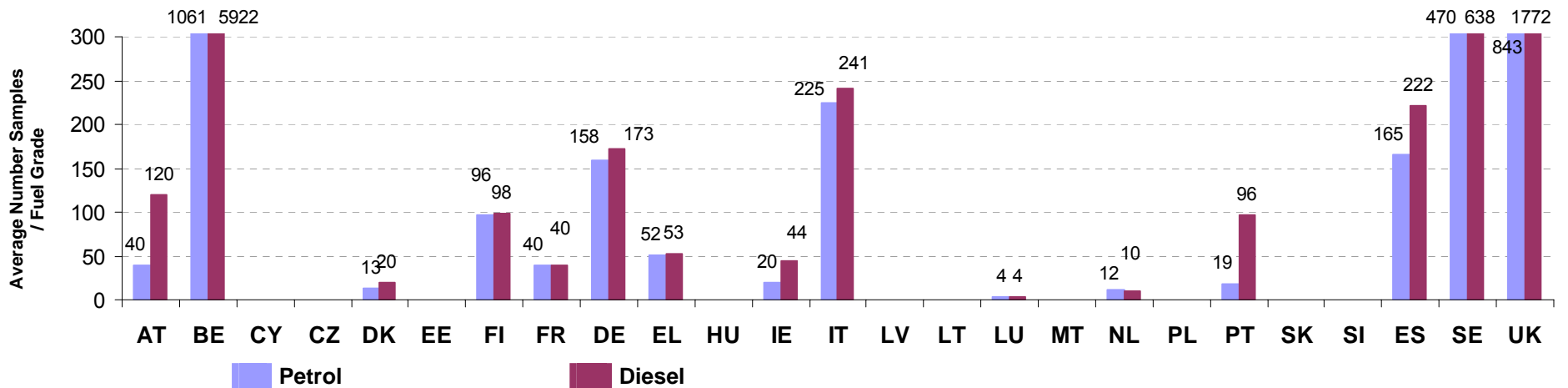


Figure 28.8: Fuel Quality Monitoring sampling rate across the EU in 2001 (average number of samples per fuel grade)





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

#### ***Petrol reporting***

In 2005, 17 of the Member States (8 of the EU15) reported at least one petrol sample that was non-compliant with Directive 98/70/EC. This is compared to 10 in 2001 and 9 in 2002 and 2003 from EU15 Member States and 13 EU MS in 2004 (6 of the EU15). Of these, the main parameters of concern were again research octane number (RON, 38 samples), summer vapour pressure (DVPE, 45 samples) and distillation - evaporation at 100/150°C (9 samples). Although many Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for the test methods) compared to previous years. However, several of the new EU10 Member States reported significant numbers of samples non-compliant with limit values. Belgium has reported a higher proportion of non-compliant samples than other Member States, but has improved compliance levels on previous years. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### ***Diesel reporting***

For diesel, 13 of the Member States (4 of the EU15) reported at least one sample that was non-compliant with Directive 98/70/EC. This is compared to 4 in 2001, 6 in 2002 and 5 in 2003 from EU15 Member States and 8 EU MS in 2004 (2 of the EU15). Of these, the parameters of concern were sulphur content (133 samples), distillation 95% point (54 samples), cetane number (6 samples) and density (5 samples). Although several Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for the test methods) compared to previous years. However, several of the new EU10 Member States reported significant numbers of samples non-compliant with limit values. Belgium has reported a higher proportion of non-compliant samples than other Member States, but has improved compliance levels on previous years. Sulphur content proved a particular problem for this year (mainly the new EU10), due to the new mandatory <50 ppm level from the start of 2005. Several of the new EU10 had problems with sales of higher sulphur grades early in the year, and there appeared to be a higher number of samples contaminated with higher sulphur diesel or gas oil than in previous years. The complete detailed reports on analysis submitted for each Member State are included in Appendix 3.

#### ***Overall Summary***

Table 28.4 summarises the compliance of Member States with Directive 98/70/EC for the year 2004 reporting in terms of the results of the analysis of samples against limit values and the reporting format and content. As in 2001 - 2004 the quality of the compliance assessment suffers in a few cases from incomplete information provided by Member States. Details of action taken with regard to limit value non-compliance by Member States are included where provided in the individual country chapters of this report.

In terms of compliance with Directive 98/70/EC, of the 24 reports received (France has again not submitted a report), 6 Member States are in complete compliance with limit values for both petrol and diesel for all samples (compared to 5 in 2001 for the EU15 and 11 in 2004 for EU25). Giving the benefit of doubt for measurement of oxygenates (for 7 Member States, see notes 4/5 of the table), 21 Member States also provided complete reporting across the range of parameters specified for monitoring in the Directive. Detail on specific non-compliances is provided in the individual country chapters and a new summary of temporal trends in compliance is provided in section 28.3.3.

The recent amendments to Directive 98/70/EC (Directive 2003/17/EC) included the insertion of a paragraph which states “Member States shall determine the penalties applicable to

*breaches of the national provisions adopted pursuant to this Directive. The penalties determined must be effective, proportionate and dissuasive.”* It is expected that the implementation of this requirement will have positive repercussions on compliance. Indeed the number of non-compliant samples has again in general decreased this year, however some of the new Member States again had a significant proportion of non-compliant samples in 2005. The percentage of non-compliant Belgian samples is also significantly higher than in other EU countries, though improved on previous years. This is the first year full information on the numbers of non-compliant samples was provided by Belgium.

**Table 28.4: Summary of Member State compliance with 98/70/EC for 2005 reporting.**

Member State	Limit value non-compliance <sup>(1)</sup> [95% confidence limits] (Non-compliant samples / Total samples]		Incomplete reporting [Number of parameters not measured / Total]		Late report (Due by 30/6/2006) <sup>(2)</sup>	Notes
	Petrol	Diesel	Petrol	Diesel		
Austria	4 / 205	3 / 100				
Belgium	232 / 4957	232 / 3748	1 / 18		<6 months	(3)
Cyprus		19 / 155	7 / 18		<1 month	(4)
Czech Republic	45 / 1381	64 / 1653				
Denmark						
Estonia	10 / 300	1 / 114			<4 months	(7)
Finland	2 / 257					
France					Not received	
Germany	6 / 543	1 / 240			<3 months	
Greece	1 / 289		6 / 18		<2 months	(4)
Hungary	7 / 120					
Ireland	3 / 118		6 / 18		<2 months	(5)
Italy	3 / 318	6 / 309				
Latvia	1 / 251	9 / 438			<1 month	(8)
Lithuania	8 / 192	20 / 268				
Luxembourg					<6 months	
Malta	13 / 51	23 / 31		1 / 5	<5 months	(9)
Netherlands	1 / 106					
Poland	16 / 392	15 / 204				
Portugal			7 / 18			(4) (6)
Slovakia	7 / 236	1 / 102				
Slovenia	22 / 136	25 / 152				
Spain					<1 month	
Sweden			6 / 18			(4)
UK					<3 months	
<b>No. Countries</b>	<b>17</b>	<b>13</b>	<b>6</b>	<b>1</b>	<b>12</b>	

**Notes:**

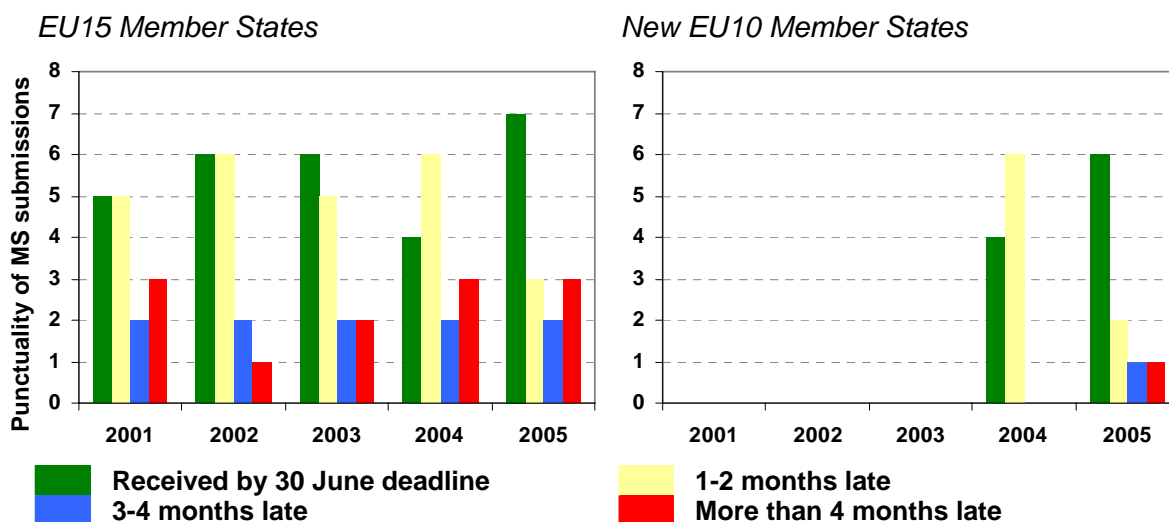
- (1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete. Where it has not been possible to establish from submissions the number of samples exceeding the limit value a '>' symbol indicates that the number of samples exceeding limits is a minimum and might be greater.
- (2) Directive 98/70/EC states that Member States should submit monitoring reports by no later than 30th June each year.
- (3) Oxygen content has not been reported
- (4) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported. However, in principle, all substances on the list are measured at once using the oxygenate test methods. However, the system has to be calibrated using a calibration sample, containing the same oxygenates in similar proportions as present in the sample under test. It is not clear in most cases, whether this has been carried out, however Portugal have stated no other oxygenates are added to the fuel. The total organically bound oxygen is calculated from the percentages by mass of the individual components after identification.
- (5) Oxygenates (other than ethers with more than 5 carbon atoms per molecule) have not been reported (see note 4 for more details).
- (6) Portugal also carried out no measurements on lead content this year.
- (7) Estonia also reported 5 samples of sulphur-free petrol and 4 samples of sulphur-free diesel that exceeded the 10ppm sulphur tolerance limits for this class of fuel in national specifications. These non-compliant samples are not included in the total as they are within the mandatory <50ppm limit value for petrol and diesel.
- (8) Quantities of regular diesel <350ppm appear to have been sold in Latvia in early 2005, in non-compliance with the <50 ppm limit value mandatory from start 2005.
- (9) Cetane index has been measured instead of Cetane number

## 28.3 Temporal trends

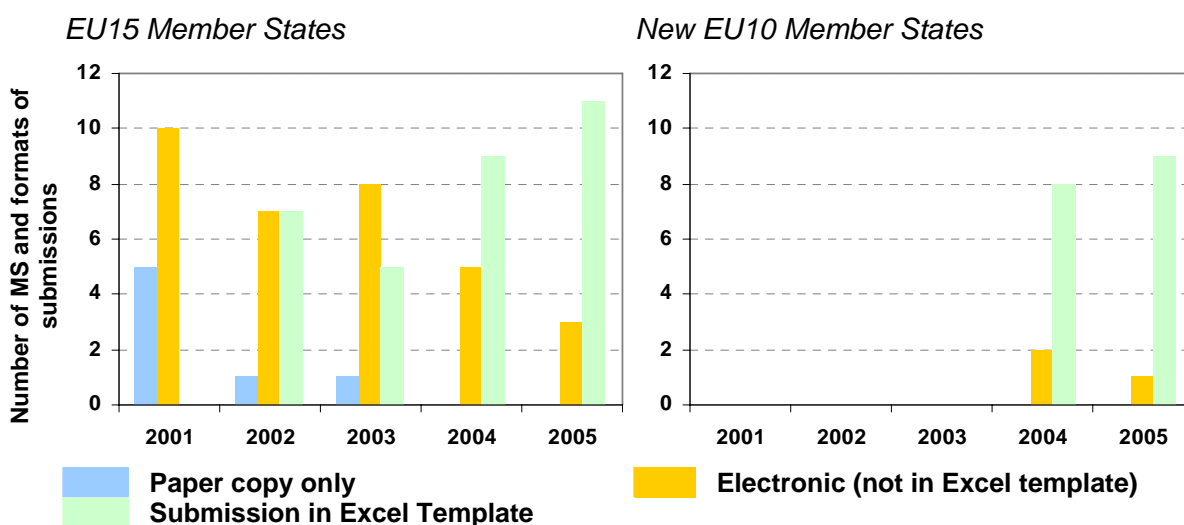
### 28.3.1 Sampling and reporting

The following figures provide a summary of the temporal trends in the sampling and reporting in the European Union. It can be seen in Figure 28.9 that whilst the numbers of Member States reporting on time has in general improved, a handful of Member States are still delivering very late, preventing timely completion of this summary report. Figure 28.10 shows that the number of Member States submitting in the Excel reporting template has also steadily improved, providing a greater level of consistency and enhancing both speed and accuracy in the evaluation of submissions. Figure 28.11 shows that the level of sampling and analysis is also improving.

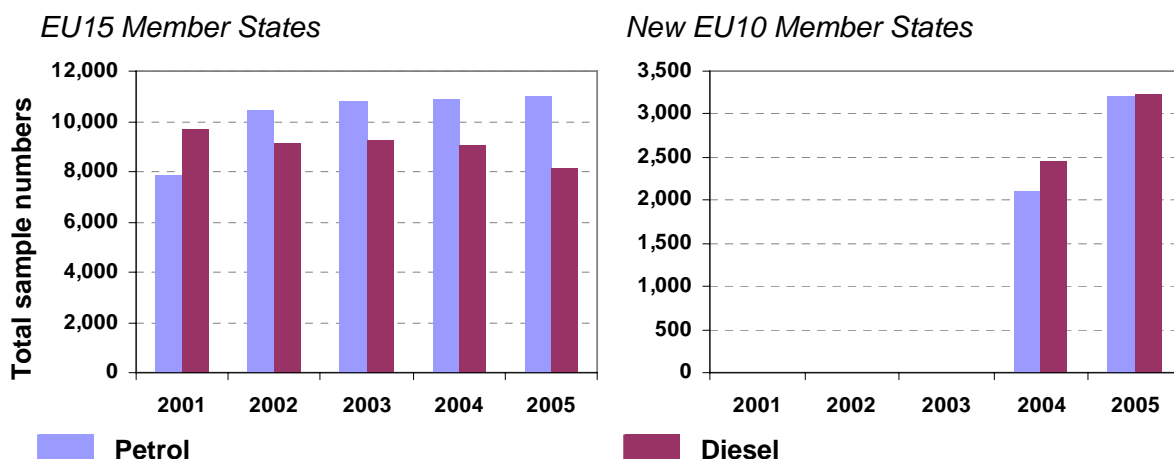
**Figure 28.9: Temporal trends in the punctuality of report submissions**



**Figure 28.10: Temporal trends in the format of Member State submissions**



**Figure 28.11: Temporal trends in the total number of petrol and diesel samples taken**



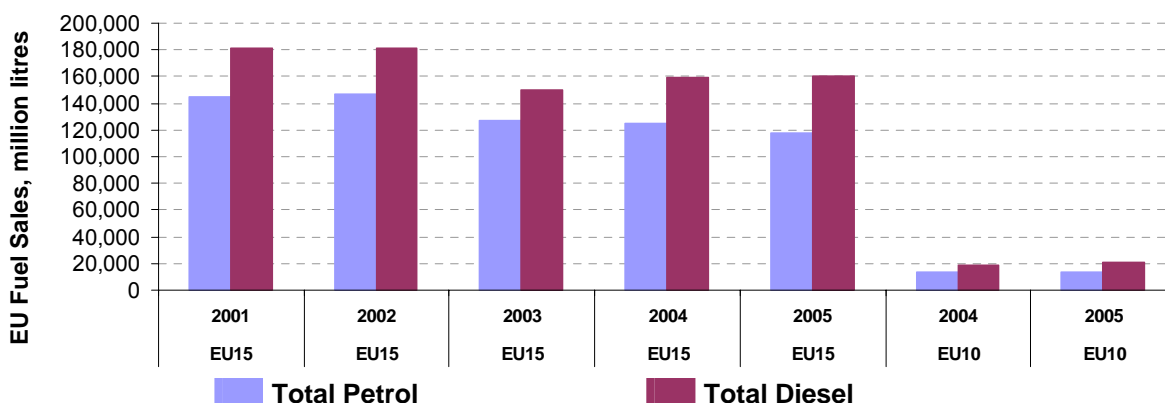
\* EU15 excludes France after 2002, which did not report in 2003-5.

### 28.3.2 Fuel sales and sulphur content

The following Figure 28.12 to Figure 28.14 show the trend in total fuel sales and low sulphur fuel sales as a proportion of total sales in the European Union. These exclude France in 2003 and 2004 (where no submissions are provided). Total sales of petrol and diesel remained approximately constant between 2001 and 2002 (increased 1% for petrol, decreased 0.5% for diesel). Total sales and then appear to dip in 2003, because France provided no data. Assuming similar sales in France as 2002, total petrol sales are again essentially unchanged in 2003, but there would be a 2% increase for diesel). Sales for 2004 show petrol +9% and diesel +18% compared to 2003. Sales for 2005 are down almost 5% for petrol and up by 2% for diesel, compared to 2004.

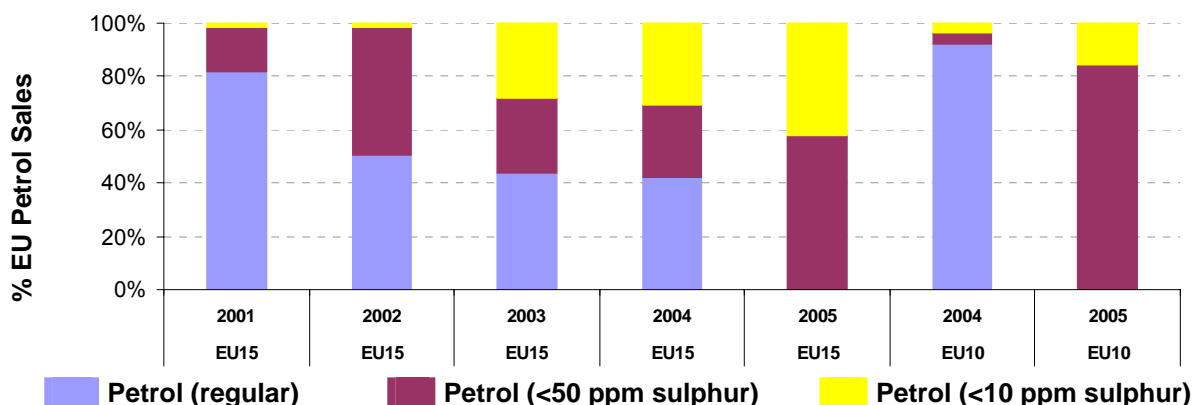
In the EU15 sales of low sulphur (<50 ppm) and sulphur-free (<10 ppm) petrol have changed from 28% each of total sales in 2003 to 27% and 31% respectively in 2004. Sales of low sulphur and sulphur free diesel have changed from 30% and 25% in 2003 to 32% and 28% in 2004. The limit for sulphur was <50ppm from 2005 and 42%, 33% of petrol and diesel sales respectively were sulphur-free fuels. Sales of low and sulphur-free petrol are much lower in the new EU10, comprising 15% and 4% of total sales respectively. The corresponding low sulphur and sulphur-free diesel figures for the EU10 are 11% and 12% respectively in 2005. Of petrol and diesel sales for the EU10 in 2005, 15.5% and 36% respectively were sulphur-free.

**Figure 28.12: Temporal trends in EU Sales of petrol and diesel (million litres)\***



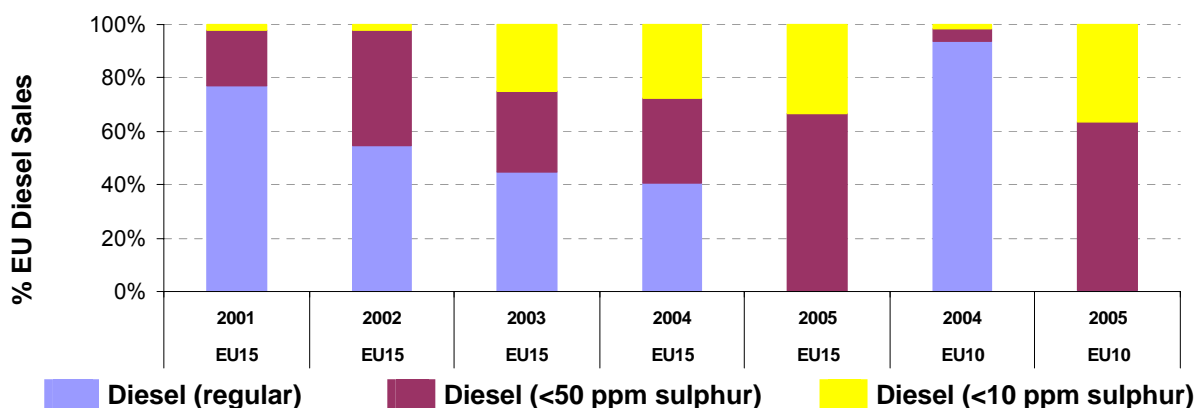
\* Excludes France in 2003 - 2005, as no submissions were provided.

Figure 28.13: Temporal trends in EU Sales of low sulphur petrol (%)\*



\* Excludes France in 2003 - 2005, as no submissions were provided.

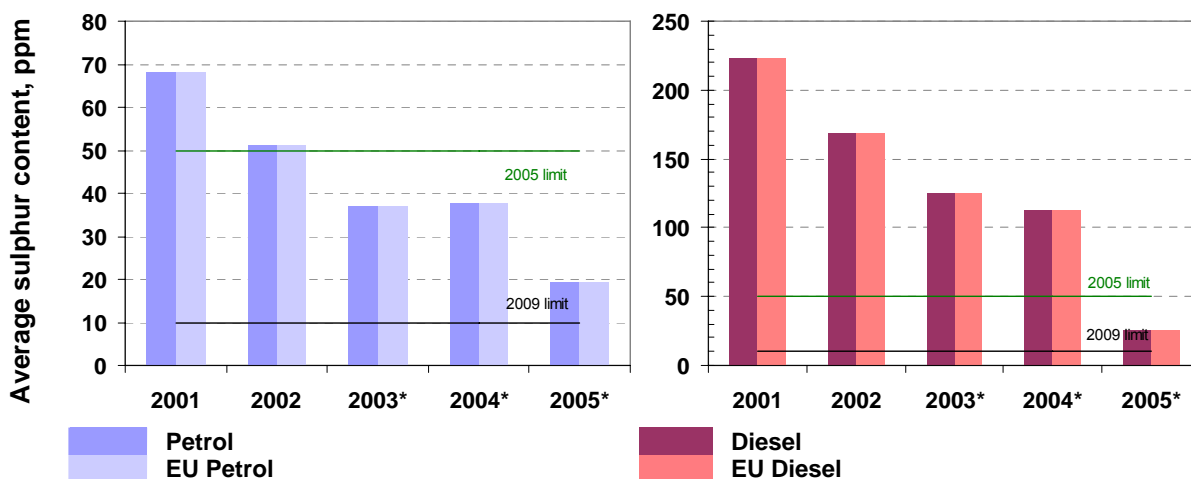
Figure 28.14: Temporal trends in EU Sales of low sulphur diesel (%)\*



\* Excludes France in 2003 - 2005, as no submissions were provided.

Figure 3.1 shows the trend in average sulphur content of petrol and diesel fuels (derived from sample analysis results and relative sales). The average sulphur content of both petrol and diesel fuels has decreased since 2001 with levels dropping significantly with the introduction of the mandatory <50 ppm limits for petrol and diesel and increased sales of sulphur-free fuels.

Figure 28.15: Temporal trends in the average sulphur content (in ppm) of petrol and diesel fuels in sample analysis results from annual monitoring



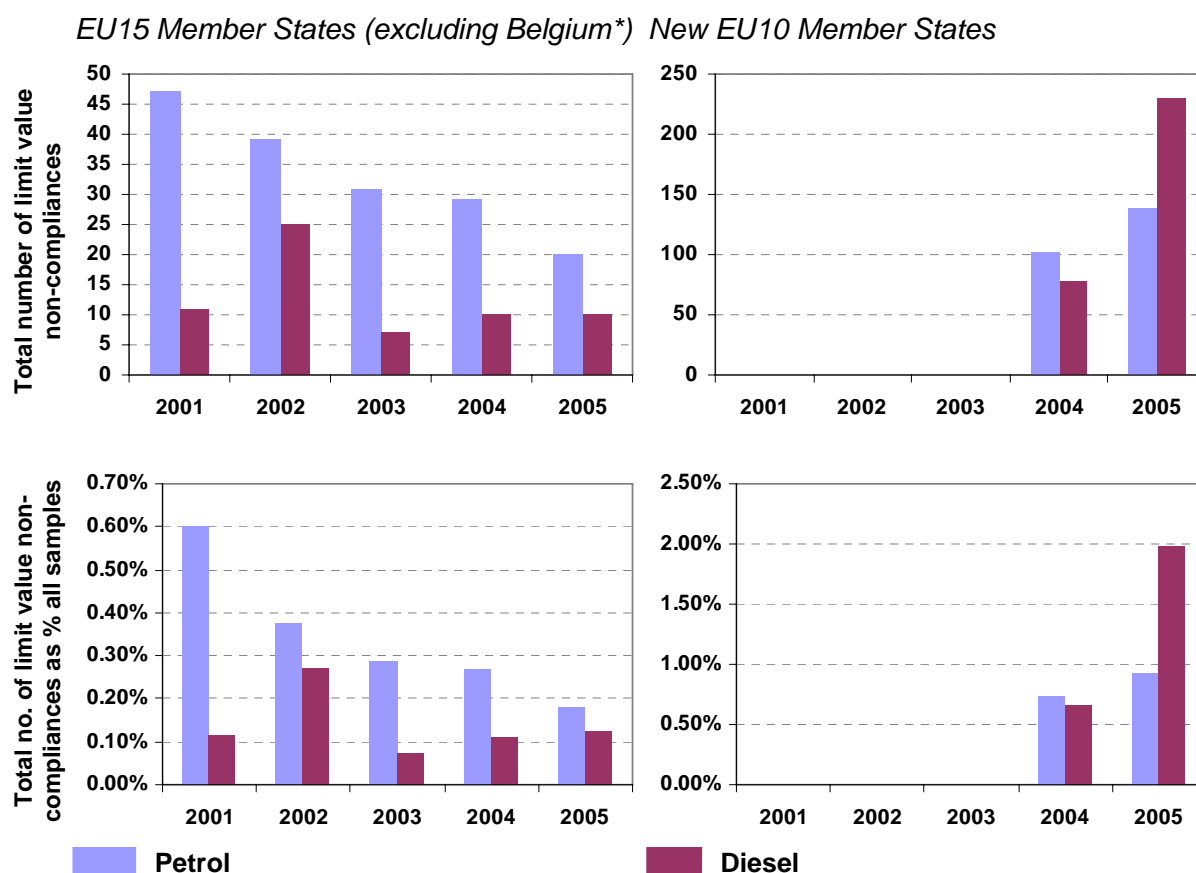
\* Excludes France in 2003 - 2005, as no report was submitted.

### 28.3.3 Compliance with limit values

The following Figure 28.16 to Figure 28.17 show the trends in the numbers of limit value non-compliances for petrol and diesel fuels in the European Union. Figures for Belgium are excluded, as the very high sampling rate (and consequent number of non-compliances) and proportion of non-compliant samples hides the underlying trend across the rest of the Member States. The figures show that in the EU15 the numbers and proportion of non-compliant samples is generally decreasing. There is a slight increase in the proportion of non-compliant diesel samples in 2005 due to increased numbers of sulphur limit non-compliances – most likely due to the introduction of the lower sulphur limit from the start of the year. Belgium reported a significantly higher proportion of non-compliant samples compared to other Member States at around 3.5% of all samples.

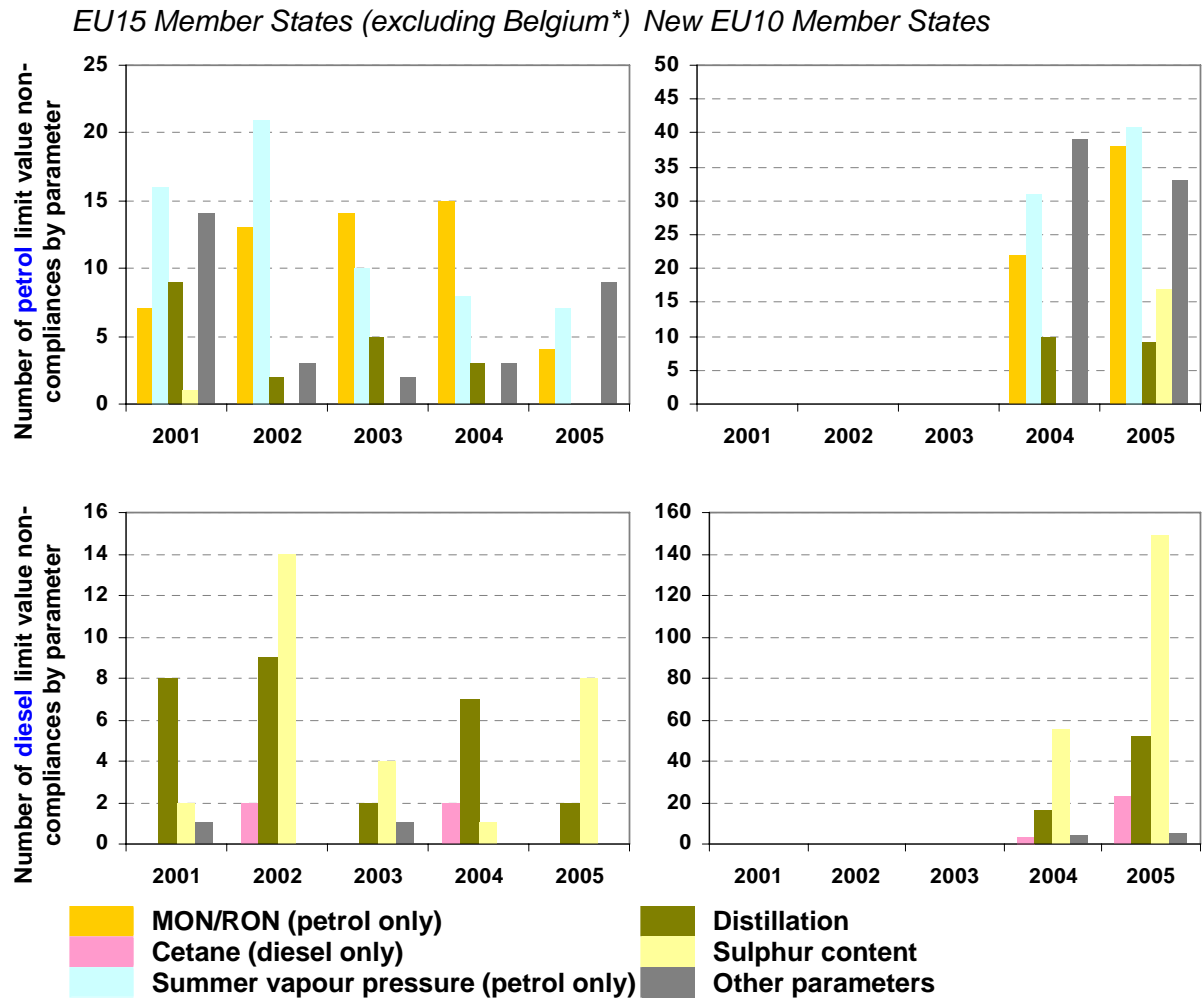
The proportion and actual numbers of non-compliances in the new EU10 are larger than in the EU15, with the majority of non-compliances from Czech Republic and Poland. The increase between 2004 and 2005 may be partly due to the fact that reporting for 2004 was only for May-December, and partly due to significantly increased sulphur limit breaches with the introduction of <50 ppm mandatory limit in 2005. Despite this there have actually been general improvements in this area from the EU10 Member States between 2004 and 2005.

**Figure 28.16: Temporal trends in total limit value non-compliances for petrol and diesel fuels**



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

**Figure 28.17: Temporal trends in numbers of samples exceeding limit values for specific petrol and diesel fuel parameters**



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

## 29 Discussion and Conclusion

### 29.1 Discussion

#### 29.1.1 2004 Reporting Submissions

##### *Completeness*

The original format for reporting agreed with Member States was officially established with 'Commission Decision 2002/159/EC of 18/02/2002 on the common format for the submission of summaries of national fuel quality data' (see Appendix 1). In this document it is specified that the first report must be submitted to the European Commission by 30th June 2002 in both paper and electronic formats.

In practice, many submissions received for 2001-2004 reporting were late, with the last received by the end of the year and a number of submissions were not sent in electronic format. In addition, a number of submissions were not entirely complete - the most common deficiency being lack of coverage of all specified fuel quality parameters. Some of these previous submissions also contained insufficient explanation and necessitated further communications with the designated national contact to obtain clarifications. This caused delays to the analysis and reporting for these years and complicated the establishment of compliance with the Directive in some cases.

Since then the completeness of submissions has considerably improved and all those for 2004 and 2005 reporting have been in electronic format. However, whilst most submissions for 2005 reporting were received by, or close to the 30th June deadline (and improved numbers since 2004), a number of Member States had still not reported well after this deadline. Submissions from Belgium, Luxemburg and Malta were received only in late November and December and 2005 sales data from Slovakia was also late. France has again not submitted a report in 2005.

Extended electronic reporting forms (in Microsoft Excel) were recommended, specified and improved in the 2001-2004 summary reports for the subsequent year's submissions in order to enhance the usefulness of information provided and facilitate more meaningful analysis. Most Member States have provided submissions in this format, even though not required to by the existing Commission Decision, again reducing the need for additional clarifications from Member States and facilitated report production. The numbers submitting in the Excel format is again improved since the previous year.

Responses have been received from most Member State contacts for most points of clarification regarding the submissions on 2005 monitoring. Cases of specific data gaps in violation of the Commission Decision have been outlined in the previous Member State sections, together with any clarifying information provided in response to queries.

One significant omission in most reports from Member States opting to use their own National Systems (as opposed to one based upon EN 14274<sup>24</sup>) is still an explanation of the reason for this decision and on the statistical confidence of their National System compared to EN 14274 specifications. Also Member States utilising EN14274 Statistical Model C should in future present a clear rationale for its use on the basis of both number of fuel

---

<sup>24</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).



sources/supply points and size/possibility of division of the territory into regions. This situation has unfortunately not improved since last years report.

### ***Fuel Quality Submission Database***

In addition to the preparation of this summary report, a Microsoft Access database was produced containing the basic reporting data and essential information provided by Member States. The database has been constructed to allow for easy input, storage/viewing of submission data, printable reports including both full reported data sets, as well as Member State and EU Summary Reports with a degree of basic analysis and graphical presentation of results and trends. It is anticipated that this database will again be made available to Member States and potentially the wider general public once the 2006 update is complete. In order to take full advantage of the functionality of the database it was also desirable for submissions to follow a more specific structured format in the future, which prompted the recommendation from the previous year's reports for submissions from Member States to be sent within an Excel template (as discussed in the previous section). Use of the template by the majority of Member States in 2006 submissions has facilitated accurate updating of the database for 2005 fuel quality.

### **29.1.2 Reporting Format**

It was clear from early reporting that there were number of areas where the reporting format outlined in Commission Decision 2002/159/EC could be improved. The new European Standard (EN 14274) is effective in addressing many of these issues (discussed in section 1.2.3) and agreement was reached on amendments to the reporting format in previous years. The common format for reporting from 2004 was developed in consultation with Member States and other stakeholders; the complete final version of the reporting format is provided in Appendix 4, with an Excel template based upon this sent to Member States by the EC earlier in the year. This process has reduced the need to return to Member States for clarifications or additional information (as discussed in the previous section) in many cases. However, information is still not always provided on non-compliances with limit values, and descriptions of the statistical confidence of National Systems in relation to EN 14274 requirements. Information in previous years was generally poor on the availability of sulphur-free fuels, discussed further in a later section, although it has improved significantly this year.

#### ***Reporting on distillation test analyses***

There has been difficulty in previous years in establishing compliance with distillation limit values, because the test reproducibility (determining the tolerance limits) varies according to each specific analysis. In some cases the individual test's reproducibility has not been available from Member States to confirm whether samples were compliant or not. This issue was raised at previous fuel quality expert meetings and in response CEN precision experts made an extensive analysis of large sets of distillation data of petrol and diesel deriving from national monitoring schemes. This analysis resulted in fixed precision statements (reproducibility) for the distillation characteristics reported in Directive 98/70/EC (4 %(V/V) for petrol distillation at 100°C and 150°C and 10°C for diesel distillation 95% point). CEN recommended in 2005 that these fixed precision statements should be implemented into the EU Fuel Quality Monitoring Submissions Reporting Template and be used to determine compliance where the reproducibility of a specific test is unavailable. This has resulted in clearer and more consistent reporting and evaluation of these test results.

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

From current indications there are still cases where <10 ppm fuels do not appear to be labelled in certain Member States. This is a problem as it significantly undermines the value of having meeting this criterion available - without labelling consumers have no possibility to

choose sulphur-free fuels, particularly important for owners of vehicles utilising technology that requires them. This lack of labelling could hamper the introduction of vehicles using technology requiring the fuels before full mandatory introduction in 2009. As a result the full potential offered for reductions in CO<sub>2</sub> from the road transport sector would not be realised.

Within current reporting requirements, where analyses for sulphur-free grades are not separated out, there will only be an indication of whether fuels comply with the <50 ppm limit value (mandatory from 2005). To give confidence that the fuels sold as sulphur-free comply with this specification it would be useful if Member States reported separately the sulphur content analyses carried out on them. Reporting provisions developed in the 2005 Excel Reporting Template aimed to encourage specific reporting of compliance with the <10 ppm limit value of fuels sold as sulphur-free. Most Member States have utilised this provision to provide separate data for sulphur-free fuels when reporting other parameters together with <50 ppm grades, giving greater assurance that these grades are indeed meeting the <10 ppm requirements.

More detail has also been provided this year by the majority of Member States on the availability of sulphur free fuels, although in some cases introduction has not included separate labelling (Belgium, Czech Republic, Ireland, Latvia, Luxemburg and Slovenia), or even has not yet begun (Cyprus, Malta and UK only). Member States with less than 60% sales of sulphur-free fuels have for the most part not provided information in any of the formats suggested in the Commission Recommendation (Appendix 5) for assessment on the geographical availability, with the exception of Greece (diesel only), Italy (the most comprehensive) and Portugal.

## 29.2 Conclusion and Recommendations

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

### Key Areas for Improvement

- 1) A small number of Member States (including Belgium, France, Luxembourg and the UK) are consistently submitting reports very late after the 30 June deadline each year, they are encouraged to report on time to avoid undermining the efforts of others in this regards.
- 2) Regarding monitoring system and reporting consistency with EN 14274 requirements:
  - a) Several Member States that state they are following EN 14274 requirements still are not providing separate reporting tables for Summer and Winter analyses.
  - b) Others do not fulfil sufficient sampling for all fuel grades (e.g. Netherlands) or are not sampling in sufficient numbers at refuelling stations (as opposed to depot/refinery).
  - c) Where Member States use their own National Systems rather than one based upon the European Standard, there needs to be a description of this system. This description should also provide an assessment that shows the monitoring system's equivalency in statistical confidence to EN 14274: 2003. This has *still* not been provided in most cases for 2004 or 2005 monitoring and needs to be provided in future.
  - d) Where EN 14274 Statistical Model C is used, Member States should present a clear rationale for its use on the basis of both number of fuel sources/supply points and country size /possibility of division of the territory into regions. For several Member

States using Model C (and not providing this information) there appears to be a good case on the basis of NUTS regional classification for instead using Model's A or B. These include Austria, Czech Republic, Hungary, Ireland and Slovakia.

- 3) In relation to the availability of sulphur free fuels, it is necessary for these fuels to be clearly labelled to ensure that the consumer has the opportunity to choose them. Belgium, Czech Republic, Ireland, Latvia, Luxemburg and Slovenia need to take action to ensure this in 2006 onwards. Reporting on this labelling could help the automotive industry gain confidence in their availability so that vehicles taking full advantage of the fuel are more widely introduced. The UK, Malta and Cyprus also still need to introduce <10ppm fuels.
- 4) It would also be valuable, for the Member States not already doing so, to report separately (to <50ppm fuels) the results of sulphur content analyses that were carried out on fuels sold as sulphur-free to further confirm their quality. These analyses need not be additional to existing sample analyses, but simply a subset of the existing total sampling and analysis requirement as part of their monitoring systems, as provided for in the Excel reporting template.
- 5) Significantly higher numbers /proportions of limit value non-compliances have been reported by a number of the EU10 Member States, indicating that more action is needed to ensure the quality of fuels in these countries. Belgium has provided more detail on the numbers of non-compliances this year, which are higher in proportion (at around 3.5% of all samples) than other Member States. Temporal information also provided indicates that in-roads are being made to reduce non-compliance, however.

Following the success of the Excel reporting templates, a revised template for reporting on 2005 monitoring was produced, taking into account additional standard test methods introduced in EN 228:2004 and EN 590:2004 and providing an additional line to allow for separate reporting on sulphur content analyses of samples from fuel sold as sulphur-free. This template has been updated/functional errors corrected for the next reporting round and the proposed 2006 template (presented in Appendix 6) will be sent to Member States. The use of the template should further assist Member States in their data reporting and again facilitate accurate data collation and analysis for the 2006 summary report.



# Appendices

## CONTENTS

Appendix 1	Commission Decision of 18/02/2002 on a common format for the submission of summaries of national fuel quality data – 2002/159/EC
Appendix 2	Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits
Appendix 3	Member State 2005 Fuel Quality Submission Tables
Appendix 4	Fuel Quality Monitoring Reporting Format for 2004 onwards
Appendix 5	Commission Recommendation 2005/27/EC
Appendix 6	2006 Excel Reporting Template



# **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 <sup>(1)</sup>, and in particular Article 8(3) thereof,

Whereas:

- (1) It is necessary for the Member States to monitor the quality of petrol and diesel fuels marketed in their territories in order to ensure compliance with the environmental specifications contained in Directive 98/70/EC and to ensure the effectiveness of measures to reduce atmospheric pollution caused by vehicles.
- (2) It is necessary to establish a common reporting format for the submission of fuel quality monitoring information in accordance with Article 8(3) of Directive 98/70/EC,

HAS ADOPTED THIS DECISION:

### *Article 1*

This Decision establishes a common format for the submission of national fuel quality data in accordance with Article 8 of Directive 98/70/EC.

### *Article 2*

Member States shall use the format set out in the Annex, when making their submission to the Commission.

### *Article 3*

This Decision is addressed to the Member States.

Done at Brussels, 18 February 2002.

*For the Commission*

Margot WALLSTRÖM

*Member of the Commission*

---

<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58.

## ANNEX

## ON A COMMON FORMAT FOR THE SUBMISSION OF SUMMARIES OF NATIONAL FUEL QUALITY DATA

## 1. INTRODUCTION

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC <sup>(1)</sup>, as last amended by Commission Directive 2000/71/EC <sup>(2)</sup>, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive. By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report must be made by 30 June 2002. The reporting format contained herein has been established by the European Commission in accordance with Article 8(3) of Directive 98/70/EC and this Decision.

## 2. DETAILS OF THOSE COMPILING THE FUEL QUALITY MONITORING REPORT

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

Reporting year	
Country	
Date report completed	
Institute responsible for report	
Address of institute	
Person responsible for report	
Telephone No:	
E-mail:	

## 3. DEFINITIONS AND EXPLANATION

*Parent fuel grade:* Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade:* Member States may, of course, define 'national' fuel grades which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, 50 ppm sulphur petrol, zero sulphur diesel, 50 ppm sulphur diesel, etc.

Zero sulphur or sulphur-free fuels are petrol and diesel fuels which contain less than 10 mg/kg (ppm) of sulphur.

## 4. DESCRIPTION OF FUEL QUALITY MONITORING SYSTEM

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

<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58.

<sup>(2)</sup> OJ L 287, 14.11.2000, p. 46.

## 5. TOTAL SALES OF PETROL AND DIESEL

Member States are requested to complete the following table detailing the quantities of each grade of petrol and diesel marketed in their territory.

Fuel grade	National sales total (litres/tonnes)
Regular unleaded petrol (minimum RON = 91) <sup>(1)</sup>	
Unleaded petrol (minimum RON = 95) <sup>(2)</sup>	
Unleaded petrol (minimum RON = 95 and less than 50 ppm sulphur) <sup>(2)</sup>	
Sulphur-free unleaded petrol (less than 10 ppm sulphur) <sup>(3)</sup>	
Unleaded petrol (95 ≤ RON < 98)	
Unleaded petrol (RON ≥ 98)	
Diesel fuel <sup>(4)</sup>	
Diesel fuel (less than 50 ppm sulphur) <sup>(5)</sup>	
Diesel fuel (less than 10 ppm sulphur) <sup>(6)</sup>	

<sup>(1)</sup> As specified in Annex I of Directive 98/70/EC.

<sup>(2)</sup> As specified in Annex III of Directive 98/70/EC.

<sup>(3)</sup> As specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10 ppm.

<sup>(4)</sup> As specified in Annex II of Directive 98/70/EC.

<sup>(5)</sup> As specified in Annex IV of Directive 98/70/EC.

<sup>(6)</sup> As specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10 ppm.

## 6. GEOGRAPHICAL AVAILABILITY OF SULPHUR-FREE FUELS

The Member States are requested to provide a description on the extent to which (i.e. geographic availability) sulphur-free fuels are marketed in their territory.

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)

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

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

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







## **Appendix 2:**

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



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

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

### Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Research Octane Number (RON) (RON 91 fuel only)	--	95		EN-ISO 5164	2005	0.7	94.6	
	--	91		EN-ISO 5164	2005	0.7	90.6	
Motor Octane Number (MON) (RON 91 fuel only)	--	85		EN-ISO 5163	2005	0.9	84.5	
	--	81		EN-ISO 5163	2005	0.9	80.5	
Vapour Pressure, DVPE								
--summer period (normal)	kPa		60	EN 13016-1	2000	3.0		61.8
--summer period (arctic or severe weather conditions)	kPa		70	EN 13016-1	2000	3.2		71.9
Distillation *								
--evaporated at 100°C	% (v/v)	46		EN-ISO 3405	2000	4.0*	43.6	
-- evaporated at 150°C	% (v/v)	75		EN-ISO 3405	2000	4.0*	72.6	
Hydrocarbon analysis								
-- Olefins	% (v/v)		18.0	ASTM D1319	95a	4.6		20.7
				EN 14517	2004	2.6		19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	95a	5.1		24.0
				EN 14517	2004	3.0		22.8
-- Aromatics	% (v/v)		42.0	ASTM D1319	95a	3.7		44.2
				EN 14517	2004	2.0		43.2
			35.0	ASTM D1319	95a	3.7		37.2
				EN 14517	2004	1.7		36.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.17		1.10
				EN 14517	2004	0.05		1.03
Oxygen content	% (m/m)		2.7	EN 1601	1997	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3	EN 1601	1997	0.4		3.2
-- Ethanol	% (v/v)		5	EN 1601	1997	0.3		5.2
-- Iso-propyl alcohol	% (v/v)		10	EN 1601	1997	0.9		10.5
-- Tert-butyl alcohol	% (v/v)		7	EN 1601	1997	0.6		7.4
-- Iso-butyl alcohol	% (v/v)		10	EN 1601	1997	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15	EN 1601	1997	1		15.6
-- other oxygenates	% (v/v)		10	EN 1601	1997	0.8		10.5
Oxygen content	% (m/m)		2.7	EN 13132	2000	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3.0	EN 13132	2000	0.3		3.2
-- Ethanol	% (v/v)		5.0	EN 13132	2000	0.4		5.2
-- Iso-propyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Tert-butyl alcohol	% (v/v)		7.0	EN 13132	2000	0.5		7.3
-- Iso-butyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15.0	EN 13132	2000	1		15.6
-- other oxygenates	% (v/v)		10.0	EN 13132	2000	0.8		10.5
Sulphur content	mg/kg		150	EN ISO 14596	1998	30		168
				EN ISO 8754	1995	CEN: Not suitable for fuels 150ppm and below***		
				EN 24260	1994	18.6		161
				EN ISO 20846	2004	25.6		165.1
				EN ISO 20847	2004	27.7		166.3
				EN ISO 20884	2004	15.9		159.4
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20		62
				EN ISO 8754	1995	CEN: Not suitable for fuels 150ppm and below***		
				EN 24260	1994	6.8		54
				EN ISO 20846	2004	9.7		55.7
				EN ISO 20847	2004	16.6		59.8
				EN ISO 20884	2004	7.9		54.7

## Petrol

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5		13
				EN 24260	1994	3.4		12
				EN ISO 20846	2004	2.7		11.6
				EN ISO 20884	2004	3.1		11.8
Lead content	g/l		0.005	EN 237	1996	0.002		0.0062
				EN 237	2004	0.00062		0.0054

\* R values and limits are fixed precision statements provided by CEN, to be used in the absence of specific values from Member States. Member States may use and report their own defined R depending on their testing conditions.

\*\*\*According to CEN/TR 15139: August 2005 - "Petroleum products and other liquids - Applicability of test methods on sulphur determination in petrol and diesel fuel", the test method EN ISO 8754 is not suitable for determining the sulphur content of petrol or diesel fuels at or below 150ppm and 350ppm, respectively. This is because the method does not comply with the tolerance limit guidance according to EN ISO 4259.

## Diesel

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproducibility, R	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Cetane number	--	51.0	--	EN-ISO 5165	1998	4.3		48.5
Density at 15°C	kg/m <sup>3</sup>		845	EN-ISO 3675	1998	1.2		845.7
				EN ISO 12185	1996	0.5		845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	1988	10.0*		365.9
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50.0		379.5
				EN 24260	1994	42.4		375.0
				EN ISO 20846	2004	40.0		373.6
				EN ISO 20847	2004	17.9		360.6
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 20884	2004	30.9		368.2
				EN ISO 14596	1998	20.0		62
				EN 24260	1994	6.8		54.0
				EN ISO 20846	2004	6.7		54.0
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 20847	2004	12.8		57.6
				EN ISO 20884	2004	7.9		54.7
				EN ISO 14596	1998	5.0		13.0
				EN 24260	1994	3.4		12.0
				EN ISO 20846	2004	2.2		11.3
				EN ISO 20884	2004	3.1		11.8

# **Appendix 3: 2005 Member State Fuel Quality Submission Tables**

## **CONTENTS**

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



## Introduction to Appendix 3 Reporting Tables

The following tables represent the output from the Fuel Quality Summary database, produced as part of this work.

### Notes 1:

Where Member States have reported that parameter values are below the limit of detection for a particular test method (e.g. "<X"), these have been entered in the Microsoft Access database as "0" (and hence the tables in this Appendix), with a footnote in the notes accompanying the analysis table stating that the limit of detection for the specific test method is "X"(and therefore values reported as "0" will fall into the range "0 – X").

### Notes 2:

In cases where separate reporting tables for summer and winter period sampling were provided, data were combined in the following manner for each of the parameters for the full-year dataset:

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

Minimum: the lowest of the two values;

Maximum: the highest of the two values;

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

Where:

N = total number of samples

$m_1$  = mean data set 1,  $m_2$  = mean data set 2

$n_1$  = no. samples in data set 1,  $n_2$  = no. samples in data set 2

In accordance with:

Mean = sum of sample values / number of samples





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

Country: Austria  
 Year: 2005  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	91.3	95.9	93.154	1.003709447	91	0	91	--
MOTOR OCTANE NO.	--	50	80.9	85.4	83.31	0.804388474	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	51.8	62.4	58.196	1.881701358	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	50.9	59.9	54.396	1.918753847	46	71	46.0	--
evaporated at 150	%(v/v)	50	78.8	94.7	84.836	3.160583775	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	3.9	14.7	10.506	2.268093688	0	0	--	21.0
aromatics	%(v/v)	50	28.9	35	33.134	1.152744728	0	0	--	35.0
benzene	%(v/v)	50	0.52	0.98	0.8188	0.106744784	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0	1.7	0.226	0.325018053	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	9.37	1.2238	1.835822554	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	0.5	7.989565764	4.979219302	1.489992777	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable.

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

Country: Austria  
 Year: 2005  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	91.2	95.9	92.796	0.776691045	91	0	91	--
MOTOR OCTANE NO.	--	50	82.5	84.9	83.508	0.502581093	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	64.1	89.1	78.366	7.15155499	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	50	65.5	55.772	3.448634157	46	71	46.0	--
evaporated at 150	%(v/v)	50	80	93.7	85.712	3.475549582	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	3.9	16.3	11.69	2.682920279	0	0	--	21.0
aromatics	%(v/v)	50	28.5	34.4	32.294	1.453975549	0	0	--	35.0
benzene	%(v/v)	50	0.6	0.94	0.7964	0.065145363	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0	0.5	0.178	0.128237662	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	2.96	0.8804	0.764340345	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	3	8.707080664	5.589147146	1.576884794	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable.

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

Country: Austria  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s)  
 National Fuel Grade Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	91.2	95.9	93				91	--
MOTOR OCTANE NO.	--	100	80.9	85.4	83.4				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	100	51.8	89.1	68.3				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	50	65.5	55.1				46.0	--
evaporated at 150	%(v/v)	100	78.8	94.7	85.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	3.9	16.3	11.1				--	21.0
aromatics	%(v/v)	100	28.5	35	32.7				--	35.0
benzene	%(v/v)	100	0.52	0.98	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1.7	0.2				--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0				--	3
Ethanol	%(v/v)	100	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0	9.37	1.1				--	15
Other oxygenate	%(v/v)	100	0	0	0				--	10
SULPHUR CONTENT	mg/kg	100	0.5	8.707080664	5.3				--	50
LEAD CONTENT	g/l	100	0	0	0				--	0.005

Notes:

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

Country: Austria  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	95	96.8	95.9	0.351416957	91	0	95	--
MOTOR OCTANE NO.	--	50	85	86	85.446	0.231419753	82.5	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	53.9	60.9	58.176	1.275284682	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	49.3	60.8	55.356	2.512999671	46	71	46.0	--
evaporated at 150	%(v/v)	50	79.2	91	85.466	2.433156177	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	3.7	12.4	9.456	2.154365288	0	0	--	18.0
aromatics	%(v/v)	50	32.7	36.5	33.776	0.826489996	0	0	--	35.0
benzene	%(v/v)	50	0.55	0.98	0.6716	0.098589232	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.3	1.7	0.916	0.343071362	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	1.41	9.34	4.9554	1.92281385	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	1.376490084	11.13242725	4.390299572	1.947302785	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable.

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

Country: Austria  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	95.3	96.3	95.948	0.287309831	91	0	95	--
MOTOR OCTANE NO.	--	50	82.8	86.4	85.528	0.481934876	82.5	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	50	62.1	89.3	79.428	6.566956242	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	50.9	61.9	56.322	2.629447835	46	71	46.0	--
evaporated at 150	%(v/v)	50	80.5	92.4	86.118	2.956879905	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	4.9	15.5	12.13	2.707755302	0	0	--	18.0
aromatics	%(v/v)	50	30.7	34.6	32.964	0.968432354	0	0	--	35.0
benzene	%(v/v)	50	0.54	0.88	0.698	0.073456915	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0	1.7	0.562	0.377905074	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	9.14	2.982	2.131361546	0	0	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	50	2.522085287	17.92049054	5.396659437	2.602329337	0	0	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable.

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

Country: Austria  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Super

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	95	96.8	95.9				95	--
MOTOR OCTANE NO.	--	100	82.8	86.4	85.5				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	100	53.9	89.3	68.8				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	49.3	61.9	55.8				46.0	--
evaporated at 150	%(v/v)	100	79.2	92.4	85.8				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	3.7	15.5	10.8				--	18.0
aromatics	%(v/v)	100	30.7	36.5	33.4				--	35.0
benzene	%(v/v)	100	0.54	0.98	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	100	0	1.7	0.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0	0				--	3
Ethanol	%(v/v)	100	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	0	9.34	4				--	15
Other oxygenate	%(v/v)	100	0	0	0				--	10
SULPHUR CONTENT	mg/kg	100	1.376490084	17.92049054	4.9				--	50
LEAD CONTENT	g/l	100	0	0	0				--	0.005

Notes:

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

Country: Austria  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	98.3	100.4	99.26	0.904433524	98	0	95	--
MOTOR OCTANE NO.	--	5	88.1	88.9	88.48	0.303315018	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	66.5	79.9	73.12	5.957935884	60	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	5	56.5	64.1	61.38	2.876108482	46	71	46.0	--
evaporated at 150	%(v/v)	5	89	90.3	89.6	0.504975247	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	5	5.5	12.6	10.2	2.935132024	0	0	--	18.0
aromatics	%(v/v)	5	32	34.9	33.46	1.215730233	0	0	--	35.0
benzene	%(v/v)	5	0.37	0.73	0.602	0.146013698	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	5	1.9	2.5	2.34	0.250998008	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	5	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	5	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	5	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	5	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	5	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	5	10.29	13.63	12.712	1.391301549	0	0	--	15
Other oxygenate	%(v/v)	5	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	5	2.759702926	7.966892238	4.235402243	2.150954843	0	0	--	50
LEAD CONTENT	g/l	5	0	0	0	0	0	0	--	0.005

Notes: All parameters were tested. Empty cells represent that the substance was not detectable.

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

Country: Belgium  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95 octane (Eurosuper)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2616	91.6	99.7	96.46	0.6828	95	0	95	--
MOTOR OCTANE NO.	--	83	83.4	86.5	85.37	0.5758	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	1244	53.9	84.8	58.1	2.0917	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2624	38.1	91	54.3	3.5813	46	0	46.0	--
evaporated at 150	%(v/v)	2624	66.1	97	87.54	2.4864	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2600	1	21	11.81	3.6247	0	18	--	18.0
aromatics	%(v/v)	2600	21.4	42.8	32.42	2.4017	0	42	--	35.0
benzene	%(v/v)	104	0.4	0.9	0.69	0.1186	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2624	0	0.7	0	0	0	3	--	3
Ethanol	%(v/v)	2624	0	1.2	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2624	0	8.4	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	2624	0	2	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	2624	0	10.1	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2624	0	14	0	0	0	15	--	15
Other oxygenate	%(v/v)	2624	0	4.6	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	104	3	72.3	15.05	11.8	0	50	--	50
LEAD CONTENT	g/l	0	0	0.005	0	0	0	0.005	--	0.005

**Notes:** 92 samples were non-compliant with limit values, of which 2 related to distillation, 9 to RON, 7 to MON and 2 to sulphur. 85 were non-compliances with summer vapour pressure. There were 92 samples non-conformity on a total of 2630 samples (thus 3,50% of the taken samples were not in conformity with the standards). 2 presented anomalies with regard to distillation, 9 were not lawful on the point of the 7 sample, octane number RON with regard to the octane number MY. In addition, there was 1 infringement concerning the sulphur content. 85 samples had negative results at the level of the vapour pressure. This figure is appreciably higher than for the previous year (44 infringements). These infringements are mainly due to the mixture of winter quality and quality be and are generally noted in the small stations with low flow. In 2006, Fapetro will endeavour to find a solution with this problem (see program of work 2006).



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

Country: Belgium  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 98 octane

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2300	93.6	100.7	99.1	0.5882	95	0	95	--
MOTOR OCTANE NO.	--	96	84.5	88.8	87.77	0.9104	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	911	17.4	83.5	58.2	3.2985	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2311	34.5	65	52.89	3.4592	46	0	46.0	--
evaporated at 150	%(v/v)	2311	59.3	97.9	87.74	2.8284	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2289	9.7	18	7.03	2.549	0	18	--	18.0
aromatics	%(v/v)	2289	19.3	38.1	30.77	2.6706	0	35	--	35.0
benzene	%(v/v)	125	0.3	0.8	0.55	0.1074	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2316	0	0.5	0	0	0	3	--	3
Ethanol	%(v/v)	2316	0	0.5	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	2316	0	2	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	0	0	9.5	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	0	0	1.4	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	15	0	0	0	15	--	15
Other oxygenate	%(v/v)	0	0	2.1	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	125	3	138	12.95	15.18	0	50	--	50
LEAD CONTENT	g/l	49	0	0.005	0	0	0	0	--	0.005

Notes: Pour la teneur en plomb les valeurs sont inférieures 0.1 et 0.5 mg/kg le minimum et le maxiFor super + the 50 S, there were only 114 infringements on a total of 2327 samples (either 4.90% of anomalies). They were the following infringements: - 79 concerning the vapour pressure; - 17 for the octane number RON; - 26 for the octane number MY; - 18 relating to distillation; - 1 as for the physical aspect. Here also, they are especially infringements in the field of the vapour pressure, which are also due to the passage of winter quality to summer. The infringements relating to the octane number are probably due to the addition of manganese.mum. 114 samples were non-compliant with limit values, of which 18 related to distillation, 17 to RON, 26 to MON. 79 were non-compliances with summer vapour pressure.

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

Country: Cyprus  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Unleaded RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	78	94.8	97.4	95.9	0.48	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	34	51.9	60	55.7	2.6	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	77	46	61	53	3	0	0	46.0	--
evaporated at 150	%(v/v)	77	76	90	83	4	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	34	8.2	18.1	15.1	2.1	0	0	--	18.0
aromatics	%(v/v)	34	29.5	35.7	33.3	1.4	0	0	--	35.0
benzene	%(v/v)	34	0.4	1	0.6	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	34	0.5	1.7	1.1	1.1	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)	34	2.6	9.2	5.3	2.6	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	52	21	49	30	6	0	50	--	50
LEAD CONTENT	g/l	34	0.002	0.003	0.002	0.0005	0	0.005	--	0.005

Notes:

0

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

Country: Cyprus  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	67	95.3	98.6	98.1	0.5	95	0	95	--
MOTOR OCTANE NO.	--	0	0	0	0	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	32	49.5	61.7	56.6	1.8	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	67	50	58	55	2	46	71	46.0	--
evaporated at 150	%(v/v)	67	79	204	100	37	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	36	10.9	16.6	13.1	1.7	0	18	--	18.0
aromatics	%(v/v)	36	33.9	36	35.1	0.5	0	35	--	35.0
benzene	%(v/v)	36	0.3	1	0.8	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	36	1.6	2.2	2	0.1	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)	36	9.1	12.4	11.7	0.6	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	43	18	43	26	8	0	50	--	50
LEAD CONTENT	g/l	36	0.002	0.003	0.002	0.0005	0	0.005	--	0.005

Notes:

0

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

Country: Czech Republic  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Normal BA-91, Speciál BA-91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	297	88.3	99.7	93.4	1.2	91	0	91	--
MOTOR OCTANE NO.	--	297	81.5	92.5	83.7	1	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	191	51	72.1	59.5	7.8	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	297	47	70.8	52.8	2.8	0	0	46.0	--
evaporated at 150	%(v/v)	297	75.5	90.4	79.3	2.6	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	230	1	17.5	9.2	3.4	0	0	--	21.0
aromatics	%(v/v)	230	21.4	37	32.4	2.3	0	35	--	35.0
benzene	%(v/v)	230	0.26	1.07	0.54	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	297	0	7.7	0.3	0.6	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	297	0	0.2	0	0	0	0	--	3
Ethanol	%(v/v)	297	0	19	0.1	1.2	0	0	--	5
Iso-propyl alcohol	%(v/v)	297	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	297	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	297	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	297	0	11	1.7	1.9	0	0	--	15
Other oxygenate	%(v/v)	297	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	230	4	106	30.8	19	0	0	--	50
LEAD CONTENT	g/l	230	0	0	0	0	0	0	--	0.005

Notes: See other notes.

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

Country: Czech Republic  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super BA-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	1072	80.8	100.1	95.7	1.1	0	0	95	--
MOTOR OCTANE NO.	--	1072	77.4	94.9	85.2	0.7	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	591	33.2	61.9	59.8	5.9	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	1072	45.6	91	52.9	3.5	0	0	46.0	--
evaporated at 150	%(v/v)	0	73	90.9	79.4	2.8	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	804	0.7	20.6	9.5	3.8	0	0	--	18.0
aromatics	%(v/v)	804	18.7	43.9	33	1.8	0	35	--	35.0
benzene	%(v/v)	1072	0.18	2.9	0.5	0.14	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	1072	0	9.4	1.1	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	1072	0	2.2	0	0.1	0	0	--	3
Ethanol	%(v/v)	1072	0	23.9	0.1	1.3	0	0	--	5
Iso-propyl alcohol	%(v/v)	1072	0	0.8	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	1072	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	1072	0	1.7	0	0.1	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	1072	0	13.7	5.9	3	0	0	--	15
Other oxygenate	%(v/v)	1072	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	804	3	81	27.2	16.6	0	0	--	50
LEAD CONTENT	g/l	804	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Czech Republic  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	97.9	100.2	98.8	0.7	98	0	95	--
MOTOR OCTANE NO.	--	12	87.5	88.5	88.1	0.3	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	8	52.8	61.8	59.2	6.5	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	12	45.7	63.1	56.2	5.8	0	0	46.0	--
evaporated at 150	%(v/v)	12	77.5	90.2	84.2	4.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	11	0.7	8.7	5.1	2.6	0	0	--	18.0
aromatics	%(v/v)	11	29.8	36.2	34.3	1.9	0	35	--	35.0
benzene	%(v/v)	12	0.38	0.6	0.48	0.06	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	12	1.35	2.48	2.2	0.3	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	12	0	0.1	0.01	0.03	0	0	--	5
Iso-propyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	7.3	13.7	12.2	1.6	0	0	--	15
Other oxygenate	%(v/v)	12	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	11	3	13	5.8	3.1	0	0	--	50
LEAD CONTENT	g/l	11	0	0	0	0	0	0	--	0.005

Notes: All of 12 samples were OK.

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

Country: Denmark  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s  
 National Fuel Grade RON 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	92	95.2	93.6	2.3	0	0	91	--
MOTOR OCTANE NO.	--	2	84	84.2	84.1	0.1	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	64.7	68.8	66.2	2.3	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	51.9	61.9	57.8	3.3	0	0	46.0	--
evaporated at 150	%(v/v)	6	85.3	91.6	88.4	2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	1.7	10.2	5	3.1	0	0	--	21.0
aromatics	%(v/v)	6	27.9	35	31	2.7	0	0	--	35.0
benzene	%(v/v)	6	0.5	1	0.7	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	0	0.3	0.2	0.1	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	6	2	4.8	3.6	1.3	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes: The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for Other oxygenates is 0.3%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for sulphur content is 2mg/kg, and therefore values reported as 0 will fall into the range 0-2mg/kg. The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.

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

Country: Denmark  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade RON 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	94.7	95.2	95	0.4	0	0	95	--
MOTOR OCTANE NO.	--	2	86.1	86.5	86.3	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	15	63.5	70	66.2	1.9	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	30	51.1	65.8	55.34333333	3.542129044	0	0	46.0	--
evaporated at 150	%(v/v)	30	82.4	94.3	89.63666667	2.665162651	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	30	0.4	11.8	4.573333333	3.954563783	0	0	--	18.0
aromatics	%(v/v)	30	29.5	34.6	32.30667	1.554733225	0	0	--	35.0
benzene	%(v/v)	30	0.4	1	0.7	0.148556271	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	30	0	1	0.1	0.2	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	30	0	4.9	2.21	1.85013513	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes: The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for Other oxygenates is 0.3%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for sulphur content is 2mg/kg, and therefore values reported as 0 will fall into the range 0-2mg/kg. The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.



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

Country: Denmark  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade RON 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	98	98	98	0	0	0	95	--
MOTOR OCTANE NO.	--	2	87.5	87.8	87.7	0.2	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	2	66.1	68.5	67.3	1.7	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	4	56.4	60.9	59.3	2	0	0	46.0	--
evaporated at 150	%(v/v)	4	90.6	93.4	92.2	1.2	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	4	0.3	2.9	1.4	1.1	0	0	--	18.0
aromatics	%(v/v)	4	29	33.5	31.5	2.3	0	0	--	35.0
benzene	%(v/v)	4	0.7	1	0.9	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	2	2.2	2.5	2.4	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	2	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	11.7	13.6	12.8	0.9	0	0	--	15
Other oxygenate	%(v/v)	2	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	4	0	8.3	2.1	4.2	0	0	--	50
LEAD CONTENT	g/l	2	0	0	0	0	0	0	--	0.005

Notes: The limit of detection for Oxygenates is 0.1%(v/v), and therefore values reported as 0 will fall into the range 0-0.1 %(v/v). The limit of detection for Other oxygenates is 0.3%(v/v), and therefore values reported as 0 will fall into the range 0-0.5 %(v/v). The limit of detection for sulphur content is 2mg/kg, and therefore values reported as 0 will fall into the range 0-2mg/kg. The limit of detection for lead content is 0.002g/l, and therefore values reported as 0 will fall into the range 0-0.002g/l.

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

Country: Estonia  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade RON91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	66	91.8	93.9	92.8	0.5	0	0	91	--
MOTOR OCTANE NO.	--	66	81.9	84.6	83.1	0.6	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	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)	66	7.3	14.7	12	2.1	0	0	--	21.0
aromatics	%(v/v)	0	0	0	0	0	0	0	--	35.0
benzene	%(v/v)	0	0	0	0	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	0	0	0	0	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	300	4	46	19.84533333	8.445448478	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes: \* National specification for winter period minimum 65,0 kPa - maximum 95,0 kPa (EVS-EN 228:2004);

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

Country: Estonia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade RON91, RON95, RON98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	234	94.8	100	96.7	1.4	0	0	95	--
MOTOR OCTANE NO.	--	234	84.6	88.9	86.8	1.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	150	55.9	83.8	72.3	4.2	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	257	43.6	59.2	52.6	4.1	0	0	46.0	--
evaporated at 150	%(v/v)	257	81.3	89.4	85.3	1.3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	220	0.8	16.5	9.9	3.7	0	0	--	18.0
aromatics	%(v/v)	286	25.4	40.4	31.1	1.9	0	0	--	35.0
benzene	%(v/v)	261	0.1	0.6	0.32	0.18	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	300	0.1	2.6	1.7	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	300	0.1	0.8	0.1	0	0	0	--	3
Ethanol	%(v/v)	300	0.1	0.3	0.1	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	300	0.1	1.7	0.1	0.1	0	0	--	10
Tetro-butyl alcohol	%(v/v)	300	0.1	0.7	0.1	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	300	0.1	0.3	0.1	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	300	0.1	14.4	8	4	0	0	--	15
Other oxygenate	%(v/v)	300	0.1	0.2	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	300	4	46	19.84533333	8.445448478	0	0	--	50
LEAD CONTENT	g/l	300	0	0.007	0	0	0	0	--	0.005

Notes: \* National specification for winter period minimum 65,0 kPa - maximum 95,0 kPa (EVS-EN 228:2004); The limit of detection for lead is 0.003g/l, and therefore values reported as 0 will fall into the range 0-0.003g/l.

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

Country: Finland  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	17	95.1	96.5	95.7	0.4	0	0	95	--
MOTOR OCTANE NO.	--	17	85.3	86.2	85.8	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	49	61.5	70.1	67.2	1.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	49	45.1	62.3	54.3	4.7	0	0	46.0	--
evaporated at 150	%(v/v)	49	80	91.1	86	3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	49	4.9	10.6	6.9	1.3	0	0	--	18.0
aromatics	%(v/v)	49	22	35	28.1	3.7	0	0	--	35.0
benzene	%(v/v)	49	0.4	1	0.7	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	49	1.9	2.5	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	49	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	49	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	49	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	49	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	49	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	49	11	14.4	12.2	0.8	0	0	--	15
Other oxygenate	%(v/v)	49	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	49	6.8	9.8	8.3	0.7	0	0	--	50
LEAD CONTENT	g/l	49	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN3: The highest DVPE value 70,1 kPa is above the maximum limiting value 70,0 kPa but within the maximum tolerance limit 71,9 kPa. FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The lowest distillation value at 100 C 44,1 % (v/v) is below the minimum limiting value 46,0 % (v/v) but within the minimum tolerance limit 43,6 % (v/v).

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

Country: Finland  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	94.5	96.2	95.3	0.7	0	0	95	--
MOTOR OCTANE NO.	--	10	85.3	86.1	85.7	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	61	44.1	65.7	54.8	6.2	0	0	46.0	--
evaporated at 150	%(v/v)	61	76.7	90.5	84.7	3.8	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	61	4.3	9.7	6.6	1	0	0	--	18.0
aromatics	%(v/v)	61	20.8	35.2	27.6	4.2	0	0	--	35.0
benzene	%(v/v)	61	0.4	1	0.7	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	61	1.9	2.4	2.1	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	61	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	61	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	61	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	61	10.6	14.1	12.1	0.9	0	0	--	15
Other oxygenate	%(v/v)	61	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	61	6.1	11.3	8.3	1.2	0	0	--	50
LEAD CONTENT	g/l	61	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN3: The highest DVPE value 70,1 kPa is above the maximum limiting value 70,0 kPa but within the maximum tolerance limit 71,9 kPa. FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The lowest distillation value at 100 C 44,1 % (v/v) is below the minimum limiting value 46,0 % (v/v) but within the minimum tolerance limit 43,6 % (v/v). FN6: The highest aromatics content 35,2 % (v/v) is above the maximum limiting value 35,0 % (v/v) but within the maximum tolerance limit 37,2 % (v/v). FN7: The highest sulphur content 11,3 mg/kg is above the maximum limiting value 10,0 mg/kg but within the maximum tolerance limit 11,6 mg/kg. FN8: The highest ethers content 15,1 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v). FN9: There is no analytical reason for exceeded value.

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

Country: Finland  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	27	94.5	96.5	95.6	0.5	0	0	95	--
MOTOR OCTANE NO.	--	27	85.3	86.2	85.8	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	49	61.5	70.1	67.2	1.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	110	44.1	65.7	54.6	5.6	0	0	46.0	--
evaporated at 150	%(v/v)	110	76.7	91.1	85.3	3.5	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	110	4.3	10.6	6.7	1.1	0	0	--	18.0
aromatics	%(v/v)	110	20.8	35.2	27.9	4	0	0	--	35.0
benzene	%(v/v)	110	0.4	1	0.7	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	110	1.9	2.5	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	110	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	110	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	110	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	110	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	110	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	110	10.6	14.4	12.2	0.8	0	0	--	15
Other oxygenate	%(v/v)	110	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	110	6.1	11.3	8.3	1	0	0	--	50
LEAD CONTENT	g/l	110	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN3: The highest DVPE value 70,1 kPa is above the maximum limiting value 70,0 kPa but within the maximum tolerance limit 71,9 kPa. FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The lowest distillation value at 100 C 44,1 % (v/v) is below the minimum limiting value 46,0 % (v/v) but within the minimum tolerance limit 43,6 % (v/v). FN6: The highest aromatics content 35,2 % (v/v) is above the maximum limiting value 35,0 % (v/v) but within the maximum tolerance limit 37,2 % (v/v). FN7: The highest sulphur content 11,3 mg/kg is above the maximum limiting value 10,0 mg/kg but within the maximum tolerance limit 11,6 mg/kg.

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

Country: Finland  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	97.5	99.5	99	0.6	0	0	95	--
MOTOR OCTANE NO.	--	14	87.4	88.5	88	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	48	59.9	68.3	65.7	1.7	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	48	46.4	54.9	50.8	2.3	0	0	46.0	--
evaporated at 150	%(v/v)	48	80.5	89.6	86.2	1.8	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	48	2.7	14.8	7.7	3.2	0	0	--	18.0
aromatics	%(v/v)	48	26.9	34.8	30.4	2.3	0	0	--	35.0
benzene	%(v/v)	48	0.4	0.7	0.5	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	48	2	2.6	2.2	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	48	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	48	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	48	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	48	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	48	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	48	11.5	14.6	12.5	0.7	0	0	--	15
Other oxygenate	%(v/v)	48	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	48	4	9.6	5.6	1.2	0	0	--	50
LEAD CONTENT	g/l	48	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary.

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

Country: Finland  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	11	98.3	99.5	99.1	0.4	0	0	95	--
MOTOR OCTANE NO.	--	11	87.9	88.9	88.3	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	55	44.9	61.3	51.8	3.5	0	0	46.0	--
evaporated at 150	%(v/v)	55	81.5	89.3	86	2.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	55	3.9	12.9	6.8	2	0	0	--	18.0
aromatics	%(v/v)	55	22.3	37.3	30.3	2.7	0	0	--	35.0
benzene	%(v/v)	55	0.2	0.7	0.5	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	55	2.1	2.7	2.3	0.2	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	55	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	55	0	1.6	0	0.3	0	0	--	5
Iso-propyl alcohol	%(v/v)	55	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	55	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	55	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	55	9.4	15.1	12.7	1.1	0	0	--	15
Other oxygenate	%(v/v)	55	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	55	4.4	10	6.2	1.1	0	0	--	50
LEAD CONTENT	g/l	55	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The lowest distillation value at 100 C 44,9 % (v/v) is below the minimum limiting value 46,0 % (v/v) but within the minimum tolerance limit 43,6 % (v/v). FN6: The highest aromatics content 37,3 % (v/v) is above the maximum limiting value 35,0 % (v/v) and also above the maximum tolerance limit 37,2 % (v/v). There is no analytical reason for exceeded value. FN8: The highest ethers content 15,1 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v).



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

Country: Finland  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	25	97.5	99.5	99.1	0.5	0	0	95	--
MOTOR OCTANE NO.	--	25	87.4	88.9	88.2	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	48	59.9	68.3	65.7	1.7	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	103	44.9	61.3	51.3	3	0	0	46.0	--
evaporated at 150	%(v/v)	103	80.5	89.6	86.1	1.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	103	2.7	14.8	7.2	2.6	0	0	--	18.0
aromatics	%(v/v)	103	22.3	37.3	30.3	2.5	0	0	--	35.0
benzene	%(v/v)	103	0.2	0.7	0.5	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	103	2	2.7	2.3	0.1	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	103	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	103	0	1.6	0	0.2	0	0	--	5
Iso-propyl alcohol	%(v/v)	103	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	103	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	103	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	103	9.3	15.1	12.6	0.9	0	0	--	15
Other oxygenate	%(v/v)	103	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	103	4	10	5.9	1.2	0	0	--	50
LEAD CONTENT	g/l	103	0	0	0	0	0	0	--	0.005

Notes: FN1: The determination of RON -number has been done by external contractor (R value 0,6). \*FN2: The determination of MON -number has been done by external contractor (R value 0,9). FN4: The lead content was measured by energydispersive X-ray fluorescence method with sensitivity much better than the limit indicated in the quality requirements. The laboratory has the ability to confirm the lead content with the EN 237 method if necessary. FN5: The lowest distillation value at 100 C 44,9 % (v/v) is below the minimum limiting value 46,0 % (v/v) but within the minimum tolerance limit 43,6 % (v/v). FN6: The highest aromatics content 37,3 % (v/v) is above the maximum limiting value 35,0 % (v/v) and also above the maximum tolerance limit 37,2 % (v/v). There is no analytical reason for exceeded value. FN8: The highest ethers content 15,1 % (v/v) is above the maximum limiting value 15,0 % (v/v) but within the maximum tolerance limit 15,6 % (v/v).

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

Country: Germany  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<10 ppm s  
 National Fuel Grade Benzin Normal

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	71	90.8	96.3	92.27042254	1.2	91	0	91	--
MOTOR OCTANE NO.	--	120	82.4	85	84.81516667	1.1	82.5	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	83	49.5	66.7	58.81228916	1.5	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	142	46.4	70.7	59.68323944	3.3	0	0	46.0	--
evaporated at 150	%(v/v)	142	79.5	96.6	88.68267606	0.3	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	117	0.2	18.4	8.001367521	5.4	0	21	--	21.0
aromatics	%(v/v)	157	20.2	35.8	25.86217	2.6	0	0	--	35.0
benzene	%(v/v)	157	0.2	0.97	0.633694268	0.3	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	120	0	2.81	0.6825	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	96	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	72	0	5.07	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	56	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	57	0	0.3	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	56	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	116	0	13.32	0	0	0	0	--	15
Other oxygenate	%(v/v)	64	0	0.2	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	157	0	11.2	6.717324841	2.1	0	0	--	50
LEAD CONTENT	g/l	30	0	0	0	0	0	0	--	0.005

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

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

Country: Germany  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Eurosuper

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	62	94.8	98	95.7	0.5	0	0	95	--
MOTOR OCTANE NO.	--	155	84.8	86.6	85.22387097	0.4	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	91	54.1	63.4	58.72989011	1.5	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	164	51.3	67.1	57.96329268	3.7	0	0	46.0	--
evaporated at 150	%(v/v)	164	79.3	96.9	88.12268293	4.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	128	2.5	15.1	8.793037037	1.3	0	0	--	18.0
aromatics	%(v/v)	193	23.1	36	24.4721	1.5	0	0	--	35.0
benzene	%(v/v)	193	0.1	0.9	0.6339	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	155	0.1	2.7	1.655752688	0.7	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	106	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	96	0	5.03	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	66	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	66	0	0.3	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	67	0	0.4	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	161	0	10	0	0	0	0	--	15
Other oxygenate	%(v/v)	84	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	193	0	11	5.824404145	1.8	0	0	--	50
LEAD CONTENT	g/l	24	0	0	0	0	0	0	--	0.005

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

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

Country: Germany  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super Plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	39	97.7	100.8	99.19538462	0.8	98	0	95	--
MOTOR OCTANE NO.	--	77	84.7	89.1	88.31493506	0.5	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	40	54.4	68.7	58.3995	1.5	45	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	85	46.1	51.8	57.03411765	4	0	0	46.0	--
evaporated at 150	%(v/v)	85	86.1	98.8	87.22917647	2.8	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	0	11.7	4.6256	3.5	0	0	--	18.0
aromatics	%(v/v)	81	26.3	37	32.74667	1.2	0	0	--	35.0
benzene	%(v/v)	81	0.14	0.85	0.499753086	0.1	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	77	0.1	2.7	1.878311688	0.4	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	57	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	34	0	0.7	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	23	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	37	0	0.3	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	37	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	70	0	14.9	0	0	0	0	--	15
Other oxygenate	%(v/v)	42	0	14.7	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	96	0	10	4.7575	2.19	0	0	--	50
LEAD CONTENT	g/l	20	0	0	0	0	0	0	--	0.005

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

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

Country: Greece  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	67	95	97	95.69701493	0.631858594	0	0	95	--
MOTOR OCTANE NO.	--	67	85	86	85.05671642	0.159718918	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	67	50	80	58.40447761	4.125393063	0	0	46.0	--
evaporated at 150	%(v/v)	67	84	92	87.25223881	2.116367449	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	67	3.8	15.4	12.97674419	2.931154494	0	0	--	18.0
aromatics	%(v/v)	67	14.9	35	30.17612	3.436396732	0	0	--	35.0
benzene	%(v/v)	67	0.7	1	0.891641791	0.085768813	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)	67	3.5	9	5.186046512	1.603632326	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	67	20	50	40	7.609370258	0	0	--	50
LEAD CONTENT	g/l	67	0.001	0.003	0.001954545	0.000820191	0	0	--	0.005

Notes:

0

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

Country: Greece  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	95	97	95.73658537	0.686205544	0	0	95	--
MOTOR OCTANE NO.	--	41	85	85.2	85.0097561	0.037449153	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	56.9	60	59.58780488	0.65084373	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	46	63.8	56.64634146	3.306894129	0	0	46.0	--
evaporated at 150	%(v/v)	41	82	90.9	87.31463415	1.708590205	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	8.6	14	12.06333333	1.391967928	0	0	--	18.0
aromatics	%(v/v)	41	26	34.6	32.0075	1.735657342	0	0	--	35.0
benzene	%(v/v)	41	0.7	1	0.900487805	0.092680937	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	41	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	3.5	8.1	5.953333333	1.425804875	0	0	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	41	20	50	37.3902439	8.188034101	0	0	--	50
LEAD CONTENT	g/l	41	0.001	0.003	0.002102564	0.000820618	0	0	--	0.005

Notes:

0

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

Country: Greece  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	96	97	96.3	0.274919173	96	0	95	--
MOTOR OCTANE NO.	--	53	85	87	85.17924528	0.425331767	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	51	62.2	57.57169811	2.83191817	0	0	46.0	--
evaporated at 150	%(v/v)	53	83	90.5	87.48679245	1.894530359	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	11	15.8	13.53333333	1.555739439	0	0	--	18.0
aromatics	%(v/v)	53	27.4	34.1	30.71321	1.779373024	0	0	--	35.0
benzene	%(v/v)	53	0.67	1	0.873962264	0.100791858	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	1.5	8.7	4.592857143	1.805194788	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	53	27	50	41.82352941	6.860629366	0	0	--	50
LEAD CONTENT	g/l	53	0.001	1	0.039886792	0.191951582	0	0	--	0.005

Notes:

0

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

Country: Greece  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	108	95	97	95.7				95	--
MOTOR OCTANE NO.	--	108	85	86	85				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	0	60	59.6				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	108	46	80	57.7				46.0	--
evaporated at 150	%(v/v)	108	82	92	87.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	108	3.8	15.4	12.6				--	18.0
aromatics	%(v/v)	108	14.9	35	30.9				--	35.0
benzene	%(v/v)	108	0.7	1	0.9				--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0					--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0				--	3
Ethanol	%(v/v)	41	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	108	3.5	9	5.5				--	15
Other oxygenate	%(v/v)	41	0	0	0				--	10
SULPHUR CONTENT	mg/kg	108	20	50	39				--	50
LEAD CONTENT	g/l	108	0.001	0.003	0				--	0.005

Notes:



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

Country: Greece  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	40	96	97.3	96.4	0.353009043	0	0	95	--
MOTOR OCTANE NO.	--	40	85	86.2	85.075	0.25293153	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	40	57.5	60	59.3975	0.73745491	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	40	52.5	60	56.1125	1.585541645	0	0	46.0	--
evaporated at 150	%(v/v)	40	83.5	96	88.1025	2.625270438	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	40	9	15.1	12.84193548	1.521134268	0	0	--	18.0
aromatics	%(v/v)	40	24.1	34.8	31.785	2.764940765	0	0	--	35.0
benzene	%(v/v)	40	0.8	1	0.943	0.07542019	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	40	3.5	8.7	6.203225806	1.66942782	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	24	50	38.625	8.23590482	0	0	--	50
LEAD CONTENT	g/l	40	0.001	0.003	0.002175	0.000780779	0	0	--	0.005

Notes: 0

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

Country: Greece  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade LRP

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	93	96	97.3	96.4				95	--
MOTOR OCTANE NO.	--	93	85	87	85.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	40	0	60	59.4				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	93	51	62.2	56.9				46.0	--
evaporated at 150	%(v/v)	93	83	96	87.8				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	93	9	15.8	13.2				--	18.0
aromatics	%(v/v)	93	24.1	34.8	31.2				--	35.0
benzene	%(v/v)	93	0.67	1	0.9				--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0					--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0					--	3
Ethanol	%(v/v)	0	0	0					--	5
Iso-propyl alcohol	%(v/v)	0	0	0					--	10
Tetro-butyl alcohol	%(v/v)	0	0	0					--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	93	1.5	8.7	5.3				--	15
Other oxygenate	%(v/v)	0	0	0					--	10
SULPHUR CONTENT	mg/kg	93	24	50	40.4				--	50
LEAD CONTENT	g/l	93	0.001	1	0				--	0.005

Notes:

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

Country: Greece  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	45	100	100.8	100.3511111	0.256393006	0	0	95	--
MOTOR OCTANE NO.	--	45	88.5	90.8	89.22666667	0.498816782	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	45	47	55	51.23333333	2.004426919	0	0	46.0	--
evaporated at 150	%(v/v)	45	82.5	97	86.81111111	2.537556289	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	45	2.9	14	5.775	3.332727326	0	0	--	18.0
aromatics	%(v/v)	45	29.9	35	33.13334	1.323047446	0	0	--	35.0
benzene	%(v/v)	45	0.5	1	0.7909	0.1407	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	45	3.5	15	13.03611111	3.902025319	0	0	--	15
Other oxygenate	%(v/v)	45	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	45	5	49	17.9	13.16141054	0	0	--	50
LEAD CONTENT	g/l	45	0.001	0.003	0.002131579	0.000777072	0	0	--	0.005

Notes:

0

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

Country: Greece  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	88	100	100.8	100.3				95	--
MOTOR OCTANE NO.	--	88	87.5	90.8	89.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	43	0	60	59.4				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	88	47	57.5	51.3				46.0	--
evaporated at 150	%(v/v)	88	82.5	97	86.6				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	88	1.7	14	5.5				--	18.0
aromatics	%(v/v)	88	25.6	35	32.9				--	35.0
benzene	%(v/v)	88	0.5	1	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	43	0	0	0				--	2.7
OXYGENATES:										
Methanol	%(v/v)	43	0	0	0				--	3
Ethanol	%(v/v)	43	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	43	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	43	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	43	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	88	3.5	15	12.5				--	15
Other oxygenate	%(v/v)	88	0	0	0				--	10
SULPHUR CONTENT	mg/kg	88	5	50	19.8				--	50
LEAD CONTENT	g/l	88	0.001	0.003	0				--	0.005

Notes:

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

Country: Greece  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade 100

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	43	100	100.6	100.1837209	0.158760425	0	0	95	--
MOTOR OCTANE NO.	--	43	87.5	90.2	89.01860465	0.804823499	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	43	55	60	59.36511628	1.039432932	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	43	47	57.5	51.33953488	2.638464519	0	0	46.0	--
evaporated at 150	%(v/v)	43	83	89.5	86.28372093	1.661601384	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	43	1.7	13	5.163333333	3.829872001	0	0	--	18.0
aromatics	%(v/v)	43	25.6	35	32.57442	2.872289034	0	0	--	35.0
benzene	%(v/v)	43	0.56	1	0.897674419	0.124170336	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	43	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	43	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	43	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	43	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	43	3.5	15	11.89	4.29718031	0	0	--	15
Other oxygenate	%(v/v)	43	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	43	6	50	21.85581395	18.17265479	0	0	--	50
LEAD CONTENT	g/l	43	0.001	0.003	0.002047619	0.000824987	0	0	--	0.005

Notes:

0

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

Country: Hungary  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Premium unleaded, Esz-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	93	96.2	95.5	0.49	95		95	--
MOTOR OCTANE NO.	--	100	83.9	86.1	85.43	0.32	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	51	53.2	62.5	57.14	1.93	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	45	57.9	51.5	3.08	46	71	46.0	--
evaporated at 150	%(v/v)	100	77.3	87.7	82.52	2.42	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	4.6	13.7	9.15	1.98	0	18	--	18.0
aromatics	%(v/v)	100	26.5	36.9	31.77	2.12	0	35	--	35.0
benzene	%(v/v)	100	0.3	0.79	0.531	0.113	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	100	0.3	1.7	0.84	0.34	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0.2	0.01	0.03	0	3	--	3
Ethanol	%(v/v)	100	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	100	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	100	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	100	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	1.7	9.3	4.59	1.88	0	15	--	15
Other oxygenate	%(v/v)	100	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	100	0	43.3	8.9	7.4	0	50	--	50
LEAD CONTENT	g/l	100	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes: Limit value exceedances were as follows: Beyond tolerance limits: Vapour pressure. kPa 62.5, 62.0; Research Octane Number 93.4, 93.0; Motor Octane Number 83.9. Within tolerance limits: Motor Octane Number 84.8; Aromatics. %(V/V) 35.5, 35.3, 35.7, 36.9, 35.2; Distillation. %(V/V) 45

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

Country: Hungary  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	98.9	100.6	99.4	0.58	98	0	95	--
MOTOR OCTANE NO.	--	10	88	91.2	88.89	1.1	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	54.6	58.6	56.84	1.44	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	47.1	57	50.74	3.1	46	71	46.0	--
evaporated at 150	%(v/v)	10	80.8	85	82.89	1.21	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	0.9	6.6	4.84	2.17	0	18	--	18.0
aromatics	%(v/v)	10	26.2	32.4	30.07	2.53	0	35	--	35.0
benzene	%(v/v)	10	0.1	0.37	0.261	0.084	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	10	2	2.4	2.16	0.13	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	11.1	13.2	11.99	0.65	0	15	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	10	0	15.4	7.34	4.57	0	50	--	50
LEAD CONTENT	g/l	10	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Hungary  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	99.8	100.6	100.17	0.3	98	0	95	--
MOTOR OCTANE NO.	--	10	88.9	91.1	89.81	0.91	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	56.1	67.6	60.5	5.46	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	53	62	56.44	2.78	46	71	46.0	--
evaporated at 150	%(v/v)	0	81	90.9	84.71	3.92	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	0.8	9.9	3.12	2.89	0	18	--	18.0
aromatics	%(v/v)	10	14.3	35	29.61	6.01	0	35	--	35.0
benzene	%(v/v)	10	0.1	0.73	0.338	0.235	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	10	2.2	2.6	2.42	0.12	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	12.2	14.2	13.37	0.68	0	15	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	10	0	7.8	3.55	1.78	0	0	--	50
LEAD CONTENT	g/l	10	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes: Values beyond limit values and tolerance limits: Vapour pressure. kPa 65.2, 67.6



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

Country: Hungary  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Premium unleaded, Esz-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	49	95	96.1	95.58	0.34	95	0	95	--
MOTOR OCTANE NO.	--	49	85	86.1	85.51	0.33	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	49	49	57.1	52.59	2.18	46	71	46.0	--
evaporated at 150	%(v/v)	49	78.6	87.7	83.23	2.19	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	49	5.3	11.3	8.95	1.66	0	18	--	18.0
aromatics	%(v/v)	49	26.5	34.9	30.77	1.96	0	35	--	35.0
benzene	%(v/v)	49	0.31	0.68	0.503	0.108	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	49	0.3	1.5	0.79	0.33	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	49	0	0.1	0	0.02	0	3	--	3
Ethanol	%(v/v)	49	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	49	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	49	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	49	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	49	1.7	8.2	4.36	1.82	0	15	--	15
Other oxygenate	%(v/v)	49	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	49	0	43.3	8.92	8.06	0	50	--	50
LEAD CONTENT	g/l	49	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes: Limit value exceedances were as follows: Beyond tolerance limits: Vapour pressure. kPa 62.5, 62.0; Research Octane Number 93.4, 93.0; Motor Octane Number 83.9. Within tolerance limits: Motor Octane Number 84.8; Aromatics. %(V/V) 35.5, 35.3, 35.7, 36.9, 35.2; Distillation. %(V/V) 45

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

Country: Hungary  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Premium unleaded, Esz-95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	51	93	96.2	95.43	0.59	95	0	95	--
MOTOR OCTANE NO.	--	51	83.9	86	85.34	0.29	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	51	53.2	62.5	57.14	1.93	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	51	45	57.9	50.45	3.45	46	71	46.0	--
evaporated at 150	%(v/v)	51	77.3	87	81.84	2.45	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	51	4.6	13.7	9.35	2.25	0	18	--	18.0
aromatics	%(v/v)	51	27.5	36.9	32.74	1.82	0	35	--	35.0
benzene	%(v/v)	51	0.36	0.79	0.557	0.112	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	51	0.4	1.7	0.88	0.34	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	51	0	0.2	0.01	0.04	0	3	--	3
Ethanol	%(v/v)	51	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	51	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	51	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	51	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	51	1.9	9.3	4.82	1.92	0	15	--	15
Other oxygenate	%(v/v)	51	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	51	0	25.9	8.88	6.78	0	50	--	50
LEAD CONTENT	g/l	51	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Hungary  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	99.1	100.6	99.7	0.68	98	0	95	--
MOTOR OCTANE NO.	--	5	88.2	91.2	89.48	1.34	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	5	49	57	52.6	3.36	46	71	46.0	--
evaporated at 150	%(v/v)	5	83	85	83.8	0.84	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	5	0.9	6.6	4.24	3.05	0	18	--	18.0
aromatics	%(v/v)	5	26.2	30.7	28.06	2.05	0	35	--	35.0
benzene	%(v/v)	5	0.1	0.37	0.254	0.118	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	5	2	2.4	2.18	0.15	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	5	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	5	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	5	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	5	11.1	13.2	12.02	0.77	0	15	--	15
Other oxygenate	%(v/v)	5	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	5	0	15.4	9.64	4.8	0	50	--	50
LEAD CONTENT	g/l	5	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Hungary  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	98.9	99.5	99.06	0.25	98	0	95	--
MOTOR OCTANE NO.	--	5	88	88.7	88.3	0.27	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	54.6	58.6	56.84	1.44	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	5	47.1	50.2	48.88	1.31	46	71	46.0	--
evaporated at 150	%(v/v)	5	80.8	82.6	81.98	0.72	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	5	4.6	6.1	5.44	0.59	0	18	--	18.0
aromatics	%(v/v)	5	31.9	32.4	32.08	0.22	0	35	--	35.0
benzene	%(v/v)	5	0.21	0.29	0.268	0.033	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	5	2	2.3	2.14	0.11	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	5	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	5	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	5	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	5	11.4	12.8	11.96	0.59	0	15	--	15
Other oxygenate	%(v/v)	5	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	5	0	10.9	5.04	3.29	0	50	--	50
LEAD CONTENT	g/l	5	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Hungary  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	99.8	100.2	100.04	0.15	98	0	95	--
MOTOR OCTANE NO.	--	10	88.9	89.9	89.38	0.44	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	55.3	58.3	57.28	1.17	46	71	46.0	--
evaporated at 150	%(v/v)	0	81.6	90.9	85.42	3.9	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	0.8	6.1	2.88	2.16	0	18	--	18.0
aromatics	%(v/v)	10	27.3	34.1	30.72	3.18	0	35	--	35.0
benzene	%(v/v)	10	0.1	0.61	0.35	0.252	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	10	2.2	2.6	2.42	0.16	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	10	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	10	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	12.2	14.2	13.32	0.91	0	15	--	15
Other oxygenate	%(v/v)	10	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	10	0	7.8	3.38	2.58	0	0	--	50
LEAD CONTENT	g/l	10	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes: Values beyond limit values and tolerance limits: Vapour pressure. kPa 65.2, 67.6

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

Country: Hungary  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super unleaded, Esz-98, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	99.8	100.6	100.3	0.37	98	0	95	--
MOTOR OCTANE NO.	--	5	89	91.1	90.24	1.09	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	56.1	67.6	60.5	5.46	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	5	53	62	55.6	3.78	46	71	46.0	--
evaporated at 150	%(v/v)	5	81	90	84	4.24	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	5	0.9	9.9	3.36	3.73	0	18	--	18.0
aromatics	%(v/v)	5	14.3	35	28.5	8.26	0	35	--	35.0
benzene	%(v/v)	5	0.11	0.73	0.326	0.246	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	5	2.3	2.5	2.42	0.08	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	5	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	5	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	5	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	5	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	5	12.9	14	13.42	0.47	0	15	--	15
Other oxygenate	%(v/v)	5	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	5	0	4.7	3.72	0.63	0	0	--	50
LEAD CONTENT	g/l	5	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Ireland  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 95 Unleaded

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	118	94	96.4	95.2	0.3	0	0	95	--
MOTOR OCTANE NO.	--	118	84.6	87.9	86.1	0.7	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	40	55.7	70	65.6	4.6	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	117	45.6	64.6	56.5	4.7	0	0	46.0	--
evaporated at 150	%(v/v)	117	82.6	97.6	90.4	3.9	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	117	0.3	15.9	7.5	4.8	0	0	--	18.0
aromatics	%(v/v)	117	21.2	40.3	29.3	3.7	0	0	--	35.0
benzene	%(v/v)	117	0.3	1.2	0.7	0.2	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	118	0	1.6	0.3	0.4	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)	118	0	9.1	0.7	1.8	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	117	0	54	19.7	15.6	0	0	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Italy  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	26	95	96.6	95.5	0.4	95	0	95	--
MOTOR OCTANE NO.	--	26	85	86.4	85.6	0.4	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	22	54.6	66.5	58.8	2.6	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	178	44.3	64.9	52	4.2	46	0	46.0	--
evaporated at 150	%(v/v)	178	79.3	93.4	85.3	2.6	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	26	1.9	17.4	8.3	4.5	0	18	--	18.0
aromatics	%(v/v)	26	22.5	34.2	30.4	3.8	0	35	--	35.0
benzene	%(v/v)	26	0.6	0.9	0.8	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	26	0.3	1.6	1	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	26	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	26	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	26	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	26	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	26	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	26	1.7	8.6	5.9	2	0	15	--	15
Other oxygenate	%(v/v)	26	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	178	10.3	47.3	25.7	8.4	0	50	--	50
LEAD CONTENT	g/l	19	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content). Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.



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

Country: Italy  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	64	94.3	96.7	95.3	0.5	95	0	95	--
MOTOR OCTANE NO.	--	64	84.8	87.1	85.7	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	64	47.1	61.9	55.3	3.7	46	0	46.0	--
evaporated at 150	%(v/v)	64	81.2	91.6	87.5	2.6	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	64	0.3	16.2	6.9	4.4	0	18	--	18.0
aromatics	%(v/v)	64	18.5	37.5	30.3	3.7	0	35	--	35.0
benzene	%(v/v)	41	0.38	0.89	0.74	0.12	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	64	0	1.66	0.6	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	64	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	64	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	64	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	64	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	64	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	64	0	9.2	3.3	2.7	0	15	--	15
Other oxygenate	%(v/v)	64	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	64	10.1	46.8	25.5	9.6	0	50	--	50
LEAD CONTENT	g/l	20	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content). Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers.

Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

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

Country: Italy  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	90	94.3	96.7	95.4				95	--
MOTOR OCTANE NO.	--	90	84.8	87.1	85.7				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	22	0	66.5	58.8				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	242	44.3	64.9	52.9				46.0	--
evaporated at 150	%(v/v)	242	79.3	93.4	85.9				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	90	0.3	17.4	7.3				--	18.0
aromatics	%(v/v)	90	18.5	37.5	30.3				--	35.0
benzene	%(v/v)	67	0.38	0.9	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	90	0	1.66	0.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	90	0	0	0				--	3
Ethanol	%(v/v)	90	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	90	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	90	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	90	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	90	0	9.2	4.1				--	15
Other oxygenate	%(v/v)	90	0	0	0				--	10
SULPHUR CONTENT	mg/kg	242	10.1	47.3	25.6				--	50
LEAD CONTENT	g/l	39	0	0	0				--	0.005

Notes:

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

Country: Italy  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	24	94.8	99.2	96.3	1.6	95	0	95	--
MOTOR OCTANE NO.	--	24	85	88.5	86.3	1.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	24	54.9	61.3	58.1	1.6	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	47	45	65.6	56.3	4.9	46	0	46.0	--
evaporated at 150	%(v/v)	47	82.4	93.6	87.6	2.7	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	24	0.3	12.7	7	4	0	18	--	18.0
aromatics	%(v/v)	24	29.9	36	32.5	1.7	0	35	--	35.0
benzene	%(v/v)	24	0.59	0.98	0.75	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	24	0	2.6	1.1	1	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	24	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	24	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	24	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	24	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	24	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	24	0	13.3	4.7	4.2	0	15	--	15
Other oxygenate	%(v/v)	24	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	47	1.2	10	6.8	2	0	50	--	50
LEAD CONTENT	g/l	21	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content). Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers.

Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

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

Country: Italy  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	29	95	100	95.5	0.9	95	0	95	--
MOTOR OCTANE NO.	--	29	84.9	88	86.1	0.9	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	29	50.6	69.7	61.2	5.2	46	0	46.0	--
evaporated at 150	%(v/v)	29	85.8	94	91.6	2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	29	0.3	15.2	6	5.6	0	18	--	18.0
aromatics	%(v/v)	29	23	36.5	30.3	3.4	0	35	--	35.0
benzene	%(v/v)	22	0.52	0.97	0.77	0.14	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	29	0	2.3	1	0.9	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	29	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	29	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	29	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	29	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	29	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	29	0	13	5.3	5	0	15	--	15
Other oxygenate	%(v/v)	29	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	29	1.7	9.1	5.6	2.3	0	50	--	50
LEAD CONTENT	g/l	10	0	0	0	0	0	0.005	--	0.005

**Notes:** The test methods employed to evaluate petrol characteristics were those listed in European standard EN 228:2004 (in particular EN ISO 20884 for sulphur content). Test method EN 1601 was employed for the determination of oxygenate content in petrol samples. EN 1601 requires the examination of each sample chromatogram to identify possible oxygen containing components, before the actual determination is carried out. The examination of all chromatograms related to FQMS samples showed that only one oxygenate compound was present in each sample (MTBE, ETBE, TAME). No other oxygenate compound was detected beside one of these ethers.

Values reported as "0.0" mean values that fall into the range 0 - limit of the detection. The greatest part of Italian petrol contain oxygenates, therefore reproducibility = 4.6 % (V/V) for olefins was considered.

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

Country: Italy  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	94.8	100	95.9				95	--
MOTOR OCTANE NO.	--	53	84.9	88.5	86.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	24	0	61.3	58.1				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	76	45	69.7	58.2				46.0	--
evaporated at 150	%(v/v)	76	82.4	94	89.1				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	0.3	15.2	6.5				--	18.0
aromatics	%(v/v)	53	23	36.5	31.3				--	35.0
benzene	%(v/v)	46	0.52	0.98	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	53	0	2.6	1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	53	0	0	0				--	3
Ethanol	%(v/v)	53	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	53	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	53	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	53	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	0	13.3	5				--	15
Other oxygenate	%(v/v)	53	0	0	0				--	10
SULPHUR CONTENT	mg/kg	76	1.2	10	6.3				--	50
LEAD CONTENT	g/l	31	0	0	0				--	0.005

Notes:

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

Country: Latvia  
 Year: 2005  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Petrol 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	92.1	95	92.5	0	0	0	91	--
MOTOR OCTANE NO.	--	12	82.6	84.8	83.1	0	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	12	60.4	71.1	66.8	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	12	45.6	61.1	50.8	0	0	0	46.0	--
evaporated at 150	%(v/v)	12	81.6	88.4	82.9	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	0.6	14.6	8.1	0	0	0	--	21.0
aromatics	%(v/v)	12	25	34.5	32.2	0	0	0	--	35.0
benzene	%(v/v)	12	0.42	0.72	0.61	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0.02	1.76	0.28	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	12	0	4.6	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	12	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	0	0.5	0.1	0	0	0	--	15
Other oxygenate	%(v/v)	12	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	12	20.1	43.3	38.1	0	0	0	--	50
LEAD CONTENT	g/l	12	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade Petrol 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	23	91.1	93	92.4	0	0	0	91	--
MOTOR OCTANE NO.	--	23	81.7	84.4	82.7	0	0	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	23	45.8	63.8	56.1	0	0	0	46.0	--
evaporated at 150	%(v/v)	23	82.2	89.7	85.8	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	23	0.6	16.3	12.5	0	0	0	--	21.0
aromatics	%(v/v)	23	21.8	38.1	30.2	0	0	0	--	35.0
benzene	%(v/v)	23	0.49	0.81	0.64	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	23	0	0.08	0.04	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	23	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	23	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	23	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	23	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	23	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	23	0	0.4	0.1	0	0	0	--	15
Other oxygenate	%(v/v)	23	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	23	0	52	34.8	0	0	0	--	50
LEAD CONTENT	g/l	23	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade Petrol 92

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	35	91.1	95	92.4				91	--
MOTOR OCTANE NO.	--	35	81.7	84.8	82.8				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	12	0	71.1	66.8				--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	35	45.6	63.8	54.3				46.0	--
evaporated at 150	%(v/v)	35	81.6	89.7	84.8				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	35	0.6	16.3	11				--	21.0
aromatics	%(v/v)	35	21.8	38.1	30.9				--	35.0
benzene	%(v/v)	35	0.42	0.81	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	23	0	1.76	0				--	2.7
OXYGENATES:										
Methanol	%(v/v)	35	0	0	0				--	3
Ethanol	%(v/v)	35	0	4.6	0				--	5
Iso-propyl alcohol	%(v/v)	35	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	35	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	35	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	35	0	0.5	0.1				--	15
Other oxygenate	%(v/v)	35	0	0	0				--	10
SULPHUR CONTENT	mg/kg	35	0	52	35.9				--	50
LEAD CONTENT	g/l	35	0	0	0				--	0.005

Notes:



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

Country: Latvia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	40	95	96.9	95.5	0	0	0	95	--
MOTOR OCTANE NO.	--	40	85	85.7	85.2	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	61.2	71.1	68.3	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	40	45.6	58.8	52.5	0	0	0	46.0	--
evaporated at 150	%(v/v)	40	82	89.3	86.1	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	40	1	15.5	8.2	0	0	0	--	18.0
aromatics	%(v/v)	40	24.7	35.2	28.4	0	0	0	--	35.0
benzene	%(v/v)	40	0.32	0.67	0.48	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0.55	2.21	1.69	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	40	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	40	0	4.5	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	40	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	40	0.4	8	5.6	0	0	0	--	15
Other oxygenate	%(v/v)	40	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	40	0	23.2	19.4	0	0	0	--	50
LEAD CONTENT	g/l	40	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	117	95	98	95.7	0	0	0	95	--
MOTOR OCTANE NO.	--	0	85	88.3	85.4	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	117	41.8	62.1	56.9	0	0	0	46.0	--
evaporated at 150	%(v/v)	117	78.8	93.9	84.6	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	117	0	17.2	9.4	0	0	0	--	18.0
aromatics	%(v/v)	117	24.6	36	29.8	0	0	0	--	35.0
benzene	%(v/v)	117	0.32	0.92	0.54	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	117	0.46	2.84	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	117	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	117	0	4.5	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	117	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	117	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	117	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	117	0	12	5	0	0	0	--	15
Other oxygenate	%(v/v)	117	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	117	8.5	53.1	28.1	0	0	0	--	50
LEAD CONTENT	g/l	117	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	157	95	98	95.6				95	--
MOTOR OCTANE NO.	--	40	85	88.3	85.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	0	0	71.1					--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	157	41.8	62.1	55.8				46.0	--
evaporated at 150	%(v/v)	157	78.8	93.9	85				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	157	0	17.2	9.1				--	18.0
aromatics	%(v/v)	157	24.6	36	29.4				--	35.0
benzene	%(v/v)	157	0.32	0.92	0.5				--	1.0
OXYGEN CONTENT	%(m/m)	117	0.46	2.84	0				--	2.7
OXYGENATES:										
Methanol	%(v/v)	157	0	0	0				--	3
Ethanol	%(v/v)	157	0	4.5	0				--	5
Iso-propyl alcohol	%(v/v)	157	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	157	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	157	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	157	0	12	5.2				--	15
Other oxygenate	%(v/v)	157	0	0	0				--	10
SULPHUR CONTENT	mg/kg	157	0	53.1	25.9				--	50
LEAD CONTENT	g/l	157	0	0	0				--	0.005

Notes:

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

Country: Latvia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	18	98	99.4	98	0	0	0	95	--
MOTOR OCTANE NO.	--	18	86.8	88.7	87.5	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	18	61.5	70.9	68.2	0	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	18	51.9	56.2	54.3	0	0	0	46.0	--
evaporated at 150	%(v/v)	18	86	90.8	87.1	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	18	0.2	14.1	4.6	0	0	0	--	18.0
aromatics	%(v/v)	18	27	32.1	30.6	0	0	0	--	35.0
benzene	%(v/v)	18	0.14	0.66	0.38	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0.88	2.61	2.31	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	18	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	18	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	18	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	18	4.8	12.8	10.1	0	0	0	--	15
Other oxygenate	%(v/v)	18	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	18	0	21.6	14.6	0	0	0	--	50
LEAD CONTENT	g/l	18	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	95	99.8	98.4	0	98	0	95	--
MOTOR OCTANE NO.	--	41	86.6	90.4	87.1	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	41	0	0	0	0	0	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	46.5	58.7	54.3	0	0	0	46.0	--
evaporated at 150	%(v/v)	41	87.2	91.2	88.3	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	0.5	15.4	4.4	0	0	0	--	18.0
aromatics	%(v/v)	41	20.9	37.6	31.6	0	0	0	--	35.0
benzene	%(v/v)	41	0.09	0.51	0.36	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	41	1.25	2.65	2.33	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	41	0	5	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	41	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	41	4.4	12.8	8.8	0	0	0	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	41	5.2	37.9	14.8	0	0	0	--	50
LEAD CONTENT	g/l	41	0	0	0	0	0	0	--	0.005

Notes:

0

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

Country: Latvia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Petrol 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	59	95	99.8	98.3				95	--
MOTOR OCTANE NO.	--	59	86.6	90.4	87.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	59	0	70.9	20.8				--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	59	46.5	58.7	54.3				46.0	--
evaporated at 150	%(v/v)	59	86	91.2	87.9				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	59	0.2	15.4	4.5				--	18.0
aromatics	%(v/v)	59	20.9	37.6	31.3				--	35.0
benzene	%(v/v)	59	0.09	0.66	0.4				--	1.0
OXYGEN CONTENT	%(m/m)	41	0.88	2.65	2.3				--	2.7
OXYGENATES:										
Methanol	%(v/v)	59	0	0	0				--	3
Ethanol	%(v/v)	59	0	5	0				--	5
Iso-propyl alcohol	%(v/v)	59	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	59	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	59	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	59	4.4	12.8	9.2				--	15
Other oxygenate	%(v/v)	59	0	0	0				--	10
SULPHUR CONTENT	mg/kg	59	0	37.9	14.7				--	50
LEAD CONTENT	g/l	59	0	0	0				--	0.005

Notes:

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

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade A-92 (RON 92, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	35	92	92.3	92.16857	0.083213	92	0	91	--
MOTOR OCTANE NO.	--	35	82	82.8	82.35143	0.199073	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	35	60.7	69.3	64.8	2.280351	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	35	48	62	55.28571	3.348146	46	0	46.0	--
evaporated at 150	%(v/v)	35	79	88	84.541286	1.930298	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	35	8.4	17.1	14.04286	2.228596	0	21	--	21.0
aromatics	%(v/v)	35	24.9	35.9	29.31429	2.391301	0	35	--	35.0
benzene	%(v/v)	35	0.52	1.03	0.670571	0.117246	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	35	0	1.7	0.245714	0.490703	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	35	0	0.2	0.048571	0.070174	0	0	--	3
Ethanol	%(v/v)	35	0	0.5	0.082857	0.142428	0	0	--	5
Iso-propyl alcohol	%(v/v)	35	0	0.3	0.045714	0.078	0	0	--	10
Tetro-butyl alcohol	%(v/v)	35	0	0.4	0.042857	0.103713	0	0	--	7
Iso-butyl alcohol	%(v/v)	35	0	0.5	0.111429	0.151019	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	35	0.1	7.3	1.908571	2.015874	0	0	--	15
Other oxygenate	%(v/v)	35	0	0.2	0.045714	0.065722	0	0	--	10
SULPHUR CONTENT	mg/kg	35	7.1	60.7	26.90857	11.83381	0	50	--	50
LEAD CONTENT	g/l	35	0	0.001	0.0001428	0.000355036	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade A-92 (RON 92, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	92	92.2	92.11	0.08756	92	0	91	--
MOTOR OCTANE NO.	--	10	82	82.9	82.53	0.394546	82	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	19	71.6	86	77.20526	3.79912	0	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	19	54	60	57.526	1.8964	46	0	46.0	--
evaporated at 150	%(v/v)	19	82	89	85.4741	1.8669	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	19	10.1	15	13.64211	1.33887	0	21	--	21.0
aromatics	%(v/v)	19	27.3	34	29.85789	1.381752	0	35	--	35.0
benzene	%(v/v)	19	0.48	0.64	0.564211	0.042337	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	19	0	1.7	0.647368	0.642364	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	19	0	0.2	0.052632	0.077233	0	0	--	3
Ethanol	%(v/v)	19	0	0.2	0.047368	0.061178	0	0	--	5
Iso-propyl alcohol	%(v/v)	19	0	0.1	0.031579	0.047757	0	0	--	10
Tetro-butyl alcohol	%(v/v)	19	0	0.1	0.031579	0.047757	0	0	--	7
Iso-butyl alcohol	%(v/v)	19	0	0.2	0.047368	0.061178	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	19	0	0.1	0.047368	0.051299	0	0	--	15
Other oxygenate	%(v/v)	19	0	0.2	0.052632	0.069669	0	0	--	10
SULPHUR CONTENT	mg/kg	19	7	40	18.744211	6.720476	0	50	--	50
LEAD CONTENT	g/l	19	0	0.001	0.0002105	0.000418854	0	0.005	--	0.005

Notes:

0



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

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	46	95	95.3	95.1	0.085607	95	0	95	--
MOTOR OCTANE NO.	--	46	85	85.8	85.18478	0.204361	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	54	59.8	72.8	65.94074	2.228589	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	54	48	56	51.62963	2.300913	46	0	46.0	--
evaporated at 150	%(v/v)	54	79	88	84.44444	2.080155	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	54	8.8	14.7	11.48148	1.24037	0	18	--	18.0
aromatics	%(v/v)	54	30.4	39	34.05926	1.34326	0	35	--	35.0
benzene	%(v/v)	54	0.4	0.88	0.532222	0.079969	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	54	0.5	2.2	0.990741	0.292206	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	30	0	0.2	0.08	0.08469	0	0	--	3
Ethanol	%(v/v)	30	0	3.4	0.716667	1.022196	0	0	--	5
Iso-propyl alcohol	%(v/v)	30	0	0.2	0.053333	0.057135	0	0	--	10
Tetro-butyl alcohol	%(v/v)	30	0	0.1	0.056667	0.050401	0	0	--	7
Iso-butyl alcohol	%(v/v)	30	0	0.2	0.053333	0.07303	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	30	3.5	8.1	5.296667	1.003265	0	0	--	15
Other oxygenate	%(v/v)	30	0	0.2	0.04	0.062146	0	0	--	10
SULPHUR CONTENT	mg/kg	54	10.2	44.1	24.79444	9.18108	0	50	--	50
LEAD CONTENT	g/l	54	0	0.001	0.0001666	0.000376177	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	22	95	95.6	95.17273	0.188179	95	0	95	--
MOTOR OCTANE NO.	--	22	85	85.4	85.10909	0.126901	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	34	71.8	89.5	82.29706	2.70538	0	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	34	47	60	53.05882	3.228107	46	0	46.0	--
evaporated at 150	%(v/v)	34	80	87	83.68824	2.122429	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	34	8	11.8	10.04118	0.850354	0	18	--	18.0
aromatics	%(v/v)	34	25	35	33.86765	1.749237	0	35	--	35.0
benzene	%(v/v)	34	0.44	0.76	0.564706	0.075688	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	34	0.6	2.5	1.135292	0.401423	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	20	0	0.3	0.075	0.106992	0	0	--	3
Ethanol	%(v/v)	20	0.1	4.5	3.305	1.097593	0	0	--	5
Iso-propyl alcohol	%(v/v)	20	0	0.1	0.06	0.050262	0	0	--	10
Tetro-butyl alcohol	%(v/v)	20	0	0.2	0.055	0.060481	0	0	--	7
Iso-butyl alcohol	%(v/v)	20	0	0.1	0.045	0.051042	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	20	2.1	7.6	4.858824	1.62427	0	0	--	15
Other oxygenate	%(v/v)	20	0	0.2	0.075	0.071635	0	0	--	10
SULPHUR CONTENT	mg/kg	34	9.6	40	18.10588	8.055261	0	50	--	50
LEAD CONTENT	g/l	34	0	0.001	0.0001764	0.000386953	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	5	95.1	95.2	95.14	0.054772	95	0	95	--
MOTOR OCTANE NO.	--	5	85	85.4	85.18	0.178885	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	5	63.8	68	66.42	1.666433	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	5	48	56	51.6	3.577709	46	0	46.0	--
evaporated at 150	%(v/v)	5	80	87	84	2.915476	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	5	8.5	10.8	9.82	0.978264	0	18	--	18.0
aromatics	%(v/v)	5	26.4	33.3	30.02	2.706843	0	35	--	35.0
benzene	%(v/v)	5	0.3	0.6	0.46	0.114018	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	5	1	2.1	1.48	0.449444	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	5	0.1	0.2	0.12	0.044721	0	0	--	3
Ethanol	%(v/v)	5	0	1.1	0.36	0.512835	0	0	--	5
Iso-propyl alcohol	%(v/v)	5	0	0.2	0.08	0.08366	0	0	--	10
Tetro-butyl alcohol	%(v/v)	5	0	0.2	0.08	0.08366	0	0	--	7
Iso-butyl alcohol	%(v/v)	5	0	0.2	0.06	0.089443	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	5	4.3	6.6	5.68	0.0889944	0	0	--	15
Other oxygenate	%(v/v)	5	0	0.2	0.08	0.083666	0	0	--	10
SULPHUR CONTENT	mg/kg	5	5.2	9.8	7.76	1.967994	0	0	--	50
LEAD CONTENT	g/l	5	0	0.001	0.0006	0.000548	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	95	96	95.275	0.386417	95	0	95	--
MOTOR OCTANE NO.	--	12	85	86	85.30833	0.347611	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	15	75.2	86.5	81.02667	2.775265	0	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	15	47	60	50.6667	3.518658	46	0	46.0	--
evaporated at 150	%(v/v)	15	81	87	84.9333	1.791514	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	7	9.1	9.6	9.3	0.182574	0	18	--	18.0
aromatics	%(v/v)	7	34	34.8	34.51429	0.307834	0	35	--	35.0
benzene	%(v/v)	7	0.69	0.74	0.715714	0.019024	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	7	1.5	2	1.785714	0.21157	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	7	0.2	1	0.442857	0.276026	0	0	--	3
Ethanol	%(v/v)	7	0	1	0.271429	0.386067	0	0	--	5
Iso-propyl alcohol	%(v/v)	7	0	1	0.328571	0.372891	0	0	--	10
Tetro-butyl alcohol	%(v/v)	7	0	1	0.257143	0.373529	0	0	--	7
Iso-butyl alcohol	%(v/v)	7	0	1	0.242857	0.377964	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	7	4	7.2	5.114286	1.112697	0	0	--	15
Other oxygenate	%(v/v)	7	0	0.5	0.142857	0.181265	0	0	--	10
SULPHUR CONTENT	mg/kg	15	4	10	7.83333	1.762979	0	0	--	50
LEAD CONTENT	g/l	15	0	0.001	0.000333	0.000488	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	98	98.2	98.125	0.095743	98	0	95	--
MOTOR OCTANE NO.	--	4	88	88.2	88.075	0.095743	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	59.8	70	64.31667	3.961018	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	47	54	49.3333	2.73252	46	0	46.0	--
evaporated at 150	%(v/v)	6	84	88	86.3333	1.36626	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	6	3.5	14.8	8.3	4.613025	0	0	--	18.0
aromatics	%(v/v)	6	33	34.8	33.98333	0.823205	0	35	--	35.0
benzene	%(v/v)	4	0	0.65	0.3375	0.268871	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	4	1	1.9	1.475	0.46188	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	4	0.1	0.2	0.125	0.05	0	0	--	3
Ethanol	%(v/v)	4	1.1	3.4	2.025	1.129528	0	0	--	5
Iso-propyl alcohol	%(v/v)	4	0	0.1	0.075	0.05	0	0	--	10
Tetro-butyl alcohol	%(v/v)	4	0.1	0.2	0.125	0.05	0	0	--	7
Iso-butyl alcohol	%(v/v)	4	0	0.2	0.1	0.08165	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	6	10.6	9.075	2.099802	0	0	--	15
Other oxygenate	%(v/v)	4	0	0.2	0.075	0.095743	0	0	--	10
SULPHUR CONTENT	mg/kg	6	11.3	32	22.61667	7.218148	0	50	--	50
LEAD CONTENT	g/l	6	0	0.001	0.0003333	0.00051639	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2	98	98.1	98.05	0.070711	98	0	95	--
MOTOR OCTANE NO.	--	2	88	88.2	88.1	0.141421	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	3	74.9	82.9	78.4	4.09	0	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	3	46	48	47	1	46	0	46.0	--
evaporated at 150	%(v/v)	3	79	84	82.3333	2.886751	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2	5.8	11.1	8.45	3.747666	0	0	--	18.0
aromatics	%(v/v)	2	34.1	35	34.55	0.636396	0	35	--	35.0
benzene	%(v/v)	2	0.4	0.64	0.52	0.169706	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	2	1.9	2.3	2.1	0.282843	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	2	0.1	0.2	0.15	0.070711	0	0	--	3
Ethanol	%(v/v)	2	0	0.1	0.05	0.070711	0	0	--	5
Iso-propyl alcohol	%(v/v)	2	0.1	0.1	0.1	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	2	0.1	0.2	0.15	0.070711	0	0	--	7
Iso-butyl alcohol	%(v/v)	2	0	0.1	0.05	0.070711	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2	9.5	10.5	10	0.070711	0	0	--	15
Other oxygenate	%(v/v)	2	0.1	0.1	0.1	0	0	0	--	10
SULPHUR CONTENT	mg/kg	3	12	40	22.6	15.18815	0	50	--	50
LEAD CONTENT	g/l	3	0	0.001	0.000666	0.000577	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	4	98	98.2	98.1	0.08165	98	0	95	--
MOTOR OCTANE NO.	--	4	88	89	88.475	0.359398	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	8	65.1	67.8	66.35	0.886405	0	70	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	8	47	56	50.375	2.66927	46	0	46.0	--
evaporated at 150	%(v/v)	8	84	89	87.375	1.767767	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	4	2.1	4.9	3.775	1.268529	0	0	--	18.0
aromatics	%(v/v)	4	34.4	34.8	34.425	0.684957	0	35	--	35.0
benzene	%(v/v)	4	0	0.64	0.185	0.306974	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	4	1.8	2.3	2	0.244949	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	4	0.1	0.3	0.15	0.1	0	0	--	3
Ethanol	%(v/v)	4	0	1	0.45	0.525991	0	0	--	5
Iso-propyl alcohol	%(v/v)	4	0	0.4	0.125	0.189297	0	0	--	10
Tetro-butyl alcohol	%(v/v)	4	0	0.2	0.075	0.095743	0	0	--	7
Iso-butyl alcohol	%(v/v)	4	0	0.1	0.05	0.057735	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	4	8.8	11.7	10.1	1.278019	0	0	--	15
Other oxygenate	%(v/v)	4	0	0.2	0.075	0.095743	0	0	--	10
SULPHUR CONTENT	mg/kg	8	5	9.6	7.575	1.77019	0	0	--	50
LEAD CONTENT	g/l	8	0	0.001	0.00025	0.00046291	0	0.005	--	0.005

Notes:

0

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

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	6	98.2	100.4	98.7	0.839047	98	0	95	--
MOTOR OCTANE NO.	--	6	88	88.7	88.5	0.252982	88	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	13	67.7	85.7	75.50769	4.837779	0	90	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	13	46	57	49.46154	2.989297	46	0	46.0	--
evaporated at 150	%(v/v)	13	83	88	85.69231	1.887883	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	13	3.4	11.7	7.8	3.836231	0	0	--	18.0
aromatics	%(v/v)	13	34	35	34.554	0.36427	0	35	--	35.0
benzene	%(v/v)	13	0.09	0.71	0.550769	0.174139	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	13	1.7	2.4	2.1	0.3	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	6	0	0.5	0.266667	0.216025	0	0	--	3
Ethanol	%(v/v)	6	0	0.8	0.35	0.288097	0	0	--	5
Iso-propyl alcohol	%(v/v)	6	0	0.5	0.2166667	0.213698	0	0	--	10
Tetro-butyl alcohol	%(v/v)	6	0	0.4	0.2166667	0.183485	0	0	--	7
Iso-butyl alcohol	%(v/v)	6	0	0.4	0.183333	0.17224	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	9.3	11.5	10.35	1.015382	0	0	--	15
Other oxygenate	%(v/v)	6	0	0.5	0.25	0.207364	0	0	--	10
SULPHUR CONTENT	mg/kg	13	4.5	10	6.461538	1.777423	0	0	--	50
LEAD CONTENT	g/l	13	0	0.001	0.0002307	0.000438529	0	0.005	--	0.005

Notes:

0



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

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade A-92 (RON 92, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	45	92	92.3	92.2				91	--
MOTOR OCTANE NO.	--	45	82	82.9	82.4				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	54	60.7	86	69.2				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	54	48	62	56.1				46.0	--
evaporated at 150	%(v/v)	54	79	89	84.9				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	54	8.4	17.1	13.9				--	21.0
aromatics	%(v/v)	54	24.9	35.9	29.5				--	35.0
benzene	%(v/v)	54	0.48	1.03	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	54	0	1.7	0.4				--	2.7
OXYGENATES:										
Methanol	%(v/v)	54	0	0.2	0				--	3
Ethanol	%(v/v)	54	0	0.5	0.1				--	5
Iso-propyl alcohol	%(v/v)	54	0	0.3	0				--	10
Tetro-butyl alcohol	%(v/v)	54	0	0.4	0				--	7
Iso-butyl alcohol	%(v/v)	54	0	0.5	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	54	0	7.3	1.3				--	15
Other oxygenate	%(v/v)	54	0	0.2	0				--	10
SULPHUR CONTENT	mg/kg	54	7	60.7	24				--	50
LEAD CONTENT	g/l	54	0	0.001	0				--	0.005

Notes:

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

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	68	95	95.6	95.1				95	--
MOTOR OCTANE NO.	--	68	85	85.8	85.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	88	59.8	89.5	72.3				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	88	47	60	52.2				46.0	--
evaporated at 150	%(v/v)	88	79	88	84.2				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	88	8	14.7	10.9				--	18.0
aromatics	%(v/v)	88	25	39	34				--	35.0
benzene	%(v/v)	88	0.4	0.88	0.5				--	1.0
OXYGEN CONTENT	%(m/m)	88	0.5	2.5	1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0.3	0.1				--	3
Ethanol	%(v/v)	50	0	4.5	1.8				--	5
Iso-propyl alcohol	%(v/v)	50	0	0.2	0.1				--	10
Tetro-butyl alcohol	%(v/v)	50	0	0.2	0.1				--	7
Iso-butyl alcohol	%(v/v)	50	0	0.2	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	2.1	8.1	5.1				--	15
Other oxygenate	%(v/v)	50	0	0.2	0.1				--	10
SULPHUR CONTENT	mg/kg	88	9.6	44.1	22.2				--	50
LEAD CONTENT	g/l	88	0	0.001	0				--	0.005

Notes:

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

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade A-95 (RON 95, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	17	95	96	95.2				95	--
MOTOR OCTANE NO.	--	17	85	86	85.3				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	20	63.8	86.5	77.4				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	20	47	60	50.9				46.0	--
evaporated at 150	%(v/v)	20	80	87	84.7				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	8.5	10.8	9.5				--	18.0
aromatics	%(v/v)	12	26.4	34.8	32.6				--	35.0
benzene	%(v/v)	12	0.3	0.74	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	12	1	2.1	1.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0.1	1	0.3				--	3
Ethanol	%(v/v)	12	0	1.1	0.3				--	5
Iso-propyl alcohol	%(v/v)	12	0	1	0.2				--	10
Tetro-butyl alcohol	%(v/v)	12	0	1	0.2				--	7
Iso-butyl alcohol	%(v/v)	12	0	1	0.2				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	12	4	7.2	5.4				--	15
Other oxygenate	%(v/v)	12	0	0.5	0.1				--	10
SULPHUR CONTENT	mg/kg	20	4	10	7.8				--	50
LEAD CONTENT	g/l	20	0	0.001	0				--	0.005

Notes:

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

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	6	98	98.2	98.1				95	--
MOTOR OCTANE NO.	--	6	88	88.2	88.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	9	59.8	82.9	69				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	9	46	54	48.6				46.0	--
evaporated at 150	%(v/v)	9	79	88	85				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	8	3.5	14.8	8.3				--	18.0
aromatics	%(v/v)	8	33	35	34.1				--	35.0
benzene	%(v/v)	6	0	0.65	0.4				--	1.0
OXYGEN CONTENT	%(m/m)	6	1	2.3	1.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	6	0.1	0.2	0.1				--	3
Ethanol	%(v/v)	6	0	3.4	1.4				--	5
Iso-propyl alcohol	%(v/v)	6	0	0.1	0.1				--	10
Tetro-butyl alcohol	%(v/v)	6	0.1	0.2	0.1				--	7
Iso-butyl alcohol	%(v/v)	6	0	0.2	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	6	6	10.6	9.4				--	15
Other oxygenate	%(v/v)	6	0	0.2	0.1				--	10
SULPHUR CONTENT	mg/kg	9	11.3	40	22.6				--	50
LEAD CONTENT	g/l	9	0	0.001	0				--	0.005

Notes:

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

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade A-98 (RON 98, <10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	98	100.4	98.5				95	--
MOTOR OCTANE NO.	--	10	88	89	88.5				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	21	65.1	85.7	72				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	21	46	57	49.8				46.0	--
evaporated at 150	%(v/v)	21	83	89	86.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	17	2.1	11.7	6.9				--	18.0
aromatics	%(v/v)	17	34	35	34.5				--	35.0
benzene	%(v/v)	17	0	0.71	0.5				--	1.0
OXYGEN CONTENT	%(m/m)	17	1.7	2.4	2.1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	0.5	0.2				--	3
Ethanol	%(v/v)	10	0	1	0.4				--	5
Iso-propyl alcohol	%(v/v)	10	0	0.5	0.2				--	10
Tetro-butyl alcohol	%(v/v)	10	0	0.4	0.2				--	7
Iso-butyl alcohol	%(v/v)	10	0	0.4	0.1				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	10	8.8	11.7	10.3				--	15
Other oxygenate	%(v/v)	10	0	0.5	0.2				--	10
SULPHUR CONTENT	mg/kg	21	4.5	10	6.9				--	50
LEAD CONTENT	g/l	21	0	0.001	0				--	0.005

Notes:

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

Country: Luxembourg  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade RON95 <50ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	15	95.7	98	96.36666667	0.569042638	0	0	95	--
MOTOR OCTANE NO.	--	5	85	88.2	85.78	1.360882067	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	52.2	56.7	54.61666667	1.890414417	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	47.6	52.7	51.06666667	1.794064287	0	0	46.0	--
evaporated at 150	%(v/v)	6	82.9	86.8	85.78333333	1.444183737	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	15	5.6	17.9	13.32666667	3.232086161	0	0	--	18.0
aromatics	%(v/v)	15	29.2	35	32.55333	1.858903927	0	0	--	35.0
benzene	%(v/v)	13	0.5	0.9	0.616153846	0.113690989	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	11	0.4	1.97	1.142727273	0.558284711	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	3
Ethanol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	0.5	10.91	5.400769231	3.520772788	0	0	--	15
Other oxygenate	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
SULPHUR CONTENT	mg/kg	15	2.7	31	11.90666667	7.070003704	0	0	--	50
LEAD CONTENT	g/l	10	0.0009	0.0009	0.0009	0	0	0	--	0.005

Notes:

0

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

Country: Luxembourg  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade RON98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	15	98.4	99.7	98.9	0.40824829	0	0	95	--
MOTOR OCTANE NO.	--	5	87.8	88.3	88.04	0.207364414	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	6	55.3	58.8	56.93333333	1.530577233	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	6	48.1	50.5	49.5	0.829457654	0	0	46.0	--
evaporated at 150	%(v/v)	6	84.2	86.1	85.3	0.695701085	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	15	4.5	11.1	8.273333333	1.912540071	0	0	--	18.0
aromatics	%(v/v)	15	27.1	34.7	32.10667	2.000166666	0	0	--	35.0
benzene	%(v/v)	13	0.4	0.5	0.443076923	0.0480251	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	10	1.3	2	1.8	0.205480467	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	3
Ethanol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	7.2	11.1	9.8	1.093160555	0	0	--	15
Other oxygenate	%(v/v)	10	0.09	0.09	0.09	0	0	0	--	10
SULPHUR CONTENT	mg/kg	15	4.2	14.2	7.433333333	2.881880999	0	0	--	50
LEAD CONTENT	g/l	10	0.0009	0.0009	0.0009	0	0	0	--	0.005

Notes:

0

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

Country: Malta

Year: 2005

Period: Winter

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

National Fuel Grade Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	16	94.6	96.7	95.417	0.613	0	0	95	--
MOTOR OCTANE NO.	--	16	84.5	87	85.294	0.739	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa	16	55.8	78.3	64.95	6.55			--	--
DISTILLATION:										
evaporated at 100	%(v/v)	16	46	60.8	54.469	5.222	0	0	46.0	--
evaporated at 150	%(v/v)	16	82.5	91.1	87.094	2.353	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	16	4.2	21.9	16.694	6.387	0	0	--	18.0
aromatics	%(v/v)	16	21.2	44.4	32.125	6.384	0	0	--	35.0
benzene	%(v/v)	16	0.7	1	0.813	0.094	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	16	0	0.1	0.019	0.04	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	16	0	0.25	0.046	0.078	0	0	--	10
Tetro-butyl alcohol	%(v/v)	16	0	0.5	0.122	0.162	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)	16	1.14	8.3	4.052	2.467	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	16	26	60	38.625	10.085	0	0	--	50
LEAD CONTENT	g/l	16	0	0.001	0	0	0	0	--	0.005

Notes: Samples tested for vapour pressure (No of samples: 16, Minimum: 55.80, Maximum: 78.30, Mean: 64.95, Std. Dev: 6.55). 0 denotes values below detection limit of test.



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

Country: Malta

Year: 2005

Period: Summer

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

National Fuel Grade Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	13	94.4	95.4	94.938	0.26	0	0	95	--
MOTOR OCTANE NO.	--	13	84.1	85.6	84.746	0.362	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	13	50	60	54.931	2.435	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	13	46	52.5	49.623	2.11	0	0	46.0	--
evaporated at 150	%(v/v)	13	86.6	90.5	88.469	1.125	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	13	16.1	19.9	18.269	1.078	0	0	--	18.0
aromatics	%(v/v)	13	27.4	36.5	30.777	2.544	0	0	--	35.0
benzene	%(v/v)	13	0.6	1	0.815	0.141	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	13	0	0.1	0.008	0.028	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	13	0	0.29	0.03	0.083	0	0	--	10
Tetro-butyl alcohol	%(v/v)	13	0	0.1	0.008	0.028	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)	13	0	7.6	2.919	1.923	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	13	25	43	33.923	5.392	0	0	--	50
LEAD CONTENT	g/l	13	0	0.002	0.001	0.001	0	0	--	0.005

Notes:

0

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

Country: Malta

Year: 2005

Period: Full-year

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

National Fuel Grade Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	29	94.4	96.7	95.2				95	--
MOTOR OCTANE NO.	--	29	84.1	87	85				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	13	0	60	54.9				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	29	46	60.8	52.3				46.0	--
evaporated at 150	%(v/v)	29	82.5	91.1	87.7				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	29	4.2	21.9	17.4				--	18.0
aromatics	%(v/v)	29	21.2	44.4	31.5				--	35.0
benzene	%(v/v)	29	0.6	1	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0					--	2.7
OXYGENATES:										
Methanol	%(v/v)	29	0	0.1	0				--	3
Ethanol	%(v/v)	0	0	0					--	5
Iso-propyl alcohol	%(v/v)	29	0	0.29	0				--	10
Tetro-butyl alcohol	%(v/v)	29	0	0.5	0.1				--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	29	0	8.3	3.5				--	15
Other oxygenate	%(v/v)	0	0	0					--	10
SULPHUR CONTENT	mg/kg	29	25	60	36.5				--	50
LEAD CONTENT	g/l	29	0	0.002	0				--	0.005

Notes:

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

Country: Malta

Year: 2005

Period: Winter

FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu

National Fuel Grade Lead Replacement Petrol (LRP)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	10	96.6	97.7	97	0.417	0	0	95	--
MOTOR OCTANE NO.	--	10	85.5	87.5	86.02	0.583	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa	10	56.5	70.3	65.57	4.226			--	--
DISTILLATION:										
evaporated at 100	%(v/v)	10	46.1	59.2	52.97	5.334	0	0	46.0	--
evaporated at 150	%(v/v)	10	83.1	90	87.17	1.801	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	10	10.8	31.9	17.41	6.389	0	0	--	18.0
aromatics	%(v/v)	10	28.1	46.4	34.53	6.047	0	0	--	35.0
benzene	%(v/v)	10	0.4	0.9	0.76	0.165	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	10	0	1.82	0.182	0.576	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	10	0	0.24	0.057	0.094	0	0	--	10
Tetro-butyl alcohol	%(v/v)	10	0	0.93	0.223	0.298	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)	10	0	5.6	3.344	2.074	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	10	25	54	44.5	9.336	0	0	--	50
LEAD CONTENT	g/l	10	0	0.001	0	0.001	0	0	--	0.005

Notes: Samples tested for vapour pressure (No of samples: 10, Minimum: 56.50, Maximum: 70.30, Mean: 65.57, Std. Dev: 4.226). 0 denotes values below detection limit of test.

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

Country: Malta  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Lead Replacement Petrol (LRP)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	12	96.1	96.8	96.525	0.273	0	0	95	--
MOTOR OCTANE NO.	--	12	84.4	86.5	85.642	0.614	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	12	49.6	55.8	53.467	2.119	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	12	46.5	51.3	49.5	1.629	0	0	46.0	--
evaporated at 150	%(v/v)	12	86	90.2	88	1.258	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	12	16.2	20.4	17.708	1.13	0	0	--	18.0
aromatics	%(v/v)	12	27.1	36.7	31.975	2.76	0	0	--	35.0
benzene	%(v/v)	12	0.6	1	0.833	0.123	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	12	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	12	0	0.32	0.053	0.123	0	0	--	10
Tetro-butyl alcohol	%(v/v)	12	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)	12	0	7.5	3.676	2.326	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	12	28	42	35.5	5.196	0	0	--	50
LEAD CONTENT	g/l	12	0	0.001	0.001	0	0	0	--	0.005

Notes: 0 denotes values below detection limit of test.

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

Country: Malta  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Lead Replacement Petrol (LRP)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	22	96.1	97.7	96.7				95	--
MOTOR OCTANE NO.	--	22	84.4	87.5	85.8				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	12	0	55.8	53.5				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	22	46.1	59.2	51.1				46.0	--
evaporated at 150	%(v/v)	22	83.1	90.2	87.6				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	22	10.8	31.9	17.6				--	18.0
aromatics	%(v/v)	22	27.1	46.4	33.1				--	35.0
benzene	%(v/v)	22	0.4	1	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0					--	2.7
OXYGENATES:										
Methanol	%(v/v)	22	0	1.82	0.1				--	3
Ethanol	%(v/v)	0	0	0					--	5
Iso-propyl alcohol	%(v/v)	22	0	0.32	0.1				--	10
Tetro-butyl alcohol	%(v/v)	22	0	0.93	0.1				--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	22	0	7.5	3.5				--	15
Other oxygenate	%(v/v)	0	0	0					--	10
SULPHUR CONTENT	mg/kg	22	25	54	39.6				--	50
LEAD CONTENT	g/l	22	0	0.001	0				--	0.005

Notes:

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

Country: Netherlands  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	106	94.55	97.55	95.71	0.2	0	0	95	--
MOTOR OCTANE NO.	--	106	84.6	86.1	85.19	0.3	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	54	48.8	60.3	55.97	1	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	106	49.15	63.35	54.5	0.5	0	0	46.0	--
evaporated at 150	%(v/v)	106	80.15	95.2	87.89	1.1	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	106	1.6	16.25	7.1	0.4	0	0	--	18.0
aromatics	%(v/v)	106	27.65	39.95	33.11	2.1	0	0	--	35.0
benzene	%(v/v)	106	0.25	0.85	0.62	0.04	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	106	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	106	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	106	0	0	0	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	106	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	106	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	106	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	106	0.2	12.25	5.03	0.14	0	0	--	15
Other oxygenate	%(v/v)	106	0	0	0	0.04	0	0	--	10
SULPHUR CONTENT	mg/kg	106	4	45.5	18.51	1.77	0	0	--	50
LEAD CONTENT	g/l	106	0	0	0	0.0007	0	0	--	0.005

**Notes:** In the summer period 4 samples of the Research Octane Number (RON), 8 samples of the Motor Octane Number (MON) and one sample for vapour pressure (DVPE) appeared to lie outside the specifications. In view of the deviation / margin of error of the manipulated analysis methods no further action was undertaken here. In the winter period one sample of the Research Octane Number (RON) and eleven samples for Motor Octane Number (MON) appeared to lie outside the specification. In view of the deviation / margin of error of the manipulated analysis methods no further action was undertaken here

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

Country: Poland  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Lead-free petrol 95, <50ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	235	87.8	98.3	95.47	0.89	0	0	95	--
MOTOR OCTANE NO.	--	235	80.2	87.8	85.5	0.82	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	235	53	68.2	67.78	10.87	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	235	42.8	64.1	52.12	2.95	0	0	46.0	--
evaporated at 150	%(v/v)	235	72.4	93.2	82.99	2.07	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	235	0.3	16.3	7.06	3.49	0	0	--	18.0
aromatics	%(v/v)	235	21.8	38.6	32.75	2.76	0	0	--	35.0
benzene	%(v/v)	235	0.34	2.6	0.65	0.17	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	235	0.02	3.78	0.94	0.63	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	235	0.17	1.5	0.18	0.09	0	0	--	3
Ethanol	%(v/v)	235	0.17	4.6	0.55	1.04	0	0	--	5
Iso-propyl alcohol	%(v/v)	235	0.17	0.2	0.17	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	235	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	235	0.17	1.2	0.17	0.07	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	235	0.17	20.5	4.49	2.33	0	0	--	15
Other oxygenate	%(v/v)	235	0.17	1.9	0.18	0.12	0	0	--	10
SULPHUR CONTENT	mg/kg	235	0.1	276	28.39	24.22	0	0	--	50
LEAD CONTENT	g/l	231	0.0025	0.006	0.005	0	0	0	--	0.005

Notes:

0

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

Country: Poland  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Lead-free petrol 98, <10ppm sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	157	96.2	100.7	98.4	0.56	0	0	95	--
MOTOR OCTANE NO.	--	157	87	90.4	88.59	0.63	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	157	48.4	69.6	61.49	8.89	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	157	45.5	58	51.23	2.87	0	0	46.0	--
evaporated at 150	%(v/v)	157	79.9	88.6	83.18	1.42	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	157	0.4	7.8	2.32	1.22	0	0	--	18.0
aromatics	%(v/v)	157	27.5	36.8	33.02	1.78	0	0	--	35.0
benzene	%(v/v)	157	0.4	0.91	0.63	0.13	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	157	1.1	2.7	1.81	0.4	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	157	0.17	0.17	0.17	0	0	0	--	3
Ethanol	%(v/v)	157	0.17	1.7	0.19	0.13	0	0	--	5
Iso-propyl alcohol	%(v/v)	157	0.17	0.17	0.17	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	157	0.17	0.17	0.17	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	157	0.17	0.17	0.17	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	157	6.8	14.9	10.53	1.84	0	0	--	15
Other oxygenate	%(v/v)	157	0.17	0.5	0.18	0.05	0	0	--	10
SULPHUR CONTENT	mg/kg	157	0.6	20	8.01	3.26	0	0	--	50
LEAD CONTENT	g/l	156	0.003	0.005	0.005	0	0	0	--	0.005

Notes:

0



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

Country: Portugal  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade EuroSuper

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	23	95	97	95.69565217	0.702901946	95	0	95	--
MOTOR OCTANE NO.	--	23	85	86	85.04347826	0.208514414	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	10	54.2	60	57.61	2.02509259	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	23	46	55	50.90869565	2.780927419	46	71	46.0	--
evaporated at 150	%(v/v)	23	76.8	88.5	83.20434783	3.580182608	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	23	3.1	13	8.539130435	2.725425593	0	18	--	18.0
aromatics	%(v/v)	23	17.4	34.8	31.31739	3.727252482	0	42	--	35.0
benzene	%(v/v)	23	0.5	1	0.714782609	0.141191989	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	18	0.3	2.5	1.083333333	0.486741869	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)	18	2	13.7	5.938888889	2.630173085	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	23	0	36.4	18.56956522	7.817197521	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes: Only ethers with 5 or more carbon atoms per molecule, are used.

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

Country: Portugal  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Super plus

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	23	98	99	98.3	0.486984754	98	0	95	--
MOTOR OCTANE NO.	--	23	87	87	87	0	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	9	54.6	59.2	57.02222222	1.54497393	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	23	46	55	50.90869565	2.780927419	46	71	46.0	--
evaporated at 150	%(v/v)	23	76.8	88.5	83.20434783	3.580182608	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	23	3	9.4	6.395652174	1.836369507	0	18	--	18.0
aromatics	%(v/v)	23	27.6	34.9	32.92174	2.085873813	0	42	--	35.0
benzene	%(v/v)	23	0.49	0.8	0.630434783	0.091526363	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	11	1.5	2.6	2.127272727	0.374408625	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)	11	8.8	14.4	11.89090909	2.018144963	0	15	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	18	0	10	7.116666667	1.863346136	0	50	--	50
LEAD CONTENT	g/l	0	0	0	0	0	0	0.005	--	0.005

Notes: Only ethers with 5 or more carbon atoms per molecule, are used.

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

Country: Slovakia  
 Year: 2005  
 Period: Summer  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	55	90.2	95.7	92.9	1.011	91	0	91	--
MOTOR OCTANE NO.	--	55	82.6	85.8	84.1	0.7093	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	55	44.9	63.6	51.5	3.4018	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	55	46.8	58.2	52	2.4524	46	0	46.0	--
evaporated at 150	%(v/v)	55	77	86.2	80.4	2.8206	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	55	4.7	16.5	11.5	2.7263	0	21	--	21.0
aromatics	%(v/v)	55	27.4	35.3	31.6	1.9569	0	35	--	35.0
benzene	%(v/v)	55	0.5	0.9	0.8	0.1139	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	55	0.01	0.8	0.18	0.2285	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	55	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	55	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	55	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	55	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	55	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	55	0.1	4.5	1	1.2544	0	15	--	15
Other oxygenate	%(v/v)	55	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	55	1.8	46.4	10.9	4.785733439	0	50	--	50
LEAD CONTENT	g/l	55	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Winter  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s)  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	91.6	95.9	92.9	0.8421	91	0	91	--
MOTOR OCTANE NO.	--	50	83	85.5	84.1	0.6718	81	0	81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	50.1	60.9	54.6	2.7167	46	0	46.0	--
evaporated at 150	%(v/v)	50	78.3	85.4	81.9	2.0213	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	4.3	18.5	11.9	3.8108	0	21	--	21.0
aromatics	%(v/v)	50	27.2	35.6	31.6	2.1938	0	35	--	35.0
benzene	%(v/v)	50	0.5	1	0.8	0.1085	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0	0.63	0.13	0.1405	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0	3.5	0.7	0.7768	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	0.3	37.1	7.304	4.235042338	0	50	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Full-year  
 FuelID: Regular unleaded petrol min. RON=91 (<50 ppm s  
 National Fuel Grade NORMAL 91

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	105	90.2	95.9	92.9				91	--
MOTOR OCTANE NO.	--	105	82.6	85.8	84.1				81	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	55	0	63.6	51.5				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	105	46.8	60.9	53.2				46.0	--
evaporated at 150	%(v/v)	105	77	86.2	81.1				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	105	4.3	18.5	11.7				--	21.0
aromatics	%(v/v)	105	27.2	35.6	31.6				--	35.0
benzene	%(v/v)	105	0.5	1	0.8				--	1.0
OXYGEN CONTENT	%(m/m)	105	0	0.8	0.2				--	2.7
OXYGENATES:										
Methanol	%(v/v)	105	0	0	0				--	3
Ethanol	%(v/v)	105	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	105	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	105	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	105	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	105	0	4.5	0.9				--	15
Other oxygenate	%(v/v)	105	0	0	0				--	10
SULPHUR CONTENT	mg/kg	105	0.3	46.4	9.2				--	50
LEAD CONTENT	g/l	105	0	0	0				--	0.005

Notes:

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

Country: Slovakia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	53	94.4	96.4	95.3	0.3718	95	0	95	--
MOTOR OCTANE NO.	--	53	85.3	87	86	0.4603	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	53	45.3	59.9	51.4	2.764	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	53	47.2	59.1	50.9	3.288	46	0	46.0	--
evaporated at 150	%(v/v)	53	77.3	87	81	3.1873	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	53	3.7	15	10.7	2.6066	0	18	--	18.0
aromatics	%(v/v)	53	29.3	35.9	32.6	1.4849	0	35	--	35.0
benzene	%(v/v)	53	0.4	0.8	0.6	0.0925	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	53	0.46	2	0.76	0.3577	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	53	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	53	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	53	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	53	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	53	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	53	2.5	11.1	4.2	1.9811	0	15	--	15
Other oxygenate	%(v/v)	53	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	53	2.4	37.1	8.950943396	1.364123822	0	50	--	50
LEAD CONTENT	g/l	53	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	50	94.5	96.7	95.7	0.4675	95	0	95	--
MOTOR OCTANE NO.	--	50	85.2	87.3	86.2	0.5473	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	50	48	57.9	52.2	3.3315	46	0	46.0	--
evaporated at 150	%(v/v)	50	77.6	87.3	81.6	3.1113	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	50	6.6	16.8	11.5	2.6787	0	18	--	18.0
aromatics	%(v/v)	50	27.4	36.9	33.1	1.9618	0	35	--	35.0
benzene	%(v/v)	50	0.5	1.3	0.7	0.1177	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	50	0.15	1.45	0.62	0.264	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	50	0	0.1	0	0.0196	0	3	--	3
Ethanol	%(v/v)	50	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	50	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	50	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	50	0.2	6.8	3.3	1.3515	0	15	--	15
Other oxygenate	%(v/v)	50	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	50	0.6	25.8	3.312	2.001883953	0	50	--	50
LEAD CONTENT	g/l	50	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Super 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	103	94.4	96.7	95.5				95	--
MOTOR OCTANE NO.	--	103	85.2	87.3	86.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	53	0	59.9	51.4				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	103	47.2	59.1	51.5				46.0	--
evaporated at 150	%(v/v)	103	77.3	87.3	81.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	103	3.7	16.8	11.1				--	18.0
aromatics	%(v/v)	103	27.4	36.9	32.8				--	35.0
benzene	%(v/v)	103	0.4	1.3	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	103	0.15	2	0.7				--	2.7
OXYGENATES:										
Methanol	%(v/v)	103	0	0.1	0				--	3
Ethanol	%(v/v)	103	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	103	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	103	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	103	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	103	0.2	11.1	3.8				--	15
Other oxygenate	%(v/v)	103	0	0	0				--	10
SULPHUR CONTENT	mg/kg	103	0.6	37.1	6.2				--	50
LEAD CONTENT	g/l	103	0	0	0				--	0.005

Notes:



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

Country: Slovakia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	15	96.8	100.2	98.7	0.8913	95	0	95	--
MOTOR OCTANE NO.	--	15	88	90.3	89.1	0.747	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	15	44.8	68.1	53.7	6.2374	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	15	49.5	62.5	54.3	4.317	46	0	46.0	--
evaporated at 150	%(v/v)	15	78.5	89.9	83.1	3.4428	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	15	4.3	9.9	5.8	1.4926	0	18	--	18.0
aromatics	%(v/v)	15	29.6	34.8	32.2	1.5561	0	35	--	35.0
benzene	%(v/v)	15	0.4	0.7	0.5	0.0943	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	15	2	2.68	2.33	0.2053	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	15	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	15	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	15	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	15	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	15	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	15	11.1	14.7	12.9	1.108	0	15	--	15
Other oxygenate	%(v/v)	15	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	15	1.7	7.4	3.8	1.9217	0	50	--	50
LEAD CONTENT	g/l	15	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	13	98.2	100.1	99.1	0.6534	95	0	95	--
MOTOR OCTANE NO.	--	13	88.7	90.7	89.4	0.5484	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	0	0	0	0	0	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	13	51.1	64.9	57.9	4.8349	46	0	46.0	--
evaporated at 150	%(v/v)	13	80	93.6	85.6	4.324	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	13	2.7	11.7	6.5	3.3515	0	18	--	18.0
aromatics	%(v/v)	13	28.4	37.7	33.6	2.5524	0	35	--	35.0
benzene	%(v/v)	13	0.4	0.8	0.6	0.1692	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	13	1.59	2.25	1.83	0.1576	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	13	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	13	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	13	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	13	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	13	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	13	8.8	12.6	10.1	0.901	0	15	--	15
Other oxygenate	%(v/v)	13	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	13	0.2	4.7	1.3	1.3493	0	50	--	50
LEAD CONTENT	g/l	13	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovakia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade Super Plus 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	28	96.8	100.2	98.9				95	--
MOTOR OCTANE NO.	--	28	88	90.7	89.2				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	15	0	68.1	53.7				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	28	49.5	64.9	56				46.0	--
evaporated at 150	%(v/v)	28	78.5	93.6	84.3				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	28	2.7	11.7	6.1				--	18.0
aromatics	%(v/v)	28	28.4	37.7	32.9				--	35.0
benzene	%(v/v)	28	0.4	0.8	0.5				--	1.0
OXYGEN CONTENT	%(m/m)	28	1.59	2.68	2.1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	28	0	0	0				--	3
Ethanol	%(v/v)	28	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	28	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	28	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	28	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	28	8.8	14.7	11.6				--	15
Other oxygenate	%(v/v)	28	0	0	0				--	10
SULPHUR CONTENT	mg/kg	28	0.2	7.4	2.6				--	50
LEAD CONTENT	g/l	28	0	0	0				--	0.005

Notes:

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

Country: Slovenia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	57	95	96.9	95.5	0.34	95	0	95	--
MOTOR OCTANE NO.	--	57	84.6	86.3	85.3	0.27	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	57	55.5	74.8	59.4	3.2	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	57	45.6	55.7	49.2	2.5	46	0	46.0	--
evaporated at 150	%(v/v)	57	78.3	93.2	83.6	2.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	57	4.4	12.6	9.3	1.54	0	18	--	18.0
aromatics	%(v/v)	57	26.1	35.1	30.5	2.15	0	35	--	35.0
benzene	%(v/v)	57	0.44	0.83	0.63	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	57	0.22	1.82	0.62	0.24	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	57	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	57	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	57	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	57	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	57	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	57	1.2	10.2	3.4	1.4	0	15	--	15
Other oxygenate	%(v/v)	57	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	57	6	42.9	24.5	6.6	0	50	--	50
LEAD CONTENT	g/l	57	0	0	0	0	0	0.005	--	0.005

Notes: Uporabljene druge metode, ki so validirane in optimizirane v skladu z 17025.

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

Country: Slovenia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	54	95.1	97	95.7	0.33	95	0	95	--
MOTOR OCTANE NO.	--	54	85	95.9	85.7	1.45	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	54	57.3	86.2	72.6	7.9	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	54	44.6	59.4	51.5	3.3	46	0	46.0	--
evaporated at 150	%(v/v)	54	80.9	89.5	85.4	2.5	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	54	4.3	16.4	8.8	3.2	0	18	--	18.0
aromatics	%(v/v)	54	23.8	36.9	29.9	2.74	0	35	--	35.0
benzene	%(v/v)	54	0.31	1.44	0.86	0.18	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	54	0.12	1.65	0.47	0.29	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	54	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	54	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	54	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	54	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	54	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	54	0.7	9.1	2.6	1.6	0	15	--	15
Other oxygenate	%(v/v)	54	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	54	11.2	74.6	32	9.7	0	50	--	50
LEAD CONTENT	g/l	54	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovenia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Unleaded petrol NMB 95 EURO SUPER

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	111	95	97	95.6				95	--
MOTOR OCTANE NO.	--	111	84.6	95.9	85.5				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	111	55.5	86.2	65.8				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	111	44.6	59.4	50.3				46.0	--
evaporated at 150	%(v/v)	111	78.3	93.2	84.5				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	111	4.3	16.4	9.1				--	18.0
aromatics	%(v/v)	111	23.8	36.9	30.2				--	35.0
benzene	%(v/v)	111	0.31	1.44	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	111	0.12	1.82	0.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	111	0	0	0				--	3
Ethanol	%(v/v)	111	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	111	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	111	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	111	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	111	0.7	10.2	3				--	15
Other oxygenate	%(v/v)	111	0	0	0				--	10
SULPHUR CONTENT	mg/kg	111	6	74.6	28.1				--	50
LEAD CONTENT	g/l	111	0	0	0				--	0.005

Notes:

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

Country: Slovenia  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded petrol NMB 98 SUPER PLUS

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	14	97.8	100	98.7	0.89	98	0	95	--
MOTOR OCTANE NO.	--	14	88	90.2	88.7	0.84	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	14	55.7	70.7	63.5	3.9	0	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	14	48.7	62.8	56	4.2	46	0	46.0	--
evaporated at 150	%(v/v)	14	82.7	90	86	2.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	14	0.7	8.8	3.2	2.98	0	18	--	18.0
aromatics	%(v/v)	14	29.6	35.7	32.9	1.65	0	35	--	35.0
benzene	%(v/v)	14	0.3	0.96	0.74	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	14	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	14	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	14	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	14	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	14	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	14	11.9	15	13.8	1.1	0	15	--	15
Other oxygenate	%(v/v)	14	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	14	0	17.7	10.5	5.3	0	50	--	50
LEAD CONTENT	g/l	14	0	0	0	0	0	0.005	--	0.005

Notes:

0

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

Country: Slovenia  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded petrol NMB 98 SUPER PLUS

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	11	98	100	98.9	0.94	98	0	95	--
MOTOR OCTANE NO.	--	11	88.1	90	88.8	0.56	87	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	11	59.8	79.6	66.8	5.3	0	0	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	11	50	64.4	58	4.7	46	0	46.0	--
evaporated at 150	%(v/v)	11	82.2	90.2	87	2.6	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	11	0.7	8.1	3.4	2.6	0	18	--	18.0
aromatics	%(v/v)	11	29.6	35.3	32.2	1.4	0	35	--	35.0
benzene	%(v/v)	11	0.34	1.33	0.73	0.26	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	11	1.87	2.7	2.45	0.24	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	11	0	0	0	0	0	3	--	3
Ethanol	%(v/v)	11	0	0	0	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	11	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	11	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	11	0	0	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	11	10.4	15	13.6	1.3	0	15	--	15
Other oxygenate	%(v/v)	11	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	11	0	8.9	7	1.8	0	50	--	50
LEAD CONTENT	g/l	11	0	0	0	0	0	0.005	--	0.005

Notes:

0



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

Country: Slovenia  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<50 ppm sulphur)  
 National Fuel Grade: Unleaded petrol NMB 98 SUPER PLUS

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	25	97.8	100	98.8				95	--
MOTOR OCTANE NO.	--	25	88	90.2	88.7				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	25	55.7	79.6	65				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	25	48.7	64.4	56.9				46.0	--
evaporated at 150	%(v/v)	25	82.2	90.2	86.4				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	25	0.7	8.8	3.3				--	18.0
aromatics	%(v/v)	25	29.6	35.7	32.6				--	35.0
benzene	%(v/v)	25	0.3	1.33	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	11	0	2.7	2.5				--	2.7
OXYGENATES:										
Methanol	%(v/v)	25	0	0	0				--	3
Ethanol	%(v/v)	25	0	0	0				--	5
Iso-propyl alcohol	%(v/v)	25	0	0	0				--	10
Tetro-butyl alcohol	%(v/v)	25	0	0	0				--	7
Iso-butyl alcohol	%(v/v)	25	0	0	0				--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	25	10.4	15	13.7				--	15
Other oxygenate	%(v/v)	25	0	0	0				--	10
SULPHUR CONTENT	mg/kg	25	0	17.7	9				--	50
LEAD CONTENT	g/l	25	0	0	0				--	0.005

Notes:

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

Country: Spain  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	159	95	96.9	95.7	0.5	95	0	95	--
MOTOR OCTANE NO.	--	159	85	87	85.3	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	159	58.7	79.7	71.8	4.7	50	80	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	159	46.1	67.9	57.2	4.8	46	71	46.0	--
evaporated at 150	%(v/v)	159	83.7	95.6	91.8	2.2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	159	3.3	17.8	11.2	2.8	0	18	--	18.0
aromatics	%(v/v)	159	18.8	35	29.4	4.2	0	35	--	35.0
benzene	%(v/v)	159	0.2	1	0.7	0.1	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	159	0	2.5	0.9	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	159	0	0.3	0.1	0.1	0	3	--	3
Ethanol	%(v/v)	159	0	0.6	0.1	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	159	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	159	0	0.4	0.1	0.1	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)	159	0.2	13.6	4.8	2.4	0	15	--	15
Other oxygenate	%(v/v)	159	0	0.8	0	0.1	0	10	--	10
SULPHUR CONTENT	mg/kg	159	0	50	27.2	11.5	0	50	--	50
LEAD CONTENT	g/l	159	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Spain  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	99	95.1	96.9	95.9	0.5	95	0	95	--
MOTOR OCTANE NO.	--	99	85	86.7	85.5	0.3	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	99	48.1	60	56.6	3.1	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	99	46.1	68	55.4	5.3	46	71	46.0	--
evaporated at 150	%(v/v)	99	84	94.6	91.8	2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	99	4.2	17.4	10.6	3.2	0	18	--	18.0
aromatics	%(v/v)	99	20.3	34.9	31.4	3.4	0	35	--	35.0
benzene	%(v/v)	99	0.4	1	0.7	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	99	0.5	2.2	1.1	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	99	0	0.2	0.1	0.1	0	3	--	3
Ethanol	%(v/v)	99	0	0.5	0.1	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	99	0	0.4	0	0.1	0	10	--	10
Tetro-butyl alcohol	%(v/v)	99	0	0.2	0.1	0.1	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)	99	2.3	11.9	5.9	2.7	0	15	--	15
Other oxygenate	%(v/v)	99	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	99	0	48.5	22.4	11.1	0	50	--	50
LEAD CONTENT	g/l	99	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Spain  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	258	95	96.9	95.8				95	--
MOTOR OCTANE NO.	--	258	85	87	85.4				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	258	48.1	79.7	66				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	258	46.1	68	56.5				46.0	--
evaporated at 150	%(v/v)	258	83.7	95.6	91.8				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	258	3.3	17.8	11				--	18.0
aromatics	%(v/v)	258	18.8	35	30.2				--	35.0
benzene	%(v/v)	258	0.2	1	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	258	0	2.5	1				--	2.7
OXYGENATES:										
Methanol	%(v/v)	258	0	0.3	0.1				--	3
Ethanol	%(v/v)	258	0	0.6	0.1				--	5
Iso-propyl alcohol	%(v/v)	258	0	0.4	0				--	10
Tetro-butyl alcohol	%(v/v)	258	0	0.4	0.1				--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	258	0.2	13.6	5.2				--	15
Other oxygenate	%(v/v)	258	0	0.8	0				--	10
SULPHUR CONTENT	mg/kg	258	0	50	25.4				--	50
LEAD CONTENT	g/l	258	0.001	0.001	0				--	0.005

Notes:

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

Country: Spain

Year: 2005

Period: Winter

FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu

National Fuel Grade GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	59	97	98.8	97.4	0.5	95	0	95	--
MOTOR OCTANE NO.	--	59	85.5	88.7	86.6	0.6	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	59	57.8	79.9	69.8	5.5	50	80	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	59	47.9	66.2	57.8	4.5	46	71	46.0	--
evaporated at 150	%(v/v)	59	86.6	95.4	91.7	2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	59	1.7	16.1	9.4	3.3	0	18	--	18.0
aromatics	%(v/v)	59	20.7	37.2	29.4	4	0	35	--	35.0
benzene	%(v/v)	59	0.2	1	0.7	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	59	0.7	2.5	1.5	0.5	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	59	0	0.3	0	0.1	0	3	--	3
Ethanol	%(v/v)	59	0	0.5	0.1	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	59	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	59	0	0.5	0.1	0.1	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)	59	3.9	14.8	8.8	2.7	0	15	--	15
Other oxygenate	%(v/v)	59	0	1.2	0	0.2	0	10	--	10
SULPHUR CONTENT	mg/kg	59	0	50	31	13.6	0	50	--	50
LEAD CONTENT	g/l	59	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Spain  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	41	97	98.8	97.5	0.5	95	0	95	--
MOTOR OCTANE NO.	--	41	85.8	87.8	86.8	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	41	52	60	57.8	2.4	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	41	46.4	63.7	55.8	4.7	46	71	46.0	--
evaporated at 150	%(v/v)	41	86.4	94.8	91.3	2.2	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	41	5.1	12.2	8.9	2.1	0	18	--	18.0
aromatics	%(v/v)	41	25.1	35.5	31.1	3.1	0	35	--	35.0
benzene	%(v/v)	41	0.3	1	0.7	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	41	0.7	2.6	1.8	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	41	0	0.5	0.2	0.1	0	3	--	3
Ethanol	%(v/v)	41	0	0.5	0.2	0.1	0	5	--	5
Iso-propyl alcohol	%(v/v)	41	0	0.4	0	0.1	0	10	--	10
Tetro-butyl alcohol	%(v/v)	41	0	0.3	0.1	0.1	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)	41	3.5	14.7	9.8	2.6	0	15	--	15
Other oxygenate	%(v/v)	41	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	41	0	48.1	23.6	10.5	0	50	--	50
LEAD CONTENT	g/l	41	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Spain  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade GASOLINA I.O.97

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	100	97	98.8	97.4				95	--
MOTOR OCTANE NO.	--	100	85.5	88.7	86.7				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	100	52	79.9	64.9				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	100	46.4	66.2	57				46.0	--
evaporated at 150	%(v/v)	100	86.4	95.4	91.5				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	100	1.7	16.1	9.2				--	18.0
aromatics	%(v/v)	100	20.7	37.2	30.1				--	35.0
benzene	%(v/v)	100	0.2	1	0.7				--	1.0
OXYGEN CONTENT	%(m/m)	100	0.7	2.6	1.6				--	2.7
OXYGENATES:										
Methanol	%(v/v)	100	0	0.5	0.1				--	3
Ethanol	%(v/v)	100	0	0.5	0.1				--	5
Iso-propyl alcohol	%(v/v)	100	0	0.4	0				--	10
Tetro-butyl alcohol	%(v/v)	100	0	0.5	0.1				--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	100	3.5	14.8	9.2				--	15
Other oxygenate	%(v/v)	100	0	1.2	0				--	10
SULPHUR CONTENT	mg/kg	100	0	50	28				--	50
LEAD CONTENT	g/l	100	0.001	0.001	0				--	0.005

Notes:

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

Country: Spain  
 Year: 2005  
 Period: Winter  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	151	98	99.6	98.6	0.4	95	0	95	--
MOTOR OCTANE NO.	--	151	86.4	89.5	87.9	0.6	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	151	54.1	80	70.5	5.9	50	80	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	151	46.2	65.3	55.8	4.8	46	71	46.0	--
evaporated at 150	%(v/v)	151	85.8	96.1	91.5	2.3	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	151	0.1	17.6	6.9	4.1	0	18	--	18.0
aromatics	%(v/v)	151	18.2	35	30.8	3.7	0	35	--	35.0
benzene	%(v/v)	151	0.2	1	0.6	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	151	0	2.5	1.7	0.7	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	151	0	0.1	0	0	0	3	--	3
Ethanol	%(v/v)	151	0	0.7	0.1	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	151	0	0.1	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	151	0	1	0.1	0.1	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)	151	0	14.7	9.4	4.1	0	15	--	15
Other oxygenate	%(v/v)	151	0	1.2	0	0.2	0	10	--	10
SULPHUR CONTENT	mg/kg	151	0	10	7.4	2.2	0	0	--	50
LEAD CONTENT	g/l	151	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0



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

Country: Spain  
 Year: 2005  
 Period: Summer  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	90	98	99.6	98.6	0.4	95	0	95	--
MOTOR OCTANE NO.	--	90	87.5	89.6	88.4	0.5	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	90	48.1	60	56	3.4	45	60	--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	90	46.1	65.7	54.5	5.3	46	71	46.0	--
evaporated at 150	%(v/v)	90	87.3	95	91.9	1.5	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	90	0.4	14.6	5.8	4	0	18	--	18.0
aromatics	%(v/v)	90	20.1	35	31.5	3.2	0	35	--	35.0
benzene	%(v/v)	90	0.1	1	0.6	0.2	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	90	1	2.7	2.2	0.4	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	90	0	0.8	0.1	0.1	0	3	--	3
Ethanol	%(v/v)	90	0	0.8	0.2	0.2	0	5	--	5
Iso-propyl alcohol	%(v/v)	90	0	0.6	0	0.1	0	10	--	10
Tetro-butyl alcohol	%(v/v)	90	0	0.4	0	0.1	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)	90	5.2	15	12.2	2.1	0	15	--	15
Other oxygenate	%(v/v)	90	0	0	0	0	0	10	--	10
SULPHUR CONTENT	mg/kg	90	0	10	5.9	2.3	0	0	--	50
LEAD CONTENT	g/l	90	0.001	0.001	0.001	0	0	0.005	--	0.005

Notes:

0

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

Country: Spain  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade GASOLINA I.O.98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	241	98	99.6	98.6				95	--
MOTOR OCTANE NO.	--	241	86.4	89.6	88.1				85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	60
Summer period	kPa	241	48.1	80	65.1				--	60
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	241	46.1	65.7	55.3				46.0	--
evaporated at 150	%(v/v)	241	85.8	96.1	91.6				75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	241	0.1	17.6	6.5				--	18.0
aromatics	%(v/v)	241	18.2	35	31.1				--	35.0
benzene	%(v/v)	241	0.1	1	0.6				--	1.0
OXYGEN CONTENT	%(m/m)	241	0	2.7	1.9				--	2.7
OXYGENATES:										
Methanol	%(v/v)	241	0	0.8	0				--	3
Ethanol	%(v/v)	241	0	0.8	0.1				--	5
Iso-propyl alcohol	%(v/v)	241	0	0.6	0				--	10
Tetro-butyl alcohol	%(v/v)	241	0	1	0.1				--	7
Iso-butyl alcohol	%(v/v)	0	0	0					--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	241	0	15	10.4				--	15
Other oxygenate	%(v/v)	241	0	1.2	0				--	10
SULPHUR CONTENT	mg/kg	241	0	10	6.8				--	50
LEAD CONTENT	g/l	241	0.001	0.001	0				--	0.005

Notes:

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

Country: Sweden  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded 95

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	670	95	97	95.5	0	0	0	95	--
MOTOR OCTANE NO.	--	670	85	87.2	85.6	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	344	55.6	70	63.4	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	670	47.6	68	56.5	0	47	0	46.0	--
evaporated at 150	%(v/v)	670	75	94.5	88.7	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	670	0.4	13	6	0	0	13	--	18.0
aromatics	%(v/v)	670	26.8	35	33.8	0	0	35	--	35.0
benzene	%(v/v)	670	0.2	1	0.71	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	0	0	0	0	0	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	0	0	0	0	0	0	0	--	3
Ethanol	%(v/v)	0	0	5	4.6	0	0	0	--	5
Iso-propyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Tetro-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	7
Iso-butyl alcohol	%(v/v)	0	0	0	0	0	0	0	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	670	0	5.7	2.2	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	670	0	10	3.6	0	0	0	--	50
LEAD CONTENT	g/l	670	0.0002	0.003	0	0	0	0	--	0.005

Notes: Ethanol is added at the gantry but also at refineries. Therefore the DVPE is a mix of both with and without ethanol. The addition of Ethanol of up to 5% increases the DVPE with about 7 kPa. The oxygen content is not available in the finished fuel

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

Country: Sweden  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol RON > 98 (<10 ppm sulphur)  
 National Fuel Grade Class 1 unleaded 98

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	160	98	99.8	98.6	0	0	0	95	--
MOTOR OCTANE NO.	--	160	87.5	88.8	87.8	0	0	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	105	55.4	70	67.3	0	45	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	160	51.4	67.6	56.1	0	47	0	46.0	--
evaporated at 150	%(v/v)	160	75	95	89.8	0	0	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	160	0	13	4.9	0	0	13	--	18.0
aromatics	%(v/v)	160	27.3	35	33.7	0	0	0	--	35.0
benzene	%(v/v)	160	0.16	1	0.68	0	0	0	--	1.0
OXYGEN CONTENT	%(m/m)	160	0.19	2.6	2.2	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)	160	6.6	14.4	12.1	0	0	0	--	15
Other oxygenate	%(v/v)	0	0	0	0	0	0	0	--	10
SULPHUR CONTENT	mg/kg	160	0.5	9	3.6	0	0	0	--	50
LEAD CONTENT	g/l	160	0.0003	0.003	0.002	0	0	0	--	0.005

Notes:

0

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

Country: UK  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol min. RON=95 (<50 ppm sulphur)  
 National Fuel Grade Premium Unleaded 95 RON

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	2325	94.7	97.7	95.37	0.31	95	0	95	--
MOTOR OCTANE NO.	--	2325	84.8	87.6	85.37	0.34	85	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	776	49.9	71.9	68.25	2.21	70	0	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	2326	46	67.7	57.72	2.94	46	0	46.0	--
evaporated at 150	%(v/v)	2037	77.2	98.6	90.64	1.91	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	2318	1	19	10.42	2.24	0	18	--	18.0
aromatics	%(v/v)	2284	19.7	37	30.57	2.66	0	35	--	35.0
benzene	%(v/v)	2282	0.2	1.05	0.72	0.14	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	971	0	1.8	0.16	0.15	0	0	--	2.7
OXYGENATES:										
Methanol	%(v/v)	541	0	0.5	0	0.03	0	3	--	3
Ethanol	%(v/v)	541	0	1	0	0.05	0	5	--	5
Iso-propyl alcohol	%(v/v)	541	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	541	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	541	0	0.2	0	0	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	2307	0	10	0.84	0.82	0	15	--	15
Other oxygenate	%(v/v)	541	0	2.1	0	0.4	0	10	--	10
SULPHUR CONTENT	mg/kg	2329	0.1	51	33.47	10.2	0	50	--	50
LEAD CONTENT	g/l	1935	0	0	0	0	0	0.005	--	0.005

Notes: All samples either met specification within limits of reproducibility, OR are acceptable using the permitted alternative test method

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

Country: UK  
 Year: 2005  
 Period: Full-year  
 FuelID: Unleaded petrol 95 =< RON < 98 (< 50 ppm sulphu  
 National Fuel Grade Super Unleaded 97 RON

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specification		EC Limit values	
							Min.	Max.	Min.	Max.
RESEARCH OCTANE NO.	--	303	96.5	99.3	97.4	0.43	97	0	95	--
MOTOR OCTANE NO.	--	302	85.5	88.9	86.65	0.53	86	0	85	--
VAPOUR PRESSURE, DVPE										
Summer + Winter period	kPa								--	70
Summer period	kPa	103	55	70.8	68.1	2.43	0	70	--	70
Winter period	kPa								--	--
DISTILLATION:										
evaporated at 100	%(v/v)	303	45.4	66.3	54.87	4.12	46	0	46.0	--
evaporated at 150	%(v/v)	271	76.5	96.5	91.48	2.68	75	0	75.0	--
HYDROCARBON ANALYSIS:										
olefins	%(v/v)	302	2	20.9	10.84	3.11	0	18	--	18.0
aromatics	%(v/v)	250	19.9	37.1	32.53	2.83	0	35	--	35.0
benzene	%(v/v)	254	0.2	1	0.72	0.17	0	1	--	1.0
OXYGEN CONTENT	%(m/m)	208	0	2	0.28	0.34	0	2.7	--	2.7
OXYGENATES:										
Methanol	%(v/v)	173	0	0.5	0	0.02	0	3	--	3
Ethanol	%(v/v)	173	0	5	0.3	0	0	5	--	5
Iso-propyl alcohol	%(v/v)	173	0	0	0	0	0	10	--	10
Tetro-butyl alcohol	%(v/v)	173	0	0	0	0	0	7	--	7
Iso-butyl alcohol	%(v/v)	173	0	0.3	0	0.02	0	10	--	10
Ethers with 5 or more C atoms per molecule	%(v/v)	294	0	11.4	1.65	1.68	0	15	--	15
Other oxygenate	%(v/v)	173	0	1.5	0	0.1	0	10	--	10
SULPHUR CONTENT	mg/kg	302	5.5	53	31.8	11.18	0	50	--	50
LEAD CONTENT	g/l	303	0	0	0	0	0	0	--	0.005

Notes: All samples either met specification within limits of reproducibility, OR are acceptable using the permitted alternative test method

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

**Country:** Austria  
**Year:** 2005  
**Period:** Summer  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	50.6	56.5	53.466	1.513828772	51	0	51	--
DENSITY AT 15 C	kg/m3	50	827	842	834.36	2.890942929	820	845	--	845
DISTILLATION - 95 oC POIN	oC	50	343.2	377.1	351.856	5.179991332	0	360	--	360
PAHs	%(m/m)	50	2.1	4.6	2.85	0.724568837	0	11	--	11
SULPHUR CONTENT	mg/kg	50	4.358828444	87.54457679	11.83056251	11.7494961	0	0	--	50

**Notes:** All parametrs weretested. Empty cells represent that the substance was not detectable.

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

Country: Austria  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	51.5	55.8	53.572	1.40843523	51	0	51	--
DENSITY AT 15 C	kg/m3	50	826	838	833.92	2.448156324	820	845	--	845
DISTILLATION - 95 oC POIN	oC	50	333.3	351.2	345.056	3.415460647	0	360	--	360
PAHs	%(m/m)	50	1.797848	5	2.855065253	0.950812329	0	11	--	11
SULPHUR CONTENT	mg/kg	50	6.185668744	76.4	13.20330407	12.40604789	0	0	--	50

**Notes:** All parametrs weretested. Empty cells represent that the substance was not detectable.



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

**Country:** Austria  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	50.6	56.5	53.5				51	--
DENSITY AT 15 C	kg/m3	100	826	842	834.1				--	845
DISTILLATION - 95 oC POIN	oC	100	333.3	377.1	348.5				--	360
PAHs	%(m/m)	100	1.797848	5	2.9				--	11
SULPHUR CONTENT	mg/kg	100	4.358828444	87.54457679	12.5				--	50

Notes:

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

Country: Belgium  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel 50 s

PARAMETER	Unit	Number of Samples				Standard deviation	National Specifications		EC Limit values	
			Min.	Max.	Mean		Min.	Max.	Min.	Max.
CETANE NUMBER	--	3734	42.9	80.8	53061666	1.666	46	0	51	--
DENSITY AT 15 C	kg/m3	3754	820.2	843.3	833.08	3.6754	0	845	--	845
DISTILLATION - 95 oC POIN	oC	3741	318.6	365.3	348.75	8.457	0	360	--	360
PAHs	%(m/m)	3741	0.03	6	2.36	0.888	0	11	--	11
SULPHUR CONTENT	mg/kg	3754	5	337.5	31.25	11.72	0	50	--	50

**Notes:** L'indice cétane est l'indice cétane calculé et non l'indice mesuré, The majority of the infringements related to the flash point traditionally. The flash point is the temperature from which a product (oil, gasoline, diesel) heated gradually emits sufficient vapour to become, in certain conditions, a flammable mixture. The flash point for the gas oil-diesel is of 55°C at least. 65 analyses showed flash points lower than this standard. The average value of the infringement was of 47,8°C. It acts of an improvement compared to 2004 when the average value of the infringement was still 45,8%, which means that the extent of the infringements decreased. The principal cause of these infringements remains the contamination. This too low flash point is due to the presence of other petroleum products mixed with the gas oil-diesel, such as the gasoline. That can be the result of a contamination at the time of transport, which explains the light infringements. Moreover, there were 25 infringements concerning the sulphur content. 22 of the 25 samples with negative result had a sulphur content of less than 110 ppm. In these cases, it probably does not act of fraud but

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

Country: Cyprus  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	41	55	58.4	56.7	0.8	51	0	51	--
DENSITY AT 15 C	kg/m3	41	823.1	842.1	835.7	5.3	820	845	--	845
DISTILLATION - 95 oC POIN	oC	52	300	491	355.7	27.1	0	360	--	360
PAHs	%(m/m)	4	0.7	2.5	2.1	0.8	0	11	--	11
SULPHUR CONTENT	mg/kg	135	23	212	46.2	32.4	0	50	--	50

Notes: 0

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

Country: Czech Republic  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Motorová nafta

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	939	48	59.1	53.2	1.2	0	0	51	--
DENSITY AT 15 C	kg/m3	939	812	848	836.5	3.9	0	0	--	845
DISTILLATION - 95 oC POIN	oC	1653	322	422.5	347.9	10.1	0	0	--	360
PAHs	%(m/m)	939	0.2	8.9	3.6	1.8	0	0	--	11
SULPHUR CONTENT	mg/kg	1653	3	1840	31.7	96.7	0	0	--	50

**Notes:** Gross breaches of quality standards (both in unleaded fuel and diesel) are deemed to constitute an attempt at tax evasion, and are currently dealt with by the Czech financial and criminal police forces. Sulphur content was > 1,500 mg/kg (1x), 1,000-1,500 mg/kg (3x = 3 samples), 500-1,000 mg/kg (9x), 350-500 mg/kg (9x), < 350 mg/kg (41x).

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

**Country:** Denmark  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Sulphur-free diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	51.1	55	52.8	1.3	0	0	51	--
DENSITY AT 15 C	kg/m3	20	829.7	844.4	840.7	3.4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	20	334.3	360.8	351.5	8	0	0	--	360
PAHs	%(m/m)	20	0.7	2.4	1.6	0.4	0	0	--	11
SULPHUR CONTENT	mg/kg	20	3.3	11	7.6	2.2	0	0	--	50

Notes: 0

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

Country: Estonia  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	50.4	54.9	51.9	0.8	0	0	51	--
DENSITY AT 15 C	kg/m3	50	827	844	839	5	0	0	--	845
DISTILLATION - 95 oC POIN	oC	50	319	360	355	7	0	0	--	360
PAHs	%(m/m)	50	0.9	4	2.3	0.8	0	0	--	11
SULPHUR CONTENT	mg/kg	50	20	114	39.2	13.5	0	0	--	50

Notes: 0

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

Country: Estonia  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	64	50.1	52.3	51.2	0.6	0	0	51	--
DENSITY AT 15 C	kg/m3	57	823	83.6	831	4	0	0	--	845
DISTILLATION - 95 oC POIN	oC	51	293	344	315	10	0	0	--	360
PAHs	%(m/m)	64	0.6	6.2	2.4	1.2	0	0	--	11
SULPHUR CONTENT	mg/kg	64	10	45	14.05	5.402704762	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Estonia  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	114	50.1	54.9	51.5				51	--
DENSITY AT 15 C	kg/m3	107	823	844	834.7				--	845
DISTILLATION - 95 oC POIN	oC	101	293	360	334.8				--	360
PAHs	%(m/m)	114	0.6	6.2	2.4				--	11
SULPHUR CONTENT	mg/kg	114	10	114	25.1				--	50

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Sulphur-free diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	21	50.1	55.2	52.9	1.2	0	0	51	--
DENSITY AT 15 C	kg/m3	46	830	840	839	2	0	0	--	845
DISTILLATION - 95 oC POIN	oC	46	259.8	356.1	346.7	11.9	0	0	--	360
PAHs	%(m/m)	46	0.4	6.5	2.6	1.1	0	0	--	11
SULPHUR CONTENT	mg/kg	46	2	9.5	5.5	1.4	0	0	--	50

**Notes:** FN9: The lowest cetane number 49,9 is below the limiting value 51,0 but within the minimum tolerance limit 48,5. FN10: The R value of 95 % - distillation point value has been changed due to the results of Round Robin proficiency test done in 2005. In the 2004 R value was 10,4.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Finland  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Sulphur-free diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	21	49.9	55	52.4	1.5	0	0	51	--
DENSITY AT 15 C	kg/m3	59	820	840	832	6	0	0	--	845
DISTILLATION - 95 oC POIN	oC	59	259.5	350.4	319.7	20.3	0	0	--	360
PAHs	%(m/m)	59	1	6.9	2	1.3	0	0	--	11
SULPHUR CONTENT	mg/kg	59	3.2	10.8	6.6	2	0	0	--	50

**Notes:** FN9: The lowest cetane number 49.9 is below the limiting value 50.1 but within the minimum tolerance limit 48.5. FN10: The R value of 95 % - distillation point value has been changed due to the results of Round Robin proficiency test done in 2005. In the 2004 R value was 10.4. FN11: The highest sulphur content 10.8 mg/kg is above the limiting value 10.0 mg/kg but within the maximum tolerance limit 11.3.

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Germany  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Diesekraftstoff

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	251	49.8	58.8	54.08964143	1.9	0	0	51	--
DENSITY AT 15 C	kg/m3	251	822.7	842.5	834.0764143	4.2	0	0	--	845
DISTILLATION - 95 oC POIN	oC	251	325.9	369	346.6654183	6.1	0	0	--	360
PAHs	%(m/m)	191	0.2	5.5	2.925863874	0.9	0	0	--	11
SULPHUR CONTENT	mg/kg	251	0	30.6	7.322948207	4.8	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Greece  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Automotive Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	89	51	67.5	58.19230769	3.156801325	0	0	51	--
DENSITY AT 15 C	kg/m3	89	819.1	844.7	832.7966292	6.891487658	0	0	--	845
DISTILLATION - 95 oC POIN	oC	89	340	360	356.6	3.94226186	0	0	--	360
PAHs	%(m/m)	89	1	2.2	1.428947368	0.240391454	0	0	--	11
SULPHUR CONTENT	mg/kg	89	0	50	37.91011236	10.84250941	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	51	59	52.98	1.37	51	0	51	--
DENSITY AT 15 C	kg/m3	100	839.9	842.1	836	2.62	820	845	--	845
DISTILLATION - 95 oC POIN	oC	100	314	358.2	348.16	6.21	0	360	--	360
PAHs	%(m/m)	100	1.6	6.2	3.16	1.04	0	11	--	11
SULPHUR CONTENT	mg/kg	100	0	39.8	11.09	7.62	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	49	51	59	52.84	1.42	51	0	51	--
DENSITY AT 15 C	kg/m3	49	831.4	842.1	836.94	2.38	820	845	--	845
DISTILLATION - 95 oC POIN	oC	49	314	356	347.34	8.02	0	360	--	360
PAHs	%(m/m)	49	1.6	6.2	3.32	1.16	0	11	--	11
SULPHUR CONTENT	mg/kg	49	6	39.8	12.47	8.25	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Hungary  
**Year:** 2005  
**Period:** Summer  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	51	51.1	57.1	53.11	1.31	51	0	51	--
DENSITY AT 15 C	kg/m3	51	829.9	839.9	835.1	2.54	820	845	--	845
DISTILLATION - 95 oC POIN	oC	51	340	358.2	348.95	3.67	0	360	--	360
PAHs	%(m/m)	51	1.8	5	3.02	0.88	0	11	--	11
SULPHUR CONTENT	mg/kg	51	3.9	31.1	9.76	6.77	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel fuel, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	52.9	57.1	54.89	1.17	51	0	51	--
DENSITY AT 15 C	kg/m3	20	829.3	843	838.43	4.22	820	845	--	845
DISTILLATION - 95 oC POIN	oC	20	317.6	354.9	344.08	11.02	0	360	--	360
PAHs	%(m/m)	20	1.2	4.7	3.03	1.16	0	11	--	11
SULPHUR CONTENT	mg/kg	20	0	13.8	9.16	2.27	0	0	--	50

**Notes:** Values beyond limit value tolerance limits Sulphur content.(sulphur-free limit value only) mg/kg 12.0, 13.8, 12.3, 13.0, 11.7



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel fuel, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	52.9	56.9	54.21	1.36	51	0	51	--
DENSITY AT 15 C	kg/m3	20	829.3	839.1	834.13	4.01	820	845	--	845
DISTILLATION - 95 oC POIN	oC	20	317.6	352	335.17	14.88	0	360	--	360
PAHs	%(m/m)	20	1.2	4	2.14	0.99	0	11	--	11
SULPHUR CONTENT	mg/kg	20	0	9.8	7.87	1.12	0	0	--	50

**Notes:** Values beyond limit value tolerance limits Sulphur content.(sulphur-free limit value only) mg/kg 12.0, 13.8, 12.3, 13.0, 11.7

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Hungary  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Diesel fuel, sulphur-free

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	20	52.9	56.9	54.21	1.36	51	0	51	--
DENSITY AT 15 C	kg/m3	20	829.3	839.1	834.13	4.01	820	845	--	845
DISTILLATION - 95 oC POIN	oC	20	317.6	352	335.17	14.88	0	360	--	360
PAHs	%(m/m)	20	1.2	4	2.14	0.99	0	11	--	11
SULPHUR CONTENT	mg/kg	13	0	13.8	9.85	2.46	0	0	--	50

**Notes:** Values beyond limit value tolerance limits Sulphur content.(sulphur-free limit value only) mg/kg 12.0, 13.8, 12.3, 13.0, 11.7

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Ireland  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	60	51.3	55.5	53	1	0	0	51	--
DENSITY AT 15 C	kg/m3	94	824.3	844.4	836.5	4.6	0	0	--	845
DISTILLATION - 95 oC POIN	oC	92	344	364	353.4	4.7	0	0	--	360
PAHs	%(m/m)	95	1.96	8.6	3.8	1.3	0	0	--	11
SULPHUR CONTENT	mg/kg	94	0	52	26.6	12.7	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)

National Fuel Grade:

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	50.5	61	53.6				51	--
DENSITY AT 15 C	kg/m3	285	822.2	843.9	833.6				--	845
DISTILLATION - 95 oC POIN	oC	122	334	365.3	356.2				--	360
PAHs	%(m/m)	51	1.3	7.1	4.3				--	11
SULPHUR CONTENT	mg/kg	285	12.9	60	36.7				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)

National Fuel Grade:

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	18	49	55.8	53.8				51	--
DENSITY AT 15 C	kg/m3	28	825.1	839.4	830.8				--	845
DISTILLATION - 95 oC POIN	oC	18	339.5	362.3	351.8				--	360
PAHs	%(m/m)	8	2.7	7.9	5.1				--	11
SULPHUR CONTENT	mg/kg	24	4	11.5	8.3				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	40	51.3	61	54.5	2.1	51	0	51	--
DENSITY AT 15 C	kg/m3	203	822.2	843.9	833.6	3.9	0	845	--	845
DISTILLATION - 95 oC POIN	oC	40	339.4	365.3	357.4	6.2	0	360	--	360
PAHs	%(m/m)	15	2.6	4.9	3.7	0.7	0	11	--	11
SULPHUR CONTENT	mg/kg	203	12.9	58	35.8	8.7	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Italy  
**Year:** 2005  
**Period:** Winter  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	60	50.5	59.8	53	1.8	51	0	51	--
DENSITY AT 15 C	kg/m3	82	822.9	843.5	833.6	4.3	0	845	--	845
DISTILLATION - 95 oC POIN	oC	82	334	365	355.6	5.9	0	360	--	360
PAHs	%(m/m)	36	1.3	7.1	4.5	1.3	0	11	--	11
SULPHUR CONTENT	mg/kg	82	20	60	39.1	8.8	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	9	49	55.8	53.8	2.1	51	0	51	--
DENSITY AT 15 C	kg/m3	14	825.1	839.4	830.8	4.4	0	845	--	845
DISTILLATION - 95 oC POIN	oC	9	339.5	362.3	351.8	7.6	0	360	--	360
PAHs	%(m/m)	4	2.7	7.9	5.1	2.1	0	11	--	11
SULPHUR CONTENT	mg/kg	14	4	11.5	7.9	2.1	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Italy  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	9	49	55.8	53.8	2.1	51	0	51	--
DENSITY AT 15 C	kg/m3	14	825.1	839.4	830.8	4.4	0	845	--	845
DISTILLATION - 95 oC POIN	oC	9	339.5	362.3	351.8	7.6	0	360	--	360
PAHs	%(m/m)	4	2.7	7.9	5.1	2.1	0	11	--	11
SULPHUR CONTENT	mg/kg	10	7.4	10.2	8.9	1.1	0	50	--	50

**Notes:** The test methods employed to evaluate diesel fuel characteristics were those listed in European standard EN 590:2004 (in particular EN ISO 20884 for sulphur content).

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	256	50.9	53.4	52.6	0	0	0	51	--
DENSITY AT 15 C	kg/m3	256	828.4	844.8	835	0	0	0	--	845
DISTILLATION - 95 oC POIN	oC	256	329	360	356.4	0	0	0	--	360
PAHs	%(m/m)	256	1.2	6.5	4.3	0	0	0	--	11
SULPHUR CONTENT	mg/kg	512	9.8	253	18	0	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	182	41.7	53.1	50.4	2.9	47	0	51	--
DENSITY AT 15 C	kg/m3	182	822	844	834	7	0	0	--	845
DISTILLATION - 95 oC POIN	oC	182	284	355	332	27	0	0	--	360
PAHs	%(m/m)	182	1.1	7	3.7	1.6	0	0	--	11
SULPHUR CONTENT	mg/kg	182	5	1560	30.2	22.2	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Latvia  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	438	41.7	53.4	51.7				51	--
DENSITY AT 15 C	kg/m3	438	822	844.8	834.6				--	845
DISTILLATION - 95 oC POIN	oC	438	284	360	346.3				--	360
PAHs	%(m/m)	438	1.1	7	4.1				--	11
SULPHUR CONTENT	mg/kg	694	5	1560	21.2				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Lithuania  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** Diesel (<10 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	13	48.2	50	49.51538	0.594203	48	0	51	--
DENSITY AT 15 C	kg/m3	36	822.8	836.7	830.867	3.6983	0	845	--	845
DISTILLATION - 95 oC POIN	oC	36	306	336	318.472	8.11167	0	360	--	360
PAHs	%(m/m)	27	3	5	3.8148	0.5573	0	11	--	11
SULPHUR CONTENT	mg/kg	36	3	10	8.233	1.7881	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	39	51.5	54	52.28718	0.487302	51	0	51	--
DENSITY AT 15 C	kg/m3	150	824.7	849.4	842.061	2.58444	0	845	--	845
DISTILLATION - 95 oC POIN	oC	150	343	359	352.12	2.97624	0	360	--	360
PAHs	%(m/m)	150	3	6	4.3333	0.598282	0	11	--	11
SULPHUR CONTENT	mg/kg	150	10.5	49.2	30.51533	8.303939	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	15	48.3	52.5	50.233	1.306941	48	0	51	--
DENSITY AT 15 C	kg/m3	82	826.6	840.9	829.1927	2.450386	0	845	--	845
DISTILLATION - 95 oC POIN	oC	82	292	355	310.561	8.482513	0	360	--	360
PAHs	%(m/m)	38	2	5	3.763158	0.99822	0	11	--	11
SULPHUR CONTENT	mg/kg	82	11	50	29.24512	12.48649	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Lithuania  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel (<50 ppm)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	54	48.3	54	51.7				51	--
DENSITY AT 15 C	kg/m3	232	824.7	849.4	837.5				--	845
DISTILLATION - 95 oC POIN	oC	232	292	359	337.4				--	360
PAHs	%(m/m)	188	2	6	4.2				--	11
SULPHUR CONTENT	mg/kg	232	10.5	50	30.1				--	50

Notes:



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Luxembourg  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	17	49.7	54.5	51.53529412	1.238921495	0	0	51	--
DENSITY AT 15 C	kg/m3	17	826.4	839.3	834.9	3.172538416	0	0	--	845
DISTILLATION - 95 oC POIN	oC	10	341	354.1	346.29	4.551056044	0	0	--	360
PAHs	%(m/m)	10	2.8	4.3	3.49	0.554677083	0	0	--	11
SULPHUR CONTENT	mg/kg	17	9	47.2	32.3	10.00743474	0	0	--	50

**Notes:** L'indice cétane est l'indice cétane calculé et non l'indice mesuré,

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel (< 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	16	51.2	54.5	52.963	1.203	0	0	51	--
DENSITY AT 15 C	kg/m3	16	828	832.7	830.213	1.327	0	0	--	845
DISTILLATION - 95 oC POIN	oC	2	343	344.6	343.8	1.131	0	0	--	360
PAHs	%(m/m)	15	4.4	6.5	5.213	0.573	0	0	--	11
SULPHUR CONTENT	mg/kg	16	39	430	158.125	144.568	0	0	--	50

**Notes:** \*Cetane index (ASTM D976) is reported here instead of cetane number. Density at 15oC tested using ASTM D4052. Sulphur content tested using ASTM D2622. High S content in market samples found. The highest exceedences values were reported for the early months of 2005. This could be due to: a) the release of high S content fuel during early 2005 derived from last imports made in late 2004 (still bought on the basis of maximum 350mg/kg S content specification); b) contamination on the market of low S fuel with high S fuel from 2004 deliveries; c) contamination during procedures for transfer of fuels from the main storage site to the tanker (for eventual distribution to service stations) filling site. This procedure is carried out by barge, which is also utilised for the transfer of 0.2% gas oil for power plant utilisation, thus leading to possible contaminations. Changes in the system for transferring of fuel have been made, principally the utilisation of better pipeline 'rinsing' procedures and the use of a much larger barge which allows for dilution of the effect of any residues of gas oil still present. These changes in work practices

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel (< 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	15	52.4	53.5	53.047	0.302	0	0	51	--
DENSITY AT 15 C	kg/m3	15	827.6	829.4	828.767	0.588	0	0	--	845
DISTILLATION - 95 oC POIN	oC	2	344	349.9	346.95	4.172	0	0	--	360
PAHs	%(m/m)	15	3.4	7.1	4.473	0.856	0	0	--	11
SULPHUR CONTENT	mg/kg	15	48	88	67	10.219	0	0	--	50

**Notes:** \*Cetane index (ASTM D976) is reported here instead of cetane number. Density at 15oC tested using ASTM D4052. Sulphur content tested using ASTM D2622. Regarding sulphur content: See note for S content exceedences for winter samples (Annex VI Diesel Winter). Reported values show significant improvement on values reported for early 2005. Reported first value of 73 was from a sample at terminal point. This was raised with fuel supplier and corrective action for future supplies immediately taken.

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Malta  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel fuel (< 50 ppm sulphur)

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	31	51.2	54.5	53				51	--
DENSITY AT 15 C	kg/m3	31	827.6	832.7	829.5				--	845
DISTILLATION - 95 oC POIN	oC	4	343	349.9	345.4				--	360
PAHs	%(m/m)	30	3.4	7.1	4.8				--	11
SULPHUR CONTENT	mg/kg	31	39	430	114				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Netherlands  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: 0

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	106	49.55	57.9	53.86	1.52	0	0	51	--
DENSITY AT 15 C	kg/m3	106	821.7	838.55	831.19	0.42	0	0	--	845
DISTILLATION - 95 oC POIN	oC	106	335.35	357.55	349.07	3.54	0	0	--	360
PAHs	%(m/m)	106	1.45	5.9	3.61	1.34	0	0	--	11
SULPHUR CONTENT	mg/kg	106	3.5	45.5	8.05	17.68	0	0	--	50

**Notes:** In the summer period two samples of the Cetane Number and one sample for distillation 95% appeared to lie outside the specification. In view of the deviation / margin of error of the manipulated analysis methods no further action was undertaken here. In the winter period two samples of the Cetane Number appeared not to satisfy to specification. In view of the deviation / margin of error of the manipulated analysis methods no further action was undertaken here.

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Poland  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel oil containing up to 50 mg/kg sulphur

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	204	47.4	59.9	52.62	1.61	0	0	51	--
DENSITY AT 15 C	kg/m3	204	826.9	846	834.37	2.65	0	0	--	845
DISTILLATION - 95 oC POIN	oC	204	329.5	400	346.98	9.92	0	0	--	360
PAHs	%(m/m)	204	1.1	6.4	2.64	0.95	0	0	--	11
SULPHUR CONTENT	mg/kg	204	5	2734	52.53	262.51	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Portugal  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Gasóleo

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	24	51	52.9	51.575	0.661519989	51	0	51	--
DENSITY AT 15 C	kg/m3	24	823.4	845.3	835.8083333	7.758244796	820	845	--	845
DISTILLATION - 95 oC POIN	oC	24	342.8	360	355.975	4.361715857	0	360	--	360
PAHs	%(m/m)	12	3	4	3.375	0.48265365	0	11	--	11
SULPHUR CONTENT	mg/kg	23	0	49	36.57391304	9.473370207	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	52	50.2	54.3	52.9	0.8337	51	0	51	--
DENSITY AT 15 C	kg/m3	52	829.8	843.7	837.7	3.4609	0	845	--	845
DISTILLATION - 95 oC POIN	oC	52	252.1	361.3	350.8	14.3065	0	360	--	360
PAHs	%(m/m)	52	2	4.5	3	0.6254	0	11	--	11
SULPHUR CONTENT	mg/kg	52	5.8	37.2	15.01538462	5.211813035	0	50	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovakia  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	50	49.4	56.6	52.5	1.2554	51	0	51	--
DENSITY AT 15 C	kg/m3	50	830.3	837.6	833.6	1.7683	0	845	--	845
DISTILLATION - 95 oC POIN	oC	50	315.2	355.5	342.3	6.611	0	360	--	360
PAHs	%(m/m)	50	1.5	5.1	2.4	0.6369	0	11	--	11
SULPHUR CONTENT	mg/kg	50	2	130.8	10.17	16.30084043	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Slovakia  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	102	49.4	56.6	52.7				51	--
DENSITY AT 15 C	kg/m3	102	829.8	843.7	835.7				--	845
DISTILLATION - 95 oC POIN	oC	102	252.1	361.3	346.6				--	360
PAHs	%(m/m)	102	1.5	5.1	2.7				--	11
SULPHUR CONTENT	mg/kg	102	2	130.8	12.6				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Slovenia  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: EURO DIESEL

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	152	48.3	56.8	53	1.2	51	0	51	--
DENSITY AT 15 C	kg/m3	152	824.7	840.7	833.2	3.3	0	845	--	845
DISTILLATION - 95 oC POIN	oC	152	334.5	358.7	348.8	4.5	0	360	--	360
PAHs	%(m/m)	152	1.8	6.6	4	1	0	11	--	11
SULPHUR CONTENT	mg/kg	152	6	203	47.2	36.9	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: GASÓLEO DE AUTOMOCIÓN

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	167	51	57.4	52.7	1.5	51	0	51	--
DENSITY AT 15 C	kg/m3	167	821.4	845	835.9	5.7	820	845	--	845
DISTILLATION - 95 oC POIN	oC	167	339.1	360	354.2	3.9	0	360	--	360
PAHs	%(m/m)	167	1.1	6.6	3.9	1	0	11	--	11
SULPHUR CONTENT	mg/kg	167	18	49.9	34.1	7.7	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: GASÓLEO DE AUTOMOCIÓN

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	100	51	59.5	52.7	1.6	51	0	51	--
DENSITY AT 15 C	kg/m3	100	824.8	844.4	838	4.4	820	845	--	845
DISTILLATION - 95 oC POIN	oC	100	338.8	360	356.2	4	0	360	--	360
PAHs	%(m/m)	100	2	6.3	4.3	0.9	0	11	--	11
SULPHUR CONTENT	mg/kg	100	15	49.8	31	7.6	0	50	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<50 ppm sulphur)  
 National Fuel Grade: GASÓLEO DE AUTOMOCIÓN

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	267	51	59.5	52.7				51	--
DENSITY AT 15 C	kg/m3	267	821.4	845	836.7				--	845
DISTILLATION - 95 oC POIN	oC	267	338.8	360	354.9				--	360
PAHs	%(m/m)	267	1.1	6.6	4				--	11
SULPHUR CONTENT	mg/kg	267	15	49.9	32.9				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2005  
 Period: Winter  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: GASÓLEO DE AUTOMOCIÓN <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	26	51.1	53.7	52.1	0.9	51	0	51	--
DENSITY AT 15 C	kg/m3	26	821.2	844.3	833.9	6.6	820	845	--	845
DISTILLATION - 95 oC POIN	oC	26	341.1	359.1	354.4	4.8	0	360	--	360
PAHs	%(m/m)	26	1.8	6.1	4.2	1.5	0	11	--	11
SULPHUR CONTENT	mg/kg	26	0	9.3	6.1	2.1	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Spain  
 Year: 2005  
 Period: Summer  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: GASÓLEO DE AUTOMOCIÓN <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	26	51.1	53.7	52.1	0.9	51	0	51	--
DENSITY AT 15 C	kg/m3	26	821.2	844.3	833.9	6.6	820	845	--	845
DISTILLATION - 95 oC POIN	oC	26	341.1	359.1	354.4	4.8	0	360	--	360
PAHs	%(m/m)	26	1.8	6.1	4.2	1.5	0	11	--	11
SULPHUR CONTENT	mg/kg	18	0	10	6.8	2	0	0	--	50

Notes: 0



## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** Spain  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<10 ppm sulphur)  
**National Fuel Grade:** GASÓLEO DE AUTOMOCIÓN <10 ppm

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	52	51.1	53.7	52.1				51	--
DENSITY AT 15 C	kg/m3	52	821.2	844.3	833.9				--	845
DISTILLATION - 95 oC POIN	oC	52	341.1	359.1	354.4				--	360
PAHs	%(m/m)	52	1.8	6.1	4.2				--	11
SULPHUR CONTENT	mg/kg	44	0	10	6.4				--	50

Notes:

## Market fuels used in vehicles with compression ignition engines (Diesel)

Country: Sweden  
 Year: 2005  
 Period: Full-year  
 FuelID: Diesel fuel (<10 ppm sulphur)  
 National Fuel Grade: Class 1 diesel fuel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	300	51	58.9	54.2	0	51	0	51	--
DENSITY AT 15 C	kg/m3	657	805.6	819.9	814	0	800	820	--	845
DISTILLATION - 95 oC POIN	oC	657	190.9	285	281.4	0	0	285	--	360
PAHs	%(m/m)	657	0.01	0.02	0.015	0	0	0.02	--	11
SULPHUR CONTENT	mg/kg	657	0	5	2	0	0	0	--	50

Notes: 0

## Market fuels used in vehicles with compression ignition engines (Diesel)

**Country:** UK  
**Year:** 2005  
**Period:** Full-year  
**FuelID:** Diesel fuel (<50 ppm sulphur)  
**National Fuel Grade:** Automotive Diesel

PARAMETER	Unit	Number of Samples	Min.	Max.	Mean	Standard deviation	National Specifications		EC Limit values	
							Min.	Max.	Min.	Max.
CETANE NUMBER	--	1264	50.3	61.9	52.6	1.18	51	0	51	--
DENSITY AT 15 C	kg/m3	2242	821.1	844.6	831.2	2.17	0	845	--	845
DISTILLATION - 95 oC POIN	oC	1618	296	355	337.43	5.82	0	360	--	360
PAHs	%(m/m)	567	0.1	8.2	2.55	1.12	0	11	--	11
SULPHUR CONTENT	mg/kg	2233	2	50	32.54	9.79	0	50	--	50

Notes: 0



## **Appendix 4: Fuel Quality Monitoring Reporting Format from 2004**



# Common Format for the Submission of Summaries of National Fuel Quality Data for Petrol and Diesel from 2004

## 1. INTRODUCTION

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC<sup>25</sup>, as last amended by Directive 2003/17/EC<sup>26</sup>, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive.

By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report was to be made by 30 June 2002, in the format specified under Commission Decision 2002/159/EC<sup>27</sup>.

From 2004 Member States are required to report according to the requirements of the European Standard EN 14274: 2003<sup>28</sup>, unless they are using national fuel quality monitoring systems of equivalent confidence. In addition from 2005 Member States are required to phase in “sulphur free” petrol and diesel fuels on an appropriately balanced geographical basis.

This reporting format for 2004 reporting onwards contained herein is proposed to attempt to harmonise reporting submissions across the Member States whether they are using either the European Standard or their own national systems. This optional format essentially summarises information already required or requested under the Directive and European Standard. Text and fields in red are additional information requested beyond the mandatory requirements outlined in the Directive.

## 2. DETAILS OF THOSE COMPILING THE FUEL QUALITY MONITORING REPORT

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

<b>Reporting Year:</b>	
<b>Country:</b>	
<b>Date Report Completed:</b>	
<b>Organisation Responsible for Report:</b>	
<b>Address of Organisation:</b>	
<b>Person Responsible for Report:</b>	
<b>Telephone Number:</b>	
<b>Email:</b>	

## 3. DEFINITIONS AND EXPLANATION

<sup>25</sup> OJ L 350, 28.12.1998, p. 58.

<sup>26</sup> OJ L76/10, 22.3.2003, p. 10

<sup>27</sup> O.J. L 53 of 23.2.2002, p.30

<sup>28</sup> EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System (FQMS).

*Parent fuel grade:* Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade:* Member States may, of course, define 'national' fuel grades, which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, <50 ppm sulphur petrol, zero sulphur diesel, <50 ppm sulphur diesel, etc.

*Zero sulphur or sulphur-free fuels* are petrol and diesel fuels that contain less than 10 mg/kg (ppm) of sulphur.

#### 4. DESCRIPTION OF FUEL QUALITY MONITORING SYSTEM

Member States should provide details on the operation of their national fuel quality monitoring systems.

Directive 98/70/EC requires the vapour pressure of petrol to be less than 60.0 kPa during the summer period, which spans 1 May until 30 September. However, for those Member States that experience 'arctic or severe weather conditions' the summer period covers the period 1 June to 31 August and the vapour pressure must not exceed 70 kPa. Member States are requested to define the Summer/Winter periods implemented in their territories and also applying to their fuel quality monitoring system reporting.

<b>Summer Period</b>		
	<i>Start</i>	
<b>33</b>	<i>End</i>	
<b>Winter Period</b>		
	<i>Start</i>	
	<i>End</i>	

Member States should indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C and whether it is based on the large or small country framework. Alternatively, the Member State should indicate if they are using their own nationally defined system.

<b>Country Size (L = Large, S = Small):</b>	
---	--

<b>Fuel Quality Monitoring System model:</b>	<b>Yes/No</b>	<b>Minimum number of samples (Petrol, per grade; Diesel)</b>	
		<b>Small Country</b>	<b>Large Country</b>
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--



If Member States **are** using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in Annex I (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States **are not** using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries and distribution terminals):

- Organisations responsible for sampling, analysis and reporting;
- Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
- Frequency of sampling and selection of sampling points;
- Assessment that shows the monitoring system's equivalency to the CEN system.

<b>Description of National Fuel Quality Monitoring System (give once and up-date if necessary):</b>

## 5. TOTAL SALES OF PETROL & DIESEL

Member States are requested to complete the following table detailing the quantities of each type and grade of petrol and diesel fuel marketed in their territory.

Parent or National Fuel Grade	National Sales Total (Litres/Tonnes)	No. Samples Taken
Regular unleaded petrol (minimum RON=91) <sup>(1)</sup>		
Regular unleaded petrol (minimum RON=91 & <50 ppm sulphur)		
Regular unleaded petrol (minimum RON=91 & <10 ppm sulphur)		
Unleaded petrol (minimum RON=95) <sup>(1)</sup>		
Unleaded petrol (minimum RON=95 & <50 ppm sulphur) <sup>(2)</sup>		
Unleaded petrol (minimum RON=95 & <10 ppm sulphur) <sup>(3)</sup>		
Unleaded petrol (minimum 95=<RON<98)		
Unleaded petrol (minimum 95=<RON<98 & <50 ppm sulphur)		
Unleaded petrol (minimum 95=<RON<98 & <10 ppm sulphur)		
Unleaded petrol (minimum RON>=98)		
Unleaded petrol (minimum RON>=98 & <50 ppm sulphur)		
Unleaded petrol (minimum RON>=98 & <10 ppm sulphur)		
Diesel fuel <sup>(4)</sup>		
Diesel fuel (<50 ppm sulphur) <sup>(5)</sup>		
Diesel fuel (<10 ppm sulphur) <sup>(6)</sup>		

(1) as specified in Annex I of Directive 98/70/EC

(2) as specified in Annex III of Directive 98/70/EC

(3) as specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10ppm

(4) as specified in Annex II of Directive 98/70/EC

(5) as specified in Annex IV of Directive 98/70/EC

(6) as specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10ppm

## 6. GEOGRAPHICAL AVAILABILITY OF SULPHUR-FREE FUELS

Member States are requested to complete the following tables with basic information on the geographical availability of sulphur free petrol and diesel sold in their territories.

	<b>(Litres/Tonnes)</b>	<b>% Total Petrol/Diesel Sales</b>
<b>Total National sales &lt;10 ppm sulphur petrol</b>		
<b>Total National sales &lt;10 ppm sulphur diesel</b>		

<b>Details of petrol RON grades available with &lt;10 ppm sulphur:</b>
<b>Are &lt;10 ppm sulphur fuels (petrol and/or diesel) labelled differently from regular grades (i.e. can they be easily distinguished from regular/higher sulphur fuels by the consumer)?</b>

Where Member States choose to apply the measures in their national territories, they are also requested to complete, as far as possible, the following tables with detailed information (Options A to D) on the geographical availability of sulphur free petrol and diesel in their territories, as outlined in the Commission Guidance note<sup>29</sup>. Member States should also take into account any specific provisions made for special cases in the Commission Guidance.

Where the more detailed information is not available, or additional notes/clarifications are needed or other guidance than that given by the Commission is used, the Member States are requested to provide a description on the extent to which sulphur free fuels are marketed in their territory (i.e. geographical availability). This free form text box should also be used to provide any additional information such as the special cases outlined in the Commission Guidance note.

<b>Description of the geographical availability of sulphur free fuels or additional notes:</b>

Option (A): Proportion of refuelling stations with sulphur free grades available by region

See Annex II for reporting table format.

<sup>29</sup> The more detailed reporting on geographical availability is not needed until the 2005 monitoring reports, but would be useful if Member States were also able to provide it from 2004.

Option (B): Average distance between refuelling stations with sulphur free grades available

	No. Refuelling Stations		Distance between refuelling stations (km)			
	<10 ppm Number	All Number	With <10 ppm grades available			All Mean
			Min.	Max.	Mean	
<b>Petrol</b>						
<b>Diesel</b>						

Option (C): Availability of sulphur free fuels at large refuelling stations

	Petrol	Diesel
National criteria for definition of "large refuelling stations" in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

## 7. SUMMARY REPORTING FORMAT FOR PETROL & DIESEL

Member States are requested to provide a brief general summary of the results of the year's monitoring, including information on any:

- other parameters measured;
- exclusions;
- further details on breaches of parameter tolerance limits (i.e. number of samples, values);
- enforcement actions taken as a result of breaches of the limit values/tolerance limits; and
- additional information deemed relevant.

In particular, Member States should provide additional explanatory information on reasoning for exceptional cases where exclusions are made, such as:

- fuel grades marketed in very small quantities;
- mandatory fuel parameters that are not measured;
- geographical areas that are left outside the monitoring programme;
- exceptionally high or low values of analytical results (i.e. outliers).

<b>General Summary of Analysis and Additional Information:</b>

#### 8. REPORTING FORMAT FOR PETROL

Member States should also submit a detailed summary report for petrol quality monitoring data (for both nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table format is attached as Appendix III for 2004 and Appendix V for 2005 onwards. Test methods shall be those included in EN 228: 1999 or later versions as appropriate.

#### 9. REPORTING FORMAT FOR DIESEL

Member States should also submit a detailed summary report for diesel quality monitoring data (for both nationally defined and parent grades) that they have collected in a given calendar year (January to December). This summary table format is attached as Appendix IV for 2004 and Appendix VI for 2005 onwards. Test methods shall be those included in EN 590: 1999 or later versions as appropriate.

#### 10. SUBMISSION OF FUEL QUALITY MONITORING REPORT

The fuel quality monitoring report should be submitted formally to the following person:

The Secretary General  
The European Commission  
Rue de la Loi/Wetstraat 200  
B-1049 Brussels.

In addition, the report should be submitted in electronic form to the following email address:  
[env-report-98-70@cec.eu.int](mailto:env-report-98-70@cec.eu.int)

**ANNEX I: Fuel Quality Monitoring System Regional Sampling of Petrol and Diesel <sup>(1)</sup>**

Country:	
Fuel type (petrol or diesel):	
Statistical Model (A, B or C) <sup>(2)</sup>	
Period and Year	

	Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability Factor <sup>(3)</sup>	Proportion of total samples	Min. number of Samples per grade	Actual number of samples taken					
						Grade:	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
						Name/ID:					
1											
2											
3											
4											
5											
6											
7											
8											
9											
1											
0											
1											
1											
1											
2											
1											
3											
1											
4											
1											
5											
	<b>Total</b>										

- (1) As defined in Annexes B and C of EN 14274:2003
- (2) Definitions according to those provided in EN 14274:2003.
- (3) Only for statistical Model A

**ANNEX II: Options (A) - Proportion of Refuelling Stations with Sulphur Free Grade Available by Region <sup>(1)</sup>**

<b>Country:</b>	
<b>Fuel type (petrol or diesel):</b>	
<b>Period and Year</b>	

<b>Regional Parameters</b>			<b>Regional availability (NUTS Level 3) of sulphur free fuel at refuelling stations <sup>(2)</sup></b>			
<b>NUTS Region Description <sup>(2)</sup></b>		<b>NUTS Code <sup>(2)</sup></b>	<b>No. of refuelling stations</b>	<b>Minimum %</b>	<b>Maximum %</b>	<b>Mean %</b>
<b>LEVEL 2 Regions</b>			--	--	--	--
<b>Region 1</b>		E.g. XX11				
<b>Region 2</b>		E.g. XX12				
<b>Region 3</b>		E.g. XX13				
<b>Etc.</b>		E.g. XX21				
		E.g. XX22				
		E.g. XX31				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>LEVEL 1 Regions</b>			--	--	--	--
<b>Region 1</b>		E.g. XX1				
<b>Region 2</b>		E.g. XX2				
<b>Etc.</b>		E.g. XX3				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>National Total</b>		<b>E.g. XX</b>				

(1) According to the Eurostat Nomenclature of territorial units for statistics – NUTS Statistical Regions of Europe (see: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html))

(2) Additional information on NUTS, including full country code listings, may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

<b>Additional Comments:</b>
-----------------------------

**ANNEX III: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) in 2004**

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
							Min.	Max.	Min.	Max.		
Research Octane Number	--							--	95 <sup>(2)</sup>	--	EN 25164	1993
Motor Octane Number	--							--	85 <sup>(3)</sup>	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 <sup>(4)</sup>	PrEN 13016-1	1997
Distillation:												
- evaporated at 100 °C	%(V/V)								46.0	--	PrEN ISO 3405	1999
- evaporated at 150 °C	%(V/V)								75.0	--		
Hydrocarbon Analysis:												
- olefins	%(V/V)									18.0 <sup>(5)</sup>	ASTM D 1319	1995
- aromatics	%(V/V)								--	42.0	ASTM D 1319	1995
- benzene	%(V/V)									1.0	EN 238	1996
Oxygen content	%(m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates:												
- Methanol	%(V/V)								--	3		
- Ethanol	%(V/V)								--	5		
- Iso-propyl alcohol	%(V/V)								--	10	EN 1601	1997
- Tert-butyl alcohol	%(V/V)								--	7	Or	
- Iso-butyl alcohol	%(V/V)								--	10	prEN 13132	1998
-Ethers containing 5 or more carbon atoms per molecule	%(V/V)								--	15		
- other oxygenates	%(V/V)								--	10		
Sulphur content	mg/kg								--	150	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						Total:
January		April		July		October
February		May		August		November
March		June		September		December

**Comments**

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 and 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

## ANNEX IV: Market Fuels Used in Vehicles with Compression Ignition Engines (Diesel) in 2004

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
							Min.	Max.	Min.	Max.		
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	Kg/m <sup>3</sup>								--	865	EN ISO 3575 EN ISO 12185	1998 1996
Distillation, 95% Point	°C								--	360	PrEN ISO 3405	1998
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	%(m/m)								--	11	IP 391	1995
Sulphur content <sup>(4)</sup>	mg/kg								--	350	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994

Sample Numbers in Month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
Total:			

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

**Comments**

<p><b>Comments</b></p>
------------------------



**ANNEX V: Market Fuels Used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

<b>Country</b>	
<b>Fuel grade:</b>	
<b>National specification:</b>	
<b>Period and Year:</b>	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
		No. of Samples	Min.	Max.	Mean	Standard Deviation	National Specification, if any		According to 98/70/EC		Method	Date
							Min.	Max.	Min.	Max.		
Research Octane Number	--							--	95 <sup>(2)</sup>	--	EN 25164	1993
Motor Octane Number	--							--	85 <sup>(3)</sup>	--	EN 25163	1993
Vapour pressure, DVPE	kPa								--	60.0 <sup>(4)</sup>	PrEN 13016-1	1997
Distillation:												
- evaporated at 100 °C	%(V/V)								46.0	--	PrEN ISO 3405	1999
- evaporated at 150 °C	%(V/V)								75.0	--		
Hydrocarbon Analysis:												
- olefins	%(V/V)								--	18.0 <sup>(5)</sup>	ASTM D 1319	1995
- aromatics	%(V/V)									35.0	ASTM D 1319	1995
- benzene	%(V/V)									1.0	EN 238	1996
Oxygen content	%(m/m)								--	2.7	EN 1601 PrEN 13132	1997 1998
Oxygenates:												
- Methanol	%(V/V)								--	3		
- Ethanol	%(V/V)								--	5		
- Iso-propyl alcohol	%(V/V)								--	10	EN 1601	1997
- Tert-butyl alcohol	%(V/V)								--	7	Or	
- Iso-butyl alcohol	%(V/V)								--	10	prEN 13132	1998
-Ethers containing 5 or more carbon atoms per molecule	%(V/V)								--	15		
- other oxygenates	%(V/V)								--	10		
Sulphur content	mg/kg								--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994
Lead content	g/l								--	0.005	EN 237	1996

Sample Numbers in Month						Total:
January		April		July		October
February		May		August		November
March		June		September		December

**Comments**

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 and 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

## ANNEX VI: Market Fuels Used in Vehicles with Compression Ignition Engines (Diesel) from 2005

Country	
Fuel grade:	
National specification:	
Period and Year:	

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specification, if any		According to 98/70/EC		Method	Date
		No. of Samples	Min.	Max.	Mean	Standard Deviation	Min.	Max.	Min.	Max.		
Cetane number	--							51.0	--	EN ISO 5165	1998	
Density at 15 °C <sup>(2)</sup>	Kg/m <sup>3</sup>							--	865	EN ISO 3575 EN ISO 12185	1998 1996	
Distillation, 95% Point	°C							--	360	PrEN ISO 3405	1998	
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	%(m/m)							--	11	IP 391	1995	
Sulphur content <sup>(4)</sup>	mg/kg							--	50	EN ISO 14596 EN ISO 8754 EN 24260	1998 1995 1994	

Sample Numbers in Month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
Total:			

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

**Comments**

<p><b>Comments</b></p>
------------------------

# **Appendix 5: Commission Recommendation 2005/27/EC**



# COMMISSION

## COMMISSION RECOMMENDATION

of 12 January 2005

**on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis**

(Text with EEA relevance)

(2005/27/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community, and in particular Article 211 thereof,

Whereas:

- (1) Under Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC<sup>(1)</sup>, the Member States are to ensure that unleaded petrol and diesel fuel of a fixed maximum sulphur content are available within their territories on an appropriately balanced geographical basis.
- (2) Directive 98/70/EC also provides that the Commission is to develop guidance for recommending what constitutes, for those purposes, availability of 10 mg/kg sulphur unleaded petrol on an appropriately balanced geographical basis.
- (3) It seems appropriate to develop this type of guidance also for diesel fuel with a maximum sulphur content of 10 mg/kg.

- (4) The Commission has assessed several options. As a result of that work, and after consultation with Member States, experts from the industrial and commercial sectors concerned, and other non-governmental organisations, the Commission has developed such guidance,

HEREBY RECOMMENDS:

For the purposes of Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC, and specifically as regards availability of sulphur-free fuels on an appropriately balanced geographical basis, Member States should apply the principles set out in the Annex.

Done at Brussels, 12 January 2005.

*For the Commission*  
Stavros DIMAS  
*Member of the Commission*

---

<sup>(1)</sup> OJ L 350, 28.12.1998, p. 58. Directive as last amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

## ANNEX

**Guidance on what constitutes availability on an appropriately balanced geographical basis for the purposes of Articles 3(2)(d) and 4(1)(d) of Directive 98/70/EC**

## 1. EXPLANATION OF TERMS USED IN THIS GUIDANCE

*Zero sulphur* or *sulphur-free fuels* are unleaded petrol and diesel fuels that contain equal to or less than 10 mg/kg (ppm) of sulphur.

*Refuelling stations* or *fuel dispensing sites* are sites, retail or commercial, where fuel is dispensed into road vehicles for propulsion (as defined in EN 14274:2003).

## 2. INFLUENCING FACTORS

To ensure availability of sulphur-free fuels, Member States need a certain level of flexibility according to different national market and supply infrastructure situations. The following factors should be taken into account:

1. *Low population density*

Large areas of low population density are likely to have fewer, smaller refuelling stations (in terms of volume throughput or number of dispensing pumps), with larger stations focused on more densely populated areas. The greater distances to travel between refuelling points and potentially the inability of existing infrastructure to support more than one sulphur level of fuel should be taken into account.

2. *High population density*

In areas of high population density, refuelling stations are likely to be larger on average (in volume throughput, as well as in the number of dispensing pumps), more numerous and hence more closely located. In this case the infrastructure is more likely to be able to support multiple fuel grades and a more gradual introduction of refuelling station coverage may also be possible.

3. *Small island markets*

Small island markets are likely to experience similar issues to low population density areas, with the added possibility of a smaller (or single) supplier market or a limited number of (or single) major terminals.

## 3. GENERAL GUIDANCE

Member States are already required under Article 8 of Directive 98/70/EC to provide the basic information on national sales volumes of sulphur-free unleaded petrol and diesel.

This guidance presents four evaluation criteria that the Commission has identified as being particularly useful in defining the geographically balanced availability of sulphur-free fuels for the purposes of Articles 3(2)(d) and 4(1)(d) of the Directive. Two detailed primary options, A and B, provide clearer and more precise information on the geographical availability of sulphur-free fuels. As a rule, it can be assumed that Member States could select either option A or B, but would not apply both of them at the same time.

And two less detailed secondary options, C and D, provide information on availability in specific areas.

It should be mentioned that the options proposed may lose their meaningfulness if a high availability, e.g. in the range of 60 to 80% of all stations, is achieved. In such cases, further evaluation of the success of the national policy may not be needed on a detailed regional basis. For option D the percentage number might be somewhat higher, depending on the situation.

In any case, the differences between the situations for introduction of sulphur-free unleaded petrol and sulphur-free diesel would indicate that they should be analysed separately.

Member States may choose the methods they feel most appropriate to implement the availability of sulphur-free fuels nationally. However, it is recommended that Member States consider the options presented here, before making a decision on the most appropriate measures to aid implementation for their national situation. Special cases are considered in section 4.

3.1. *Option A: Proportion of refuelling stations with sulphur-free grade available by region*

3.1.1. **Criterion**

Number and percentage of national unleaded petrol and diesel refuelling stations with sulphur-free fuel grades/types available (at the end of each reporting year), by Eurostat's three-level Nomenclature of Territorial Units for Statistics (NUTS) Level 3 regional breakdown.

The following units are used in this criterion:

- (a) number of refuelling stations;
- (b) percentage of refuelling stations with sulphur-free fuel available.

3.1.2. **Usefulness**

The advantage of this criterion is that it gives a clear indication of the geographical availability of sulphur-free fuels at a level that ensures reasonably even distribution across the national territory. Furthermore, the NUTS regional areas are already defined, and used in other Community statistics and the availability of other NUTS regional data (such as population, land area, etc.) will allow further useful analyses to be carried out.

3.2. *Option B: Average distance between refuelling stations with sulphur-free grade available*

3.2.1. **Criterion**

Average distances between either unleaded petrol or diesel refuelling stations where sulphur-free fuel is available. It includes the calculation of the national average, maximum and minimum distances between refuelling stations providing sulphur-free fuel (separately for unleaded petrol and diesel). It may also be useful to compare this with the national average for all refuelling stations.

3.2.2. **Usefulness**

The advantage of this criterion is that it gives an appreciation of the variation in distances owners of vehicles needing sulphur-free fuels may have to travel in order to refuel their vehicle within the national territory. Comparison with the national average for all refuelling stations puts the criterion in better perspective with national specific conditions.

3.3. *Option C: Availability of sulphur-free fuels at large refuelling stations*

3.3.1. **Criterion**

Number and total percentage of large/major refuelling stations with sulphur-free unleaded petrol or diesel available nationally. Large refuelling stations should be defined by the Member State in terms of the minimum limit in million litres/year fuel throughput, as appropriate to the national situation (e.g. it may be that around 5 % of all refuelling stations are included).

3.3.2. **Usefulness**

Large refuelling stations are located in areas of high demand, so this criterion will provide a useful measure of availability of sulphur-free fuels in such areas. These are likely to be distributed fairly evenly across the national territory, and the criterion should also be relatively easily utilised.

3.4. *Option D: Availability of sulphur-free fuels at highway/motorway refuelling stations*

3.4.1. **Criterion**

Number and total percentage of major road or highway/motorway refuelling stations with sulphur-free unleaded petrol or diesel available nationally. Major roads or highways/motorways should be defined, as appropriate, by the Member State.

3.4.2. **Usefulness**

This criterion is particularly useful with regard to transit and tourism in that it gives a measure of the availability on the major transport arteries. These stations are also likely to be distributed on a relatively even and wide geographical basis across the national territory, though mainly linked to larger population centres.

#### 4. SPECIAL CASES

In some cases, due to the type of measures taken by Member States or due to the special situation they are facing, it need not be necessary for Member States to fully use either the primary or the secondary options to adequately illustrate the level of geographical availability of sulphur-free fuels. Two such cases are envisaged, where reduced evaluation of the success of the national policy may be appropriate:

1. very high availability or conversion of the national market to sulphur-free unleaded petrol or diesel;
2. single terminal/supplier for Member State or restricted island market.

In these cases the following reduced level of analysis is appropriate.

##### 4.1. *Very high availability/market conversion*

In cases where the type of measures taken by Member States ensures a very high availability/market conversion nationwide (e.g. 60 to 80 % of refuelling stations or sales), it could possibly be sufficient to utilise only the basic information on total sales proportions (volumes) of sulphur-free fuels and national level data for unleaded petrol or diesel, as appropriate.

There are a number of ways this high availability/market conversion may have been achieved. These could possibly include:

- (a) industry agreements guaranteeing sulphur-free fuels offered at the majority of refuelling stations;
- (b) use of fiscal incentives resulting in a facilitated market switch to predominantly sulphur-free fuels;
- (c) introduction of mandatory conversion to/availability of sulphur-free fuels at refuelling stations.

##### 4.2. *Single terminal/island markets*

Member States with single supply terminals, or island market conditions might experience a swift increase to wide or even 100 % availability of sulphur-free fuels. This could reduce the usefulness of applying the options A to D in these particular areas, depending on the specific situation.

---



# **Appendix 6: 2006 Excel Reporting Template**



## EU Fuel Quality Monitoring Submissions – 2006 Reporting Template

### Introduction, purpose & format

Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Directive 93/12/EEC, as last amended by Directive 2003/17/EC, sets the environmental specifications for all petrol and diesel fuel marketed in the European Union. These specifications can be found in Annexes I to IV of the Directive. Article 8(1) obliges the Member States to monitor the compliance with these fuel quality specifications according to the analytical measurement methods referred to in the Directive.

By no later than 30 June each year the Member States must submit a summary of the fuel quality monitoring data collected during the period January to December of the previous calendar year. The first report was to be made by 30 June 2002, in the format specified under Commission Decision 2002/159/EC. From 2004 Member States are required to report according to the requirements of the European Standard EN 14274:2003, unless they are using national fuel quality monitoring systems of equivalent confidence. In addition from 2005 Member States are required to phase in “sulphur free” petrol and diesel fuels on an appropriately balanced geographical basis. To support this revised reporting a ‘Common Format for the Submission of Summaries of National Fuel Quality for Petrol and Diesel from 2004’ was proposed & agreed with Member States.

Member State submissions providing the results of monitoring for years 2001 and 2002 have been summarised in the EU Fuel Quality Monitoring 2001 and 2002 Summary Reports. In these reports an electronic format for submissions was recommended, together with additional information to assist in the collation and interpretation of results. The common reporting format for 2005 reporting onwards contained herein is proposed to attempt to harmonise reporting submissions across the Member States whether they are using either the European Standard or their own national systems. This format essentially summarises information already required or requested under the Directive and European Standard. The purpose of this extended Excel template based upon the format for reporting from 2006 is to:

- Assist Member States in their data reporting;
- Facilitate the collation and interpretation of Member State submissions, reducing the need to return to Member States for additional information;
- Provide additional guidance to Member States on the provision of information that would assist in the interpretation/understanding of both their national fuel quality monitoring systems and the significance of the results of sample analysis in the annual EU Fuel Quality Monitoring Summary Report.

The format of this template broadly follows that of the common format for reporting from 2005; mandatory requirements outlined in the Directive/European Standard, which are denoted by **black text/light blue fields**, text and fields in **red/orange** are additional information requested beyond these (such as specific information on the availability of sulphur free fuels, or the national monitoring system where EN 14274:2003 is not used).

**Your assistance in providing submission data using this Excel template is greatly appreciated.**

### Additional Information Fields

#### 1. Description of fuel quality monitoring system.

The additional optional information requested serves several purposes, firstly in clarifying the location/method of sample collection and analysis; second to help put into context/explain the reasons for differences in national fuel quality monitoring systems; in particular the number of samples taken and location of sampling:

- a) The number of sources fuels and distribution pathways (i.e. number of refineries, imported fuel sources and major distribution terminals) will affect the total number of samples needed to ensure a similar degree of statistical confidence in how representative monitoring results are of national fuel quality.
- b) Sampling at the end of the distribution chain (i.e. dispensing/refuelling sites) ensures that any contamination is identified before it reaches the vehicle, whilst sampling the whole distribution chain will also help identify at what point any potential contamination might have occurred.

#### 2. Sales and availability.

The additional optional information requested serves to help clarify EU picture of the rate of introduction of low (<50 ppm) and zero (<10 ppm) sulphur petrol and diesel.

#### 3. Petrol and Diesel sample analysis reporting tables

- Separate tables are requested for different RON and different sulphur grades in order to identify any particular issues with different fuel types;
- Additional clarifying information is requested to help interpret correctly the significance of any exceedances of the limit values and allow Member States the opportunity to provide information on how such a potential exceedances are followed up.

### Help on completing the Form

If you have any queries, regarding this Excel reporting template, please do not hesitate to call or e-mail Nikolas Hill of AEA Technology on: Tel: +44 (0)870 190 6490; E-mail: [nikolas.hill@aeat.co.uk](mailto:nikolas.hill@aeat.co.uk)

**Thank you again for your assistance with this work.**

**Directive 98/70/EC: Test Methods, Limit Values and Tolerance Limits\***

\*Based on information provided by the German Environmental Protection Agency, Italy, Irish EPA, UK DTI and CEN TC19

**Petrol**

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 228:1999				
		Limit values		Method	Date	Reproducibility, R*	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Research Octane Number (RON) (RON 91 fuel only)	--	95		EN-ISO 5164	2005	0.7	94.6	
	--	91		EN-ISO 5164	2005	0.7	90.6	
Motor Octane Number (MON) (RON 91 fuel only)	--	85		EN-ISO 5163	2005	0.9	84.5	
	--	81		EN-ISO 5163	2005	0.9	80.5	
Vapour Pressure, DVPE								
--summer period (normal)	kPa		60	EN 13016-1	2000	3.0		61.8
--summer period (arctic or severe weather conditions)	kPa		70	EN 13016-1	2000	3.2		71.9
Distillation *								
--evaporated at 100 °C	% (v/v)	46		EN-ISO 3405	2000	4.0	43.6	
-- evaporated at 150 °C	% (v/v)	75		EN-ISO 3405	2000	4.0	72.6	
Hydrocarbon analysis								
-- Olefins	% (v/v)		18.0	ASTM D1319	95a	4.6		20.7
				ASTM D1319*	95a	6.5		21.8
				EN 14517	2004	2.6		19.5
-- Olefins (RON 91 fuel only)	% (v/v)		21.0	ASTM D1319	95a	5.1		24.0
				EN 14517	2004	3.0		22.8
-- Aromatics (up to 2004)	% (v/v)		42.0	ASTM D1319	95a	3.7		44.2
				EN 14517	2004	2.0		43.2
-- Aromatics (from 2005)			35.0	ASTM D1319	95a	3.7		37.2
				EN 14517	2004	1.7		36.0
-- Benzene	% (v/v)		1.0	EN 12177	1998	0.10		1.06
				EN 238	1996	0.17		1.10
				EN 14517	2004	0.05		1.03
Oxygen content	% (m/m)		2.7	EN 1601	1997	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3	EN 1601	1997	0.4		3.2
-- Ethanol	% (v/v)		5	EN 1601	1997	0.3		5.2
-- Iso-propyl alcohol	% (v/v)		10	EN 1601	1997	0.9		10.5
-- Tert-butyl alcohol	% (v/v)		7	EN 1601	1997	0.6		7.4
-- Iso-butyl alcohol	% (v/v)		10	EN 1601	1997	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15	EN 1601	1997	1		15.6
-- other oxygenates	% (v/v)		10	EN 1601	1997	0.8		10.5
Oxygen content	% (m/m)		2.7	EN 13132	2000	0.3		2.9
Oxygenates								
-- Methanol	% (v/v)		3.0	EN 13132	2000	0.3		3.2
-- Ethanol	% (v/v)		5.0	EN 13132	2000	0.4		5.2
-- Iso-propyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Tert-butyl alcohol	% (v/v)		7.0	EN 13132	2000	0.5		7.3
-- Iso-butyl alcohol	% (v/v)		10.0	EN 13132	2000	0.8		10.5
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)		15.0	EN 13132	2000	1		15.6
-- other oxygenates	% (v/v)		10.0	EN 13132	2000	0.8		10.5
Sulphur content	mg/kg		150	EN ISO 14596	1998	30		168
				EN ISO 8754	1995	CEN: Not suitable for fuels 150ppm and below***		
				EN 24260	1994	18.6		161
				EN ISO 20846	2004	25.6		165.1
				EN ISO 20847	2004	27.7		166.3
				EN ISO 20884	2004	15.9		159.4
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20		62
				EN 24260	1994	6.8		54
				EN ISO 20846	2004	9.7		55.7
				EN ISO 20847	2004	16.6		59.8
				EN ISO 20884	2004	7.9		54.7
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5		13
				EN 24260	1994	3.4		12
				EN ISO 20846	2004	2.7		11.6
				EN ISO 20884	2004	3.1		11.8
Lead content	g/l		0.005	EN 237	1996	0.002		0.0062
				EN 237	2004	0.00062		0.0054

\* R values and limits are fixed precision statements provided by CEN, to be used in the absence of specific values from Member States. Member States may use and report their own defined R depending on their testing conditions.

\*\*\* According to CEN/TR 15139: August 2005 - "Petroleum products and other liquids - Applicability of test methods on sulphur determination in petrol and diesel fuel", the test method EN ISO 8754 is not suitable for determining the sulphur content of petrol or diesel fuels at or below 150ppm and 350ppm, respectively. This is because the method does not comply with the tolerance limit guidance according to EN ISO 4259.

**Diesel**

Parameter	Unit	98/70/EC		Test specified in 98/70/EC or EN 590:1999				
		Limit values		Method	Date	Reproducibility, R*	Tolerance limits (95% confidence)	
		Min.	Max.				Minimum	Maximum
Cetane number	--	51.0	--	EN-ISO 5165	1998	4.3	48.5	
Density at 15 °C	kg/m <sup>3</sup>		845	EN-ISO 3675	1998	1.2		845.7
				EN ISO 12185	1996	0.5		845.3
Distillation -- 95% Point	°C		360	EN-ISO 3405	2000	10.0		365.9
Polycyclic aromatic hydrocarbons	% (m/m)		11	IP 391	1995	3.8		13.2
Sulphur content	mg/kg		350	EN ISO 14596	1998	50.0		379.5
				EN 24260	1994	42.4		375.0
				EN ISO 20846	2004	40.0		373.6
				EN ISO 20847	2004	17.9		360.6
				EN ISO 20884	2004	30.9		368.2
Sulphur content (low sulphur, from 2005)	mg/kg		50	EN ISO 14596	1998	20.0		62
				EN 24260	1994	6.8		54.0
				EN ISO 20846	2004	6.7		54.0
				EN ISO 20847	2004	12.8		57.6
				EN ISO 20884	2004	7.9		54.7
Sulphur content (sulphur free, from 2005)	mg/kg		10	EN ISO 14596	1998	5.0		13.0
				EN 24260	1994	3.4		12.0
				EN ISO 20846	2004	2.2		11.3
				EN ISO 20884	2004	3.1		11.8

## Contacts & Summary

### Details of those compiling the Fuel Quality Monitoring Report

The authorities responsible for compiling the fuel quality monitoring report are requested to complete the table below.

Reporting Year:	2006
Country:	
Date Report Completed:	
Organisation Responsible for Report	
Address of Organisation:	
Person Responsible for Report:	
Telephone Number:	
Email:	

### DEFINITIONS AND EXPLANATION

*Parent fuel grade* : Directive 98/70/EC sets the environmental specifications for petrol and diesel fuel marketed in the EU. The specifications in the Directive can be thought of as 'parent fuel grades'. These include (i) regular unleaded petrol (RON > 91), (ii) unleaded petrol (RON > 95) and (iii) diesel fuel.

*National fuel grade* : Member States may, of course, define 'national' fuel grades which must still, however, respect the specification of the parent fuel grade. For example, national fuel grades may comprise super unleaded petrol (RON > 98), lead replacement petrol, zero sulphur petrol, <50 ppm sulphur petrol, zero sulphur diesel, <50 ppm sulphur diesel, etc.

*Zero sulphur or sulphur-free fuels* are petrol and diesel fuels that contain less than 10 mg/kg (ppm) of sulphur.

### SUMMARY REPORTING FORMAT FOR PETROL & DIESEL

Member States are requested to provide a brief general summary of the results of the year's monitoring, including information on any:

- other parameters measured;
- exclusions;
- further details on breaches of parameter tolerance limits (i.e. number of samples, values);
- enforcement actions taken as a result of breaches of the limit values/tolerance limits; and
- additional information deemed relevant.

In particular, Member States should provide additional explanatory information on reasoning for exceptional cases where exclusions are made, such as:

- fuel grades marketed in very small quantities;
- mandatory fuel parameters that are not measured;
- geographical areas that are left outside the monitoring programme;
- exceptionally high or low values of analytical results (i.e. outliers).

### General Summary of Analysis and Additional Information:

## Fuel Quality Monitoring System

Year:

### Description of Fuel Quality Monitoring System

Member States should provide details on the operation of their national fuel quality monitoring systems.

Directive 98/70/EC requires the vapour pressure of petrol to be less than 60.0 kPa during the summer period, which spans 1 May until 30 September. However, for those Member States that experience 'arctic or severe weather conditions' the summer period covers the period 1 June to 31 August and the vapour pressure must not exceed 70 kPa. Member States are requested to define the Summer/Winter periods implemented in their territories and also applying to their fuel quality monitoring system reporting.

#### Definition of Monitoring System Summer and Winter Periods:

Summer Period	Start	
	End	
Winter Period	Start	
	End	

\* Normal = 1st May to 30th September; Arctic = 1st June to 31st August

Member States should indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C and whether it is based on the large or small country framework. Alternatively, the Member State should indicate if they are using their own nationally defined system.

Country Size (L = Large, S = Small)		Minimum number of samples each period (Petrol, per grade; Diesel)	
Fuel Quality Monitoring System model used:	Yes / No	Small Country	Large Country
EN 14274 Statistical Model A		50	100
EN 14274 Statistical Model B		100	200
EN 14274 Statistical Model C		50	--
National System		--	--

If Member States are using the European Standard EN 14274:2003, they should also provide details on the sampling programme by completing the relevant sections of the table in **Annex I** (as defined in Annexes B and C of EN 14274:2003), plus details of any additional provisions made in the table below.

If Member States are not using the European Standard EN 14274:2003 and are using their own national system, they should provide a description of the operation of their national fuel quality monitoring systems. This should preferably include the following information, in addition to any additional information that the Member State thinks is relevant (e.g. number of national refineries & distribution terminals):

- Organisations responsible for sampling, analysis and reporting;
- Types of locations at which sampling is carried out (e.g. refineries, terminals/depots, or from refuelling stations);
- Frequency of sampling and selection of sampling points;
- Assessment that shows the monitoring system's equivalency to the CEN system.

#### Description of National Fuel Quality Monitoring System (give once and up-date if necessary):

**Total Sales of Petrol and Diesel**Year: 

Member states are requested to complete the following table, as applicable detailing the quantities of each type and grade of petrol and diesel fuel marketed in their territory.

**\*NB: Please do not report national fuel grade sales under more than one category.**

Fuel Grade	Name of national fuel grade	National sales total		No. Samples Taken
		Litres	Tonnes	
Regular unleaded petrol (minimum RON = 91) <sup>1</sup>				
Regular unleaded petrol (minimum RON = 91 & < 50 ppm Sulphur)				
Regular unleaded petrol (minimum RON = 91 & < 10 ppm Sulphur)				
Unleaded petrol (minimum RON = 95) <sup>1</sup>				
Unleaded petrol (minimum RON = 95 & < 50 ppm Sulphur) <sup>2</sup>				
Unleaded petrol (minimum RON = 95 & < 10 ppm Sulphur) <sup>3</sup>				
Unleaded petrol (minimum 95 =< RON < 98)				
Unleaded petrol (minimum 95 =< RON < 98 & < 50 ppm Sulphur)				
Unleaded petrol (minimum 95 =< RON < 98 & < 10 ppm Sulphur)				
Unleaded petrol (minimum RON >= 98)				
Unleaded petrol (minimum RON >= 98 & < 50 ppm Sulphur)				
Unleaded petrol (minimum RON >= 98 & < 10 ppm Sulphur)				
<b>Total unleaded petrol (&lt;150 ppm Sulphur)</b>				
<b>Total unleaded petrol (&lt;50 ppm Sulphur)</b>				
<b>Total unleaded petrol (&lt;10 ppm Sulphur)</b>				
<b>Total Petrol</b>				
Diesel fuel <sup>4</sup>				
Diesel fuel (< 50 ppm sulphur) <sup>5</sup>				
Diesel fuel (< 10 ppm sulphur) <sup>6</sup>				
<b>Total Diesel</b>				

1 as specified in Annex I of Directive 98/70/EC

2 as specified in Annex III of Directive 98/70/EC

3 as specified in Annex III of Directive 98/70/EC except the sulphur content which must be less than 10ppm

4 as specified in Annex II of Directive 98/70/EC

5 as specified in Annex IV of Directive 98/70/EC

6 as specified in Annex IV of Directive 98/70/EC except the sulphur content which must be less than 10ppm

**Comments (completeness of data, particular issues, etc.)**



**Geographical Availability of Sulphur-Free Fuels**

Year: 2006

Member States are requested to complete the following tables with basic information on the geographical availability of sulphur free petrol and diesel sold in their territories.

	Litres	Tonnes	% Total Petrol/Diesel Sales
Total National sales <10 ppm sulphur petrol			
Total National sales <10 ppm sulphur diesel			
<b>Details of petrol RON grades available with &lt;10 ppm sulphur:</b>			
<b>Are &lt;10 ppm sulphur fuels (petrol and/or diesel) labelled differently from regular grades (i.e. can they be easily distinguished from regular/higher sulphur fuels by the consumer)?</b>			

Where Member States choose to apply the measures in their national territories, they are also requested to complete, as far as possible, the following tables with detailed information (Options A to D) on the geographical availability of sulphur free petrol and diesel in their territories, as outlined in the Commission Guidance note[1]. Member States should also take into account any specific provisions made for special cases in the Commission Guidance.

[1] The more detailed reporting on geographical availability is not needed until the 2005 monitoring reports, but would be useful if Member States were also able to provide it from 2004.

Where the more detailed information is not available, or additional notes/clarifications are needed or other guidance than that given by the Commission is used, the Member States are requested to provide a description on the extent to which sulphur free fuels are marketed in their territory (i.e. geographical availability). This free form text box should also be used to provide any additional information such as the special cases outlined in the Commission Guidance note.

Description of the geographical availability of sulphur free fuels or additional notes:

**Option (A): Proportion of refuelling stations with sulphur free grades available by region**

See Annex II for reporting table format.

**Option (B): Average distance between refuelling stations with sulphur free grades available**

	No. Refuelling Stations		Distance between refuelling stations (km)			
	<10 ppm	All	With <10 ppm grades available			All
	Number	Number	Min.	Max.	Mean	Mean
Petrol						
Diesel						

**Option (C): Availability of sulphur free fuels at large refuelling stations**

	Petrol	Diesel
National criteria for definition of "large refuelling stations" in terms of a minimum volume throughput (in million litres / annum)		
Total number of large refuelling stations nationally		
Number of large refuelling stations with <10 ppm fuel available		
% Total large refuelling stations with <10 ppm fuel available		

**Option (D): Availability of sulphur free fuels at highway/motorway refuelling stations**

	Petrol	Diesel
Total number of highway/motorway refuelling stations nationally		
Number of highway/motorway refuelling stations with <10 ppm fuel available		
% Total highway/motorway refuelling stations with <10 ppm fuel available		

### ANNEX I: Fuel Quality Monitoring System Regional Sampling of Petrol and Diesel <sup>(1)</sup>

Country:												
Fuel type (petrol or diesel):												
Statistical Model (A, B or C) <sup>(2)</sup>												
Reporting Year:		2006										
Period (Summer or Winter):												
Min. number of samples per grade:												
Macro / Non-Macro Regions (add extra rows as needed)	Fuel Consumption (million tonnes)	Variability factor <sup>(3)</sup>	Proportion of total samples	Min. number of Samples per grade <sup>(4)</sup>	Actual number of samples taken							
					Grade: Name/ID:	Grade 1 e.g. RON95	Grade 2 e.g. RON98	Grade 3	Grade 4	Grade 5	Grade 6	
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
			-	-								
Remainder	--	--	--									
<b>Total</b>												

Fill out a separate form for petrol and diesel

Fill out a separate form for summer and winter OR separate information below (e.g. Grade 1 = RON95 summer, Grade 2 = RON95 winter

In EACH of the summer and winter periods

- (1) As defined in Annexes B and C of EN 14274:2003
- (2) Definitions according to those provided in EN 14274:2003.
- (3) Only for statistical Model A
- (4) For grades comprising <10% total sales, the minimum is calculated as: %sales x min. for parent grade (at least 1 sample)

**Additional Notes (e.g. identification of grades comprising <10% total sales)**

**ANNEX II: Options (A) - Proportion of Refuelling Stations with Sulphur Free Grade Available by Region<sup>(1)</sup>**

<b>Country:</b>	
<b>Fuel type (petrol or diesel):</b>	
<b>Year:</b>	2006
<b>Period (Summer or Winter):</b>	

*Note:*

Please fill out the orange sections with the relevant information as far as possible, inserting extra rows for additional regions as needed and with additional comments as necessary for explanation in the relevant section.

<b>Regional Parameters</b>				<b>% of refuelling stations with sulphur free fuel available<sup>(2)</sup></b>		
<b>NUTS Region Description<sup>(2)</sup></b>		<b>NUTS Code<sup>(2)</sup></b>	<b>No. of refuelling stations</b>	<b>Minimum %</b>	<b>Maximum %</b>	<b>Mean %</b>
<b>LEVEL 2 Regions</b>	<b>Region Names</b>	--	--	<b>By (NUTS) level 3 region:</b>		
<b>Region 1</b>		E.g. XX11				
<b>Region 2</b>		E.g. XX12				
<b>Region 3</b>		E.g. XX13				
<b>Region 4</b>		E.g. XX21				
<b>Region 5</b>		E.g. XX22				
<b>Region 6</b>		E.g. XX31				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>LEVEL 1 Regions</b>	<b>Region Names</b>	--	--	<b>By (NUTS) level 2 region:</b>		
<b>Region 1</b>		E.g. XX1				
<b>Region 2</b>		E.g. XX2				
<b>Region 3</b>		E.g. XX3				
<i>&lt;insert extra rows as needed&gt;</i>						
<b>National Total</b>		<b>E.g. XX</b>				

(1) According to the Eurostat Nomenclature of territorial units for statistics – NUTS Statistical Regions of Europe (see: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.h](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.h))

(2) Additional information on NUTS, including full country code listings, may be found on the Eurostat web site at: [http://europa.eu.int/comm/eurostat/ramon/nuts/home\\_regions\\_en.html](http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html)

**Additional Comments:**

--

**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2006
Period (Summer or Winter)	Winter
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specification, if any		According to 98/70 EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum			
Research Octane Number	--									95 <sup>(2)</sup>		EN 25164	2005
Motor Octane Number	--									85 <sup>(3)</sup>		EN 25163	2005
Vapour Pressure, DVPE	kPa										(4)		
--summer period only											60.0	EN 13016-1	2000
Distillation													
-- evaporated at 100 °C	% (v/v)									46.0		EN ISO 3405	2000
-- evaporated at 150 °C	% (v/v)									75.0			
Hydrocarbon analysis													
-- Olefins	% (v/v)										18.0 <sup>(5)</sup>	ASTM D 1319 or EN 14517	1995, 2004
-- Aromatics	% (v/v)										42.0	ASTM D 1319 or EN 14517	1995, 2004
-- Benzene	% (v/v)										1.0	EN 12177, EN 238 or EN 14517	1998, 1996, 2004
Oxygen content	% (m/m)										2.7	EN 1601 or PrEN 13132	1997 1998
Oxygenates													
-- Methanol	% (v/v)										3		
-- Ethanol	% (v/v)										5		
-- Iso-propyl alcohol	% (v/v)										10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)										7	Or	
-- Iso-butyl alcohol	% (v/v)										10	EN 13132	2000
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)										15		
-- other oxygenates	% (v/v)										10		
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004
Lead content	g/l										0.005	EN 237	1996, 2004

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
(RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
(RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3	61.8					
--summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3.2	71.9					
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63	20.7					
*without oxygenates		ASTM D1319*	95a	6.5	21.8					
		EN 14517	2004	2.6	19.5					
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	95a	5.1	24.0					
		EN 14517	2004	3	22.8					
-- Aromatics (from 2005)		ASTM D1319	95a	3.7	37.2					
		EN 14517	2004	1.7	36.0					
-- Benzene	% (v/v)	EN 12177	1998	0.1	1.1					
		EN 238	1996	0.2	1.1					
		EN 14517	2004	0.1	1.0					
Oxygen content	% (m/m)	EN 1601	1997	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4	3.2					
-- Ethanol	% (v/v)	EN 1601	1997	0.3	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6	7.4					
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8	10.5					
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1	15.6					
-- other oxygenates	% (v/v)	EN 1601	1997	0.8	10.5					
Oxygen content	% (m/m)	EN 13132	2000	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3	3.2					
-- Ethanol	% (v/v)	EN 13132	2000	0.4	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5	7.3					
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0	15.6					
-- other oxygenates	% (v/v)	EN 13132	2000	0.8	10.5					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	9.7	55.7					
		EN ISO 20847	2004	16.6	59.8					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					
		EN ISO 20846	2004	2.7	11.6					
		EN ISO 20884	2004	3.1	11.8					
Lead content	g/l	EN 237	1996	0.002	0.0062					
		EN 237	2004	0.00062	0.0054					

**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2006
Period (Summer or Winter)	Summer
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specification, if any		According to 98/70 EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum			
Research Octane Number	--									95 <sup>(2)</sup>		EN 25164	2005
Motor Octane Number	--									85 <sup>(3)</sup>		EN 25163	2005
Vapour Pressure, DVPE	kPa										(4)		
-- summer period only											60.0	EN 13016-1	2000
Distillation													
-- evaporated at 100 °C	% (v/v)									46.0		EN ISO 3405	2000
-- evaporated at 150 °C	% (v/v)									75.0			
Hydrocarbon analysis													
-- Olefins	% (v/v)										18.0 <sup>(5)</sup>	ASTM D 1319 or EN 14517	1995, 2004
-- Aromatics	% (v/v)										42.0	ASTM D 1319 or EN 14517	1995, 2004
-- Benzene	% (v/v)										1.0	EN 12177, EN 238 or EN 14517	1998, 1996, 2004
Oxygen content	% (m/m)										2.7	EN 1601 or PrEN 13132	1997 1998
Oxygenates													
-- Methanol	% (v/v)										3		
-- Ethanol	% (v/v)										5		
-- Iso-propyl alcohol	% (v/v)										10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)										7	Or	
-- Iso-butyl alcohol	% (v/v)										10	EN 13132	2000
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)										15		
-- other oxygenates	% (v/v)										10		
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004
Lead content	g/l										0.005	EN 237	1996, 2004

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
(RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
(RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3	61.8					
--summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3.2	71.9					
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63	20.7					
*without oxygenates		ASTM D1319*	95a	6.5	21.8					
		EN 14517	2004	2.6	19.5					
-- Olefins (RON 91 fuel only)	% (v/v)	ASTM D1319	95a	5.1	24.0					
		EN 14517	2004	3	22.8					
-- Aromatics (from 2005)		ASTM D1319	95a	3.7	37.2					
		EN 14517	2004	1.7	36.0					
-- Benzene	% (v/v)	EN 12177	1998	0.1	1.1					
		EN 238	1996	0.2	1.1					
		EN 14517	2004	0.1	1.0					
Oxygen content	% (m/m)	EN 1601	1997	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4	3.2					
-- Ethanol	% (v/v)	EN 1601	1997	0.3	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6	7.4					
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8	10.5					
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1	15.6					
-- other oxygenates	% (v/v)	EN 1601	1997	0.8	10.5					
Oxygen content	% (m/m)	EN 13132	2000	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3	3.2					
-- Ethanol	% (v/v)	EN 13132	2000	0.4	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5	7.3					
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0	15.6					
-- other oxygenates	% (v/v)	EN 13132	2000	0.8	10.5					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	9.7	55.7					
		EN ISO 20847	2004	16.6	59.8					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					
		EN ISO 20846	2004	2.7	11.6					
		EN ISO 20884	2004	3.1	11.8					
Lead content	g/l	EN 237	1996	0.002	0.0062					
		EN 237	2004	0.00062	0.0054					

**Annex V: Market Fuels used in Vehicles with Spark Ignition Engines (Petrol) from 2005**

Country	
Reporting Year	2006
Period (Summer or Winter)	Full-Year
Parent fuel grade	
National fuel grade	
Summer Period*	1st May to 30th September (normal)

\* N = 1st May to 30th September (normal) ; A = 1st June to 31st August (arctic).

**Reporting results**

Parameter	Unit	Analytical and statistical results					Limiting Value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specification, if any		According to 98/70 EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Minimum	Maximum			
Research Octane Number	--									95 <sup>(2)</sup>		EN 25164	2005
Motor Octane Number	--									85 <sup>(3)</sup>		EN 25163	2005
Vapour Pressure, DVPE	kPa										(4)		
--summer period only											60.0	EN 13016-1	2000
Distillation													
-- evaporated at 100 °C	% (v/v)									46.0		EN ISO 3405	2000
-- evaporated at 150 °C	% (v/v)									75.0			
Hydrocarbon analysis													
-- Olefins	% (v/v)										18.0 <sup>(5)</sup>	ASTM D 1319 or EN 14517	1995, 2004
-- Aromatics	% (v/v)										42.0	ASTM D 1319 or EN 14517	1995, 2004
-- Benzene	% (v/v)										1.0	EN 12177, EN 238 or EN 14517	1998, 1996, 2004
Oxygen content	% (m/m)										2.7	EN 1601 or PrEN 13132	1997 1998
Oxygenates													
-- Methanol	% (v/v)										3		
-- Ethanol	% (v/v)										5		
-- Iso-propyl alcohol	% (v/v)										10	EN 1601	1997
-- Tert-butyl alcohol	% (v/v)										7	Or	
-- Iso-butyl alcohol	% (v/v)										10	EN 13132	2000
-- Ethers with ≥5 carbon atoms / molecule	% (v/v)										15		
-- other oxygenates	% (v/v)										10		
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Lead content	g/l										0.005	EN 237	1996, 2004

**Sampling frequency**

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) 91 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(3) 81 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 3.

(4) 70 kPa for Member States with arctic or severe weather conditions: See 98/70/EC, Annex I, Footnotes 4 & 5.

(5) 21 for unleaded regular grade petrol: See 98/70/EC, Annex I, Footnote 6.

**Other notes (optional):**



**Test Methods and Analysis**

Parameter	Unit	Test specified in 98/70/EC or EN228 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Research Octane Number (RON) (RON 91 fuel only)	--	EN-ISO 5164	2005	0.7	94.6		Yes			
	--	EN-ISO 5164	2005	0.7	90.6		Yes			
Motor Octane Number (MON) (RON 91 fuel only)	--	EN-ISO 5163	2005	0.9	84.5		Yes			
	--	EN-ISO 5163	2005	0.9	80.5		Yes			
Vapour Pressure, DVPE										
--summer period (normal)	kPa	EN 13016-1	2000	3	61.8					
--summer period (arctic or severe weather cond	kPa	EN 13016-1	2000	3.2	71.9					
Distillation *										
--evaporated at 100 oC	% (v/v)	EN-ISO 3405	2000	4.0	43.6		Yes			
-- evaporated at 150 oC	% (v/v)	EN-ISO 3405	2000	4.0	72.6		Yes			
Hydrocarbon analysis										
-- Olefins	% (v/v)	ASTM D1319	95a	4.63	20.7					
*without oxygenates		ASTM D1319*	95a	6.5	21.8					
		EN 14517	2004	2.6	19.5					
		ASTM D1319	95a	5.1	24.0					
-- Olefins (RON 91 fuel only)	% (v/v)	EN 14517	2004	3	22.8					
-- Aromatics (from 2005)		ASTM D1319	95a	3.7	37.2					
		EN 14517	2004	1.7	36.0					
-- Benzene	% (v/v)	EN 12177	1998	0.1	1.1					
		EN 238	1996	0.2	1.1					
		EN 14517	2004	0.1	1.0					
Oxygen content	% (m/m)	EN 1601	1997	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 1601	1997	0.4	3.2					
-- Ethanol	% (v/v)	EN 1601	1997	0.3	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 1601	1997	0.9	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 1601	1997	0.6	7.4					
-- Iso-butyl alcohol	% (v/v)	EN 1601	1997	0.8	10.5					
-- Ethers with 5 or more carbon atoms per molecule	% (v/v)	EN 1601	1997	1	15.6					
-- other oxygenates	% (v/v)	EN 1601	1997	0.8	10.5					
Oxygen content	% (m/m)	EN 13132	2000	0.3	2.9					
Oxygenates										
-- Methanol	% (v/v)	EN 13132	2000	0.3	3.2					
-- Ethanol	% (v/v)	EN 13132	2000	0.4	5.2					
-- Iso-propyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Tert-butyl alcohol	% (v/v)	EN 13132	2000	0.5	7.3					
-- Iso-butyl alcohol	% (v/v)	EN 13132	2000	0.8	10.5					
-- Ethers with 5 or more carbon atoms per mole	% (v/v)	EN 13132	2000	1.0	15.6					
-- other oxygenates	% (v/v)	EN 13132	2000	0.8	10.5					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	9.7	55.7					
		EN ISO 20847	2004	16.6	59.8					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					
		EN ISO 20846	2004	2.7	11.6					
		EN ISO 20884	2004	3.1	11.8					
Lead content	g/l	EN 237	1996	0.002	0.0062					
		EN 237	2004	0.00062	0.0054					

## Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	2006
Period (Summer or Winter)	Winter
Parent fuel grade	
National fuel grade	

## Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specifications		According to 98/70/EC		Method	Date
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum		
Cetane number	--							51.0	--	EN ISO 5165	1998	
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>								845	EN ISO 3575, EN ISO 12185	1998, 1996	
Distillation -- 95%-Point	°C								360	EN ISO 3405	2000	
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)								11	IP 391	1995	
Sulphur content (regular grades)	mg/kg								50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004	
Sulphur content (fuels sold as sulphur-free)	mg/kg								10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004	

## Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

## Other notes (optional):

--

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3	48.5		Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2	845.7					
		EN ISO 12185	1996	0.51	845.3					
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0	365.9					
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8	13.2					
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0	61.8					
		EN 24260	1994	6.8	54.0					
		EN ISO 20846	2004	6.7	54.0					
		EN ISO 20847	2004	12.8	57.6					
		EN ISO 20884	2004	7.9	54.7					
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0	13.0					
		EN 24260	1994	3.4	12.0					

## Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	2006
Period (Summer or Winter)	Summer
Parent fuel grade	
National fuel grade	

## Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)	
							National Specifications		According to 98/70/EC		Method	Date
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum		
Cetane number	--								51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>									845	EN ISO 3575, EN ISO 12185	1998, 1996
Distillation -- 95%-Point	°C									360	EN ISO 3405	2000
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)									11	IP 391	1995
Sulphur content (regular grades)	mg/kg									50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg									10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004

## Sampling Frequency

Number of samples in month		
January		July
February		August
March		September
April		October
May		November
June		December
		<b>Total</b>

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

## Other notes (optional):

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3	48.5		Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51		845.3				
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0		365.9				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	6.7		54.0				
		EN ISO 20847	2004	12.8		57.6				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				

## Annex VI: Market Fuels used in the Compression Ignition Engines (Diesel) from 2005

Country	
Reporting year	2006
Period (Summer or Winter)	Full-Year
Parent fuel grade	
National fuel grade	

## Reporting Results

Parameter	Unit	Analytical and statistical results					Limiting value <sup>(1)</sup>				Test method (more recent versions may also be used)		
							National Specifications		According to 98/70/EC		Method	Date	
		N° Samples	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Minimum	Maximum			
Cetane number	--									51.0	--	EN ISO 5165	1998
Density at 15 °C <sup>(2)</sup>	kg/m <sup>3</sup>										845	EN ISO 3575, EN ISO 12185	1998, 1996
Distillation -- 95%-Point	°C										360	EN ISO 3405	2000
Polycyclic aromatic hydrocarbons (PAH) <sup>(3)</sup>	% (m/m)										11	IP 391	1995
Sulphur content (regular grades)	mg/kg										50	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20847, EN ISO 20884	1998, 1994, 2004, 2004, 2004
Sulphur content (fuels sold as sulphur-free)	mg/kg										10	EN ISO 14596, EN 24260, EN ISO 20846, EN ISO 20884	1998, 1994, 2004, 2004

## Sampling Frequency

Number of samples in month			
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	
		<b>Total</b>	

(1) The limiting values are "true values" and were established according to the procedures for limit setting in EN ISO 4259:1995. The results of individual measurements shall be interpreted following the criteria described in EN ISO 4259:1995.

(2) In cases of dispute EN ISO 3675: 1998 shall be used

(3) Polycyclic aromatic hydrocarbons are defined as the total aromatic hydrocarbon content less than the mono-aromatic hydrocarbons content, both as determined by IP 391

(4) In cases of dispute EN ISO 14596: 1998 shall be used

## Other notes (optional):

--

## Test Methods and Analysis

Parameter	Unit	Test specified in 98/70/EC or EN590 (more recent versions may also be used)						Notes on exceedences		
		Method	Date	Reproducibility, R	Tolerance limits		Exceeded?	No. samples	Values	Details/action taken
					Minimum	Maximum				
Cetane number	--	EN-ISO 5165	1998	4.3	48.5		Yes			
Density at 15 oC	kg/m <sup>3</sup>	EN-ISO 3675	1998	1.2		845.7				
		EN ISO 12185	1996	0.51		845.3				
Distillation -- 95% Point	oC	EN-ISO 3405	2000	10.0		365.9				
Polycyclic aromatic hydrocarbons	% (m/m)	IP 391	1995	3.8		13.2				
Sulphur content (low sulphur, from 2005)	mg/kg	EN ISO 14596	1998	20.0		61.8				
		EN 24260	1994	6.8		54.0				
		EN ISO 20846	2004	6.7		54.0				
		EN ISO 20847	2004	12.8		57.6				
		EN ISO 20884	2004	7.9		54.7				
Sulphur content (sulphur free, from 2005)	mg/kg	EN ISO 14596	1998	5.0		13.0				
		EN 24260	1994	3.4		12.0				