

Fuel quality in the EU in 2016

Fuel quality monitoring under the Fuel Quality Directive

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Abbreviations

AMA	Agrar Market Austria
B+	Diesel fuel with > 7 % (v/v) biodiesel content
B5	Diesel fuel with up to 5 % (v/v) biodiesel content
B7	Diesel fuel with up to 7 % (v/v) biodiesel content
CEN	European Committee for Standardization
CNG	Compressed Natural Gas
CPSC	Cyprus Petroleum Storage Company
CTIA	Czech Trade Inspection Authority
DG QCLF	Directorate-General 'Quality Control of Liquid Fuels', Bulgaria
E+	Petrol with > 10 % ethanol content
E0	Petrol with no ethanol content
E5	Petrol fuel with up to 5 % (v/v) ethanol content
E10	Petrol with up to 10 % ethanol content
EEA	European Environment Agency
ELOT	Hellenic Organization for Standardization, Greece
ENMC	National Authority for the Fuel Market, Portugal
EPA	Environmental Protection Agency, Denmark
ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation
EU	European Union
FAME	Fatty acid methyl ester
FQD	Fuel Quality Directive
FQMS	Fuel Quality Monitoring System
ISO	International Organization for Standardization
kPa	Kilopascal
LPG	Liquid petroleum gas
MECIT	Ministry of Energy, Commerce, Industry and Tourism, Cyprus
MIT	Ministry of Industry and Trade, Czech Republic
MON	Motor octane number
NFM	Ministry of National Development, Hungary
QA/QC	Quality Assurance/Quality Control
QCLF	Quality Control of Liquid Fuels
RON	Research octane number
SAMTS	State Agency for Metrological and Technical Surveillance, Bulgaria
TL	Tolerance limit
UBA	Federal Environment Agency, Germany
% v/v	Percentage volume/volume

Executive summary

About this report

This report of the European Environment Agency (EEA) provides a summary of the volume and the quality of petrol and diesel sold in 2016 for use in road transport in the European Union (EU), based on the information reported in 2017 by EU Member States under the European Fuel Quality Directive 98/70/EC (FQD).

Each year, under the requirements of Article 8 of the FQD, EU Member States must report information relating to the quality of petrol and diesel fuels sold for road transport in their territories. More specifically, Member States must sample fuels each year and analyse their technical characteristics to ensure that they are consistent with the requirements of the FQD. The limiting values set out by the FQD concern parameters such as:

- for petrol fuels: distillation value, hydrocarbon analysis, lead content, manganese content, motor octane number (MON), oxygen content, oxygenates, research octane number (RON) ⁽¹⁾, sulphur content and the vapour pressure for the summer period;
- for diesel fuels: cetane number, density at 15 °C, distillation (95 %) point, fatty acid methyl esters (FAME) content, manganese content, polycyclic aromatic hydrocarbons and sulphur content.

Member States assess the quality of fuels through a Fuel Quality Monitoring System (FQMS). European Standard EN 14274 provides information on how to set up an FQMS, depending on the country size and statistical model used, as well as guidance on determining the minimum number of samples to be taken.

Since 2015, the EEA has supported the European Commission's Directorate-General for Climate Action in the compilation, quality checking and dissemination of information reported under the FQD.

Main findings

All EU Member States, plus Norway and Iceland, submitted fuel quality reports for 2016. Seven Member States provided reports after the legal deadline of 31 August 2017.

Fuels sales, types and biocomponent content

EU fuel sales continue to be dominated by diesel: 71.8 % (257 206 million litres) of fuel sold was diesel and 28.2 % was petrol (100 838 million litres). Petrol sales in 2016 remained almost unchanged compared with 2015, whereas diesel sales increased by 3.8 %.

The proportion of diesel in total fuel sales has increased over the years, from 55.6 % of total sales in 2001 to 71.8 % in 2016. This reflects to a large degree the increasing dieselisation of Europe's vehicle fleet during that period. Diesel fuel consumption is significant in most of the 28 EU Member States (> 60 % of total fuel sales), with the exception of Cyprus, Greece, Malta and the Netherlands.

The majority of petrol sales in 2016 comprised fuels with a petrol grade of RON 95, which accounted for 86.3 % of the total petrol fuel sales; 7.6 % of sales were of fuel with RON between 95 and 98; and 5.8 % were of fuel with RON ≥ 98. There was an insignificant proportion of RON 91 sales.

All diesel sold in the EU contains biodiesel, whereas 85 % of petrol sold contains bioethanol. In 2016, 75 % of petrol fuel sold in the EU had up to 5 % ethanol content by volume, and 10 % had up to 10 % ethanol content. Of the diesel fuel sold, 83 % contained up to 7 % FAME and 17 % contained more.

Compliance of fuel sold with FQD limits

Five Member States reported full compliance for petrol (Greece, Lithuania, the Netherlands, Slovenia and Sweden) and nine for diesel (Bulgaria, Croatia, Finland, Germany, Ireland, Lithuania, Malta, Slovenia and

⁽¹⁾ RON is an indication of the performance of the fuel in the engine. Higher RON numbers indicate that the fuel can withstand higher compression ratios in the combustion chamber before ignition. This fuel can be used in high-performance engines that require higher compression ratios.

Sweden). Lithuania, Slovenia and Sweden reported full compliance for both fuels. One Member State (Belgium) reported more than 100 non-compliances for petrol in 2016.

Member States reported a total of 507 non-compliances for petrol and 101 for diesel for 2016. For petrol, the most common parameters falling outside the specifications were summer vapour pressure (in 14 Member States), RON (in 11 Member States) and MON (in seven Member States). Fourteen Member States reported exceedances of aromatics, oxygen

content or distillation parameters. For diesel, the most common parameters falling outside the specifications were sulphur content (in seven Member States) and FAME content (in seven Member States).

All Member States have described the actions taken when non-compliant samples were identified. These included informing the competent authorities, initiating investigations, imposing penalties and fines, or resampling. In a small number of cases, no action has been taken where the non-compliant parameters were found to be very close to the tolerance limits.

1 Introduction

The road transport sector is a major contributor to air pollution and greenhouse gas emissions in Europe. Significant efforts are made by vehicle manufacturers to optimise vehicles in terms of energy conversion efficiency, exhaust emission levels and the durability of emission control systems (e.g. catalytic converters). Having clean fuels available on the market and following strict technical specifications with regard to them contributes to achieving higher levels of performance from vehicles. The role of liquid fuels and their contribution to air pollution and greenhouse gas emissions has been recognised in European Union (EU) law, which has stipulated minimum quality requirements and reduction targets for a range of petroleum and bio-based fuels.

Each year, EU Member States report information on the volumes and quality of petrol and diesel used for road transport to the European Commission, in line with their obligations under the Fuel Quality Directive 98/70/EC (FQD). The requirements of the FQD have evolved with the introduction of new fuel specifications and reporting requirements. The first FQD specifications for petrol and diesel sold for road transport in the EU came into force on 1 January 2000, the second on 1 January 2005 and the third on 1 January 2009.

The key documents that lay out the official requirements for the quality of fuel sold in the EU, as well as its monitoring and reporting, are the following:

- **Directive 98/70/EC** of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC;
- **Commission Decision 2002/159/EC** of 18 February 2002 on a common format for the submission of summaries of national fuel quality data;
- **European Standard EN 14274:2003** describing the Fuel Quality Monitoring System (FQMS) for assessing the quality of petrol and automotive diesel fuel marketed in any of the EU Member States within the European Community;
- **Directive 2003/17/EC** of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels;
- **Directive 2009/30/EC** of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

Since 2015, this reporting has been managed by cooperation between the European Commission and the European Environment Agency (EEA). Member States now use the European Environment Information and Observation Network Reportnet infrastructure to report the required information.

This report summarises the information on the quality of petrol and diesel fuel sold in the EU in 2016.

Following this introductory chapter, Chapter 2 describes the reporting requirements and the summary format for each Member State's submission. Chapter 3 provides an overview of the information aggregated at EU level, while Chapter 4 provides a summary of each Member State's submission.

2 Reporting by European Union Member States

A reporting template is used by EU Member States for their reporting obligations. Its purpose is to provide the necessary information and guidance for the preparation of national reports, and to ensure that all the required information has been provided. A number of consistency tools and checks are included in the template to facilitate data entry, as well as to provide a standard format for the presentation of the collected data.

This report provides a summary, for the EU overall and for each Member State, of the information received.

The individual country profiles included in Chapter 4 are based exclusively on the information provided by the Member States ^(?). They present information on the following four aspects:

1. country details: responsible organisations, country size, summer period, a description of the FQMS used and the location of sampling;
2. FQMS information, including a description of the sampling undertaken, FQMS administration, national legislation that transposed the FQD and reporting periods;
3. fuel sales information, including details of fuel sales by fuel type, bioethanol contents, the number of samples taken in winter and summer periods, and the number of technical parameters measured;
4. exceedances of the fuel quality limits, including a summary of the parameters for which exceedances were reported for the fuel grades measured.

^(?) The textual information provided by the Member States is taken verbatim from the template submitted; editing was undertaken to improve the flow for reading.

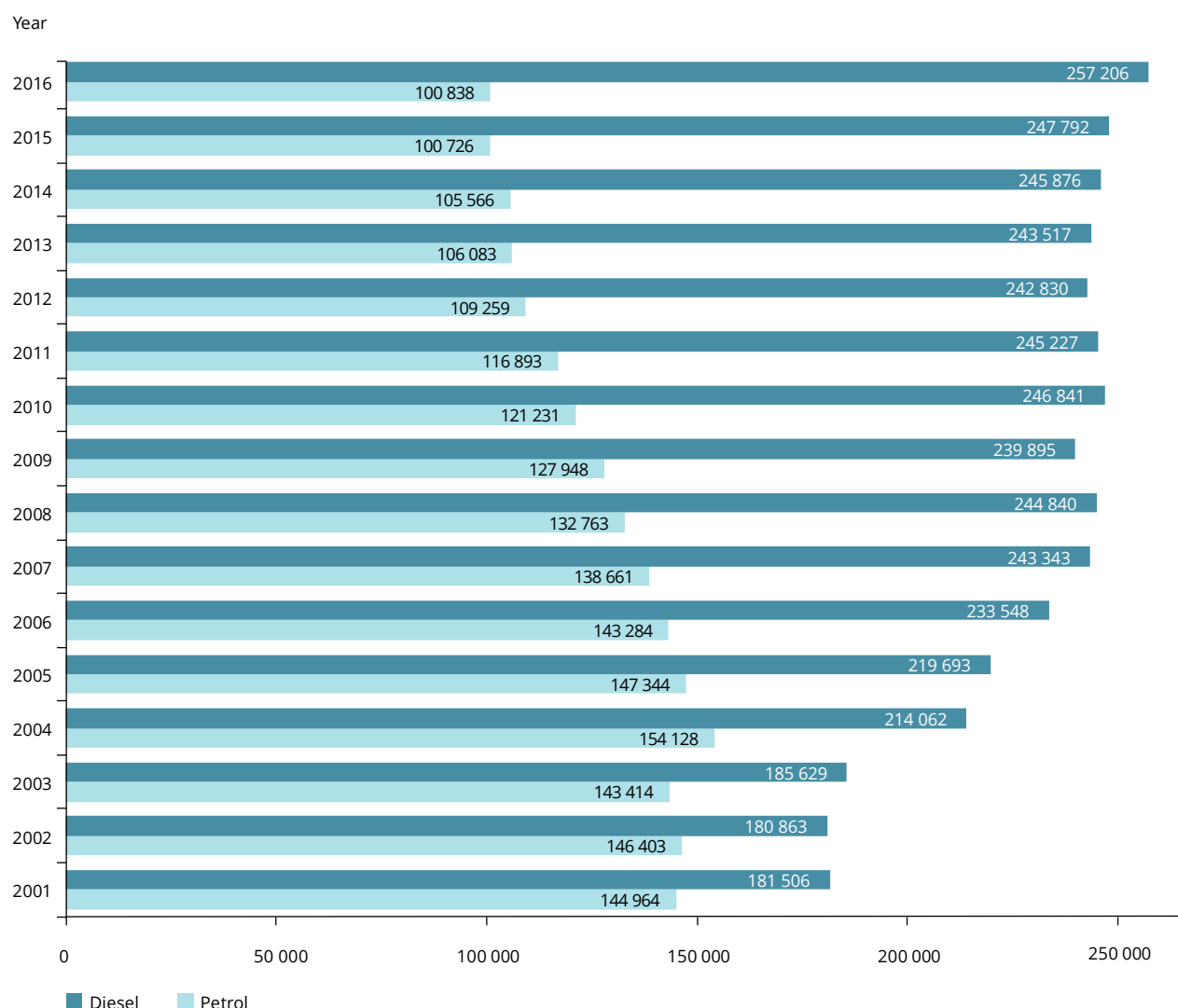
3 European Union summary

3.1 Fuel sales

EU fuel sales continue to be dominated by diesel: 71.8 % (257 206 million litres) of fuel sold was diesel and 28.2 % was petrol (100 838 million litres). Petrol sales in 2016 remained almost unchanged compared with 2015, whereas diesel sales increased by 3.8 % (Figure 3.1).

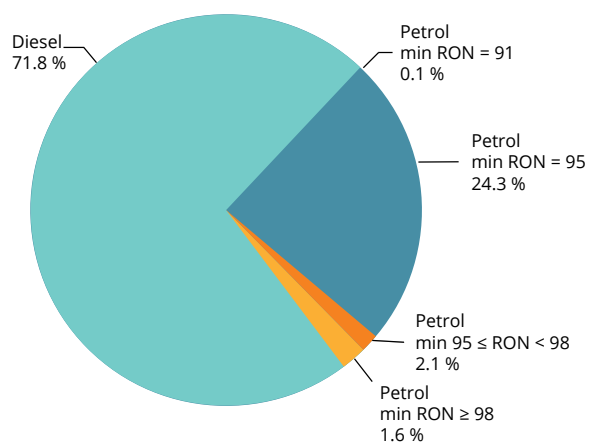
The proportion of diesel in total fuel sales has increased over the years, from 55.6 % of total sales in 2001 to 71.8 % in 2016 (Figure 3.2). This reflects to a large degree the increasing dieselisation of Europe's vehicle fleet during that period. While sales of diesel fuel increased by 10 % between 2006 and 2016, sales of petrol fuels decreased by 30 % during the same 10-year period.

Figure 3.1 EU petrol and diesel fuel sales in 2015 (million litres)



Note: Data for Romania for 2015 refer to 2014, as no data were submitted for 2015. For 2016, only partial data had been delivered by the end of October 2017.

Figure 3.2 2016 EU petrol and diesel fuel sales



Note: RON, research octane number.

The majority of petrol sales in 2016 comprised fuels with a petrol grade research octane number (RON) of 95, which accounted for 86.3 % of the total petrol fuel sales; 7.6 % of sales were of fuel with RON between 95 and 98; and 5.8 % were of fuel with RON ≥ 98. There was an insignificant proportion of RON 91 sales.

Diesel fuel consumption is dominant (> 60 % of total fuel sales) in most Member States, with the exception of Cyprus, Greece, Malta and the Netherlands (Table 3.1).

The nine Member States with the highest volumes of fuel sold account for more than 80 % of total EU sales, while the 15 Member States with the lowest volumes account for less than 10 % of total EU fuel sales.

Table 3.1 Fuel sales by Member State and fuel type in 2016 (million litres)

Member State	Minimum RON = 91	Minimum RON = 95	Petrol sales 95 ≤ RON < 98	RON ≥ 98	Total petrol	Total diesel
Austria	22		2 079	95	2 196	8 030
Belgium		1 674	285		1 959	8 464
Bulgaria		610		47	657	2 258
Croatia		705	17	18	740	1 841
Cyprus			453	28	481	345
Czech Republic		2 082		62	2 144	5 669
Denmark	259	1 541			1 800	3 216
Estonia			293	32	325	811
Finland		1 267		690	1 957	3 002
France		7 600		2 148	9 748	40 798
Germany		23 338		1 123	24 461	45 103
Greece		3 076	2	159	3 237	3 043
Hungary		1 711		67	1 778	3 937
Ireland		1 617			1 617	3 376
Italy		10 129			10 129	29 953
Latvia		234	25		259	1 713
Lithuania		286		4	290	1 855
Luxembourg		318	74		392	1 811
Malta			100		100	132
Netherlands		5			5	7
Poland		4 790		508	5 298	15 895
Portugal			1 309	102	1 411	5 185
Romania			1 612	94	1 706	4 769
Slovakia		771		16	787	1 780
Slovenia			505	49	554	1 633
Spain		5 823		500	6 323	26 647
Sweden		3 197		109	3 306	5 757
United Kingdom		16 262	916		17 178	30 176

The number of fuel grades and biofuel blends sold in the EU Member States is increasing and, therefore, the reporting and monitoring processes are becoming increasingly complex.

3.2 Use of biocomponents

A large part of the fuel sold in the EU in 2016 contained biocomponents (Figure 3.3). All diesel sold in the EU contained biodiesel, whereas 85 % of petrol sold contained bioethanol.

Of petrol sold in the EU in 2016, 75 % was of the product type E5 (i.e. up to 5 % ethanol content by volume, and in which the ethanol is derived from biofuels or is of biogenic origin). A total of 9.5 % was E10 (i.e. up to 10 % ethanol content by volume) and 15.4 % was E0 (no ethanol content). Only 0.1 % of petrol was E+ (i.e. > 10 % ethanol content by volume).

All diesel sold in the EU contained biodiesel, while

83.4 % of diesel fuel was of the B7 product type (i.e. containing up to 7 % fatty acid methyl esters, FAME) and 16.6 % was of the B+ product type (i.e. containing more than 7 % FAME).

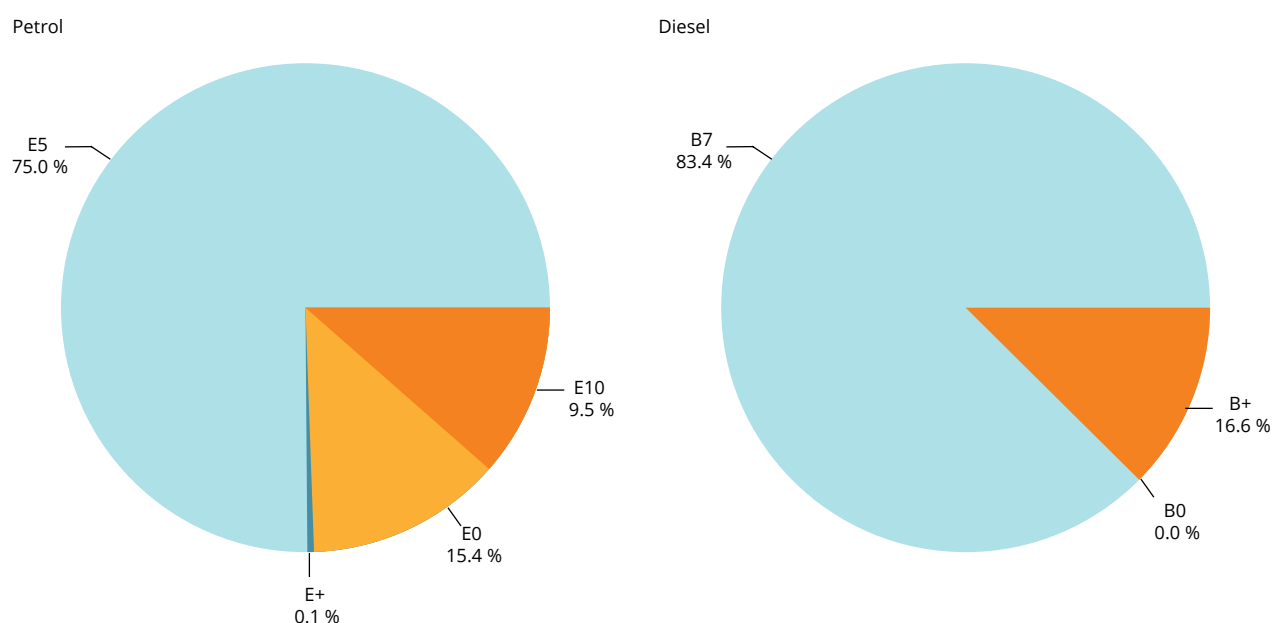
The average percentage content of biodiesel and bioethanol in diesel and petrol sales cannot be calculated because most countries have not reported the exact biofuel content in the various fuel grades.

3.3 Monitoring systems and sampling methods

Table 3.2 summarises the main information on the operation of the relevant FQMS by Member States, including model used, country size and sampling method as well as the number of samples.

The information contained in this table is described in more detail below.

Figure 3.3 Use of biocomponents in petrol and diesel fuels sold in the EU in 2016



Note: E+, petrol with > 10 % ethanol content; E0, petrol with no ethanol content; E5, petrol fuel with up to 5 % (percentage volume/volume) ethanol content; E10, petrol with up to 10 % ethanol content; B+, diesel fuel with > 7 % (% v/v) biodiesel content; B0, diesel fuel with no biodiesel content; B7, diesel fuel with up to 7 % (% v/v) biodiesel content.

3.3.1. Statistical models

Member States have to indicate whether their monitoring system is set up using the European Standard EN 14274:2003 statistical model A, B or C (see description in Table 3.3) and whether it is based on the large or small country framework. Alternatively, they have to indicate if they are using their own nationally defined system.

Twenty-three Member States used one of the three statistical models defined by the European Standard EN 14274:2003. Five Member States (Belgium, Latvia, Luxembourg, Sweden and the United Kingdom) used a national monitoring system.

Table 3.2 FQMS summary

Member State	FQMS model	Country size	Summer and winter sampling	Total samples required ^(a)	
				Petrol	Diesel
Austria	A	S	Yes	100	100
Belgium	National	S	Yes	National system	National system
Bulgaria	A	S	Yes	116	100
Croatia	C	S	Yes	100	100
Cyprus	C	S	Yes	106	100
Czech Republic	C	S	Yes	110	104
Denmark	C	S	Yes	200	100
Estonia	C	S	Yes	112	100
Finland	A	S	Yes	200	100
France	A	L	Yes	415	200
Germany	B	L	Yes	421	400
Greece	A	S	Yes	108	100
Hungary	C	S	Yes	120	120
Ireland	C	S	Yes	100	100
Italy	A	L	Yes	200	200
Latvia	National	S	Yes	National system	National system
Lithuania	C	S	Yes	100	100
Luxembourg	National	S	Yes	124	62
Malta	C	S	Yes	100	100
Netherlands	A	S	Yes	100	100
Poland	B	L	Yes	420	400
Portugal	C	S	Yes	100	100
Romania	-	-	-	-	-
Slovakia	C	S	Yes	106	100
Slovenia	C	S	Yes	110	100
Spain	A	L	Yes	218	200
Sweden	National	S	Yes	National system	National system
United Kingdom	National	L	Yes	National system	National system

Note: L, large country, total automotive road fuel sales of > 15 million tonnes per annum; S, small country, total automotive road fuel sales of < 15 million tonnes per annum.

^(a) Based on EN 14274:2003.

Table 3.3 Main types of statistical models used by Member States

Statistical model	Description
European Standard EN 14274 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, as well as approximately the same number of supply sources. This approach is recommended, as it is designed to capture fuel variations efficiently and therefore requires a smaller number of samples. If geographical or other circumstances (e.g. force majeure) do not allow fulfilment of the requirements for the design of this preferred model, model B shall be considered the next best model. The minimum overall number of samples per grade and per season is 50 per small country and 100 per large country.
European Standard EN 14274 B: non-macro-regions	If the construction of macro-regions (based on fuel supply patterns) is not possible within a country, then the country shall be divided into regions using only geographical and administrative criteria. To ensure that fuel variability is reliably captured, a large number of samples per grade is required: 100 for small countries and 200 for large countries.
European Standard EN 14274 C: non-region model	If the country is small and 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 one region for sampling purposes. A total of 50 samples per grade and per season is required.
National model	Some countries have implemented their own models for the FQMS in accordance with their national legislation.

Note: FQMS, Fuel Quality Monitoring System.

3.3.2. Information on summer and winter fuel grade sampling

Member States are also requested to define the summer/winter periods implemented in their territories and applying to their FQMS reporting. All of them (excluding Romania) provided information for both summer and winter fuel grades. Sampling in both summer and winter periods ensures representability of the samples taken and is also relevant for the vapour pressure of petrol, for which the FQD sets a limit value during the summer period only.

3.3.3. Minimum number of samples

The minimum number of samples specified in EN 14274 refers to the minimum number of samples taken from fuel dispensing sites to determine fuel quality at the point of use.

For fuel grades with market shares of 10 % and above, the minimum number of fuel-dispensing sites that should be sampled and tested in any country is given in Table 3.4.

For each fuel grade with a market share of < 10 %, considering petrol and diesel separately, the minimum number of fuel-dispensing sites to be sampled shall be calculated in proportion to the number of samples for the corresponding parent grade, using the following equation:

$$N_{\text{grade } i} = \text{market share}_{\text{grade } i} / \text{market share}_{\text{parent grade}} \times N_{\text{parent grade}}$$

Table 3.4 Minimum number of samples per fuel grade in each winter and summer period

Fuel grade	Country size	Statistical model		
		A	B	C
Petrol	Small	50	100	50
Petrol	Large	100	200	N/A
Diesel	Small	50	100	50
Diesel	Large	100	200	N/A

Note: N/A, not applicable.

3.4 Exceedances of fuel quality limits

Most key fuel parameters in the samples taken in 2016 were within the tolerance limits (TL). In total, 507 non-compliances for petrol and 101 for diesel were reported for 2016 (Table 3.5).

One Member State (Belgium) reported more than 100 non-compliances for petrol in 2016.

Seventeen Member States reported fewer than 10 non-compliances for petrol, five of which have reported full compliance (Greece, Lithuania, the Netherlands, Slovenia and Sweden). Exceedances of the summer vapour pressure were reported in 14 Member States, exceedances of the RON were reported in 11 Member States, exceedances of the motor octane number (MON) were reported in seven Member States, and exceedances of aromatics, oxygen content or distillation parameters were reported in 14 Member States.

Table 3.5 Number of non-compliances for petrol and diesel fuels by country in 2016

Member State	Samples taken (and samples required in brackets)		Non-compliant		Parameters outside tolerance limits for non-compliant samples
	Petrol	Diesel	Petrol	Diesel	
Austria	106 (100)	100 (100)	2	1	Vapour pressure, diesel sulphur content
Belgium	2 185 (National system)	4 132 (National system)	256	50	RON, MON, vapour pressure, aromatics, oxygen content, sulphur content, diesel density, diesel sulphur content, FAME content, distillation values
Bulgaria	129 (116)	128 (100)	1	0	Sulphur content
Croatia	168 (100)	197 (100)	3	0	Vapour pressure, aromatics
Cyprus	262 (106)	137 (100)	1	1	Vapour pressure, diesel sulphur content
Czech Republic	992 (110)	1 213 (104)	8	3	RON, MON, sulphur content, vapour pressure, distillation point, FAME content
Denmark	203 (200)	100 (100)	33	3	Vapour pressure, aromatics, diesel sulphur content
Estonia	320 (112)	150 (100)	9	1	RON, MON, vapour pressure, diesel sulphur content
Finland	235 (200)	121 (100)	18	0	RON, aromatics
France	409 (415)	215 (200)	14	2	Vapour pressure, sulphur content, RON, oxygen content, FAME content
Germany	845 (421)	401 (400)	19	0	Vapour pressure, oxygen content, ethanol, RON, MON, sulphur content
Greece	114 (108)	100 (100)	0	7	Density at 15 °C, FAME content
Hungary	120 (120)	120 (120)	3	1	Vapour pressure, aromatics, FAME content
Ireland	100 (100)	100 (100)	2	0	Vapour pressure
Italy	200 (200)	200 (200)	3	4	RON, MON, distillation point
Latvia	101 (National system)	158 (National system)	11	1	RON, diesel sulphur content
Lithuania	100 (100)	100 (100)	0	0	-
Luxembourg	124 (124)	62 (62)	15	4	Distillation, olefins, aromatics, ether, diesel density
Malta	104 (100)	104 (100)	1	0	Vapour pressure
Netherlands	100 (100)	100 (100)	0	3	Distillation point
Poland	530 (442)	403 (400)	12	2	RON, MON, vapour pressure, aromatics, sulphur content, distillation point
Portugal	657 (100)	667 (100)	64	5	RON, MON, vapour pressure, aromatics, oxygen content, diesel sulphur content, FAME content
Romania	-	-	-	-	-
Slovakia	209 (106)	200 (100)	6	5	RON, MON, evaporation point, benzene, diesel density, FAME content
Slovenia	125 (110)	132 (100)	0	0	-
Spain	400 (218)	200 (200)	5	3	Vapour pressure, aromatics, ROM, diesel sulphur content
Sweden	827 (National system)	856 (National system)	0	0	-
United Kingdom	1 399 (National system)	2 668 (National system)	21	5	RON, vapour pressure, aromatics, oxygen content, sulphur content, diesel density, diesel sulphur content

Note: The numbers of samples required per country are also shown in Table 3.1.

FAME, fatty acid methyl ester; MON, motor octane number; N/A, not available (not reported by the Member States); RON, research octane number.

Twenty-six Member States reported fewer than 10 non-compliances for diesel, nine of which reported full compliance (Bulgaria, Croatia, Finland, Germany, Ireland, Lithuania, Malta, Slovenia and Sweden). Of the seven fuel parameters that require testing and analysis (cetane number, density at 15 °C, distillation (95 %) point, polycyclic aromatic hydrocarbon (PAH) content, sulphur content, FAME content and manganese content), the most common parameters falling outside the specifications were sulphur content (in seven Member States) and FAME content (in seven Member States) ⁽³⁾.

All Member States have described the actions taken when non-compliant samples were identified. These included informing the competent authorities, initiating investigations, imposing penalties and fines, or resampling. For a small number of cases, no action has been taken where the non-compliant parameters were found to be very close to the tolerance limits.

3.5 Quality of Member States' reporting in 2017

The EEA is responsible for the quality assurance/quality control (QA/QC) of the data submitted at EU level and is assisted in these checks by the European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM) ⁽⁴⁾.

In 2017, 27 EU Member States plus Norway and Iceland submitted their fuel quality reports in accordance with the requirements of the FQD. Romania did not submit a complete report ⁽⁵⁾. During the QA/QC procedure, the ETC/ACM reviewers posed in total 44 questions to EU Member States, relating to the completeness and consistency of their submitted data sets. The most common findings communicated to Member

States following the quality checks performed on the information reported were:

- incorrect determination of the minimum number of samples that have to be taken;
- no fuel sales reported in the regional sampling sheets;
- national fuel sales and numbers of samples not consistent with the corresponding regional data;
- missing values for various fuel parameters;
- reporting of national specifications when they are the same as in Directive 2009/30/EC;
- exceedances of certain fuel quality parameters (e.g. summer vapour pressure, sulphur content), without specifying the number of samples outside the tolerance limits, or providing any explanations or a description of the action taken;
- analytical and statistical values (e.g. maximum, minimum, median, mean) reported for the full year not consistent with the corresponding summer/winter data.

Most of these issues could be solved directly with the Member States in the communication process, by means of them completing missing information, correcting erroneous values or providing the necessary clarifications to comments. Following the QA/QC procedure, 15 Member States submitted revised data sets.

With the exception of Romania having not submitted a complete report, there are no outstanding issues that could not be resolved during the QA/QC procedure.

⁽³⁾ It is noted that manganese is a metallic additive used for octane boosting in petrol only. However, the FQD limits the manganese content in all fuels, even though it has no application in diesel, hence most Member States do not routinely test for manganese content in diesel.

⁽⁴⁾ The ETC/ACM is a consortium of 14 European organisations contracted by the EEA to carry out specific tasks identified in the EEA strategy in the area of air pollution and climate change mitigation.

⁽⁵⁾ Only total fuel sales were reported and no samples for analysis have been collected as required by the Directive.

4 Summary of Member States' submissions

4.1 Austria

4.1.1 Country details

Responsible organisation:	Umweltbundesamt GmbH Wien (Austrian Environment Agency — AEA)
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model A
Location of sampling:	Refuelling stations

4.1.2 Fuel quality monitoring service

Sampling

The organisation responsible for sampling is Agrar Market Austria (AMA); analysing and reporting activities are performed by the Austrian Environment Agency (AEA). Samples are taken from filling stations that are selected at random, while the proportion of small and large marketers is constant. Within each year, three campaigns are undertaken — two in winter (at the beginning and end of the year) and one in summer. All parameters are tested according to the 'Methods and Limits' sheet to be found in the template

Fuel Quality Monitoring System administration

The FQM Directive was implemented by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management. The AMA and the AEA are commissioned by the Ministry to perform the FQM monitoring in Austria. The samples were taken from filling stations three times a year (AMA campaigns) and brought to the AEA for analysis. Reporting starts when all samples from the previous year have been

tested. After analysing the samples, non-compliant fuels are reported to the Ministry, where further legal action is taken.

At the beginning of the reporting period, Austria set up a model C FQMS because the Ministry stated that only one company (Österreichische Mineralölverwaltung OMV Refinery) is responsible for supplying the Austrian market, and the fuel is therefore more or less homogeneous; the FQMS at that time could find no evidence that this was not the case.

In 2009 Austria shifted to model A because it was proven that two refineries were supplying Austrian filling stations with fuels — some fuels were from a German refinery (OMV Burghausen). Differentiation became possible with the introduction of blending ethyl tert-butyl ether (ETBE) and ethanol, as, for the first time, differences were detectable between fuels sold in Austria. Since then two macro-regions have been defined (west and east), and samples are divided according to population and number of filling station.

National legislation that transposed the Fuel Quality Directive

The transposition of the FQD into national law, as well as the Renewable Energy Directive, was done by an amendment of the Austrian Fuel Ordinance, which was published in 2012 ⁽⁶⁾.

Reporting periods

There are no arctic weather conditions in Austria. The transition periods are 1 to 31 October and 1 March to 30 April. Samples taken within the transition periods are regarded as 'winter' samples. They are part of the FQMS.

⁽⁶⁾ BGBl. II Nr. 398/2012, <https://www.ris.bka.gv.at/eli/bgbl/II/2012/398>

4.1.3 Sales

Table 4.1 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Regular unleaded petrol (minimum RON = 91) E5 (Normal)	4.9	22 168 388	16 529	3	0	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Super)	4.8	2 079 101 707	1 550 147	50	50	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (Super Plus)	4.7	95 411 592	71 043	3	0	19 of 19
Total petrol		2 196 681 688	1 637 719	56	50	
Diesel fuel B7 (Diesel)	6.4	8 030 109 470	6 748 124	50	50	6 of 7
Total diesel		8 030 109 470	6 748 124	50	50	

4.1.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.2 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.2 Regular unleaded petrol (minimum RON = 91) E5 (Normal)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPA	< 60	60	71.4	2	3

Diesel fuel grades

Table 4.3 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.3 Diesel fuel B7 (Diesel)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	2.41	11.70	1	100

4.2 Belgium

4.2.1 Country details

Responsible organisation:	Fapetro
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	National system
Location of sampling:	Refuelling stations, depots and pumps from private owners

4.2.2 Fuel quality monitoring service

Sampling

The International Organization for Standardization (ISO) EN 17020-certified organisation Fapetro is responsible for the reporting of fuel quality in Belgium. Belgium uses a national system, instead of the statistical models, and takes samples at refuelling stations, depots and pumps belonging to private owners. Only samples for refuelling stations and depots are reported here. Petrol at depots is not sampled because of blending issues.

The division of samples is adapted to the volume of fuels sold on the Belgian market, so mainly diesel samples are taken.

Belgium controls many more parameters than are imposed by the European Commission, to ensure the quality of fuel sold. A template is available that shows in detail the parameters analysed and methods used for every fuel type.

Only a very small number of samples were non-compliant, as a result of involuntary contamination.

Belgium has used ISO 4259 for the interpretation of analysis results since 1 January 2009. Samples were taken in compliance with EN 14275 (latest version).

All samples were analysed by laboratories that were ISO 17025 certified. All test methods were accredited (or an application for accreditation was in progress at the time of testing). In addition, Fapetro audits the laboratories twice a year to ensure the quality of the analysed samples reported.

Pump labelling is regulated by national legislation.

Fuel Quality Monitoring System administration

See entries under sampling.

National legislation that transposed the Fuel Quality Directive

Transposition into national law was effected by the Ministerial decree of 24 January 2002 (latest version) and needs to be viewed in relation to the ISO 17020 procedures of Fapetro.

4.2.3 Sales

Table 4.4 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Essence95/Benzine95)	4.0	1 674 464 227	1 247 476	806	638	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Essence98/Benzine98)	4.0	285 165 628	212 473	715	26	19 of 19
Total petrol		1 959 629 855	1 459 949	1 521	664	
Diesel fuel B7 (Diesel10S)	6.0	8 464 106 216	7 050 600	2 047	2 085	7 of 7
Total diesel		8 464 106 216	7 050 600	2 047	2 085	

Reporting periods

Concerning the results provided for petrol, national specifications for the vapour pressure are (?):

- in summer (kPa): min 45.0, max 60.0;
- in winter (kPa): min 65.0, max 95.0;
- two transition periods: April and October (kPa): min 45.0, max 95.0.

Vapour pressure is analysed throughout the year in Belgium.

The transition periods are used to give fuel producers the ability to adapt fuel production to meet the specifications for summer or winter fuel quality.

Every year high levels of dry vapour pressure equivalent (DVPE) infringements can be observed in May. Those infringements are involuntary and due to low stock rotation, mainly in small retail stations (at the end of the chain). At those stations, the 'winter' quality petrol stays in stock longer, as the retail turnover is comparatively low. As a result, during the transfer period from 'winter' to 'summer' petrol, quality is altered as the petrol is mixed. All these infringements were small, harmless to the environment and involuntary.

With regard to petrol, non-compliant samples for vapour pressure came about because of low stock rotation in the transition periods between winter and summer grades.

(?) See Annex of the NBN EN 228, <https://www.nbn.be/nl/catalogue/standard/nbn-en-228-6>

4.2.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.5 and 4.6 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.5 Unleaded petrol (minimum RON = 95) E5 (Essence95/Benzine95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	—	> 95 (2)	93.7	97.40	95	169
Motor octane number	—	> 85 (3)	56.5	87.60	13	1 444
Vapour pressure		< 60	55.4	96.20	65	806
— evaporated at 100 °C	% v/v	> 46	40.0	69.80	1	1 444
— evaporated at 150 °C	% v/v	> 75	59.0	96.80	1	1 444
— aromatics	% v/v	< 35	9.4	38.70	3	1 444
Oxygen content (petrol with 5 % (v/v) or less ethanol content)	% (m/m)	< 2.7	0.2	2.85	2	1 444
Sulphur content	mg/kg	< 10	2.1	14.3	1	172

Table 4.6 Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Essence98/Benzine98)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	54.7	79.7	74	715
— aromatics	% v/v	< 35	19.6	96.4	1	741

Diesel fuel grades

Table 4.7 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.7 Diesel fuel B7 (Diesel10S)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Density at 15 °C (2)	kg/m ³	< 845	529.3	855.9	1	4 132
Distillation — 95 % point	°C	< 360	258.1	382.9	9	4 132
Sulphur content	mg/kg	< 10	3.1	24.7	6	4 132
FAME content	% v/v	< 7 (4)	0.0	8.3	34	4 132

4.3 Bulgaria

4.3.1 Country details

Responsible organisations:	1. Ministry of Environment and Water 2. State Agency for Metrology and Technical Surveillance to Ministry of Economy and Energy
Country size:	Small
Summer period:	16 April to 15 October
FQMS used:	EN 14274 Statistical Model A
Location of sampling:	Refinery, petroleum depots and terminals, refuelling stations and mobile tanks

4.3.2 Fuel quality monitoring service

Sampling

Control of liquid fuel quality is performed by the President of the State Agency for Metrological and Technical Surveillance (SAMTS) via the Directorate-General 'Quality Control of Liquid Fuels' (DG QCLF). DG QCLF officials are authorised by the President of SAMTS to take samples of liquid fuels, to test them and to report their results.

Control of marine fuel is performed in marine areas and inland waterways by the authorised Executive Director of the Executive Agency 'Maritime Administration' and its officials.

In 2016, the fuel quality monitoring model was statistical model A for a small country, in accordance with BDS EN 14274.

DG QCLF staff inspected liquid fuels in refineries, petroleum depots and terminals, refuelling stations, and mobile tanks for liquid fuel transport.

In fulfilment of the requirements of EN 14274, a minimum of 120 locations were established for control, providing 50 petrol samples and 50 diesel fuel samples during the summer and winter periods. The number of samples of petrol of RON \geq 98 was calculated by means of a formula, in accordance with EN 14274, whereby the market share of petrol of RON \geq 98 was around 7 %.

Locations were chosen by region, determined in proportion to the annual fuel consumption in each region, and using randomisation software. Each location has a unique identification number. Liquid fuel samples were collected every week, in accordance with EN ISO 3170 and BDS EN 14275. Samples were tested only in the permanently sited laboratory, pursuant

to European Directive 98/70/EC; methods were in accordance with EN 228 and EN 590.

The samples taken for the purposes of control were tested in a mobile laboratory and in the permanently sited laboratory of DG QCLF. In a mobile laboratory the following parameters are tested: distillation, in accordance with ASTM D 7345; benzene, in accordance with ASTM D 6277; oxygen content and oxygenates, in accordance with ASTM D 5845; sulphur content, in accordance with ASTM D 7212; density at 15 °C, in accordance with BDS EN ISO 12185; flash point, in accordance with BDS EN ISO 2719; vapour pressure, in accordance with BDS EN 13016-1; cold filter plugging point, in accordance with BDS EN 116, and FAME content, in accordance with BDS EN 14078. The parameter 'cetane number' is tested in a mobile laboratory using a diesel analyser, 'IROX Diesel'.

The equipment of the permanently sited laboratory covers the requirements of BDS EN 228 and BDS EN 590, and allows the following testing methods to be applied:

- For petrol: RON, in accordance with BDS EN ISO 5164; lead content, in accordance with BDS EN 237; density at 15 °C, in accordance with BDS EN ISO 12185 and BDS EN ISO 3675; sulphur content, in accordance with BDS EN ISO 20846; oxidation stability, in accordance with BDS EN ISO 7536; copper strip corrosion, in accordance with BDS EN ISO 2160; hydrocarbon content (olefins and aromatics), in accordance with BDS EN 15553; benzene content, in accordance with BDS EN 238+A1 and BDS EN 12177+AC; oxygen content and oxygenates, in accordance with BDS EN 13132; vapour pressure, in accordance with BDS EN 13016-1; distillation characteristics, in accordance with BDS EN ISO 3405; sulphur content, in accordance with BDS EN ISO 20884; manganese content, in accordance with BDS EN 16135, and volatility index, in accordance with point 5.5.2 of BDS EN 228.
- For diesel fuel: flammability properties (cetane number), in accordance with BDS EN ISO 5165; cetane index, in accordance with BDS EN ISO 4264; density at 15 °C, in accordance with BDS EN ISO 12185 and BDS EN ISO 3675; polycyclic aromatic hydrocarbons (aromatics), in accordance with BDS EN 12916; sulphur content, in accordance with BDS EN ISO 20846; flash point, in accordance with BDS EN ISO 2719; coke residue (at 10 % distillation residue), in accordance with BDS EN ISO 10370; ash content, in accordance with BDS EN ISO 6245; water content, in accordance with BDS EN ISO 12937;

total impurities, in accordance with BDS EN 12662; copper strip corrosion, in accordance with BDS EN ISO 2160; lubricating characteristics — corrected ware sign diameter 1.4 at 60 °C, in accordance with BDS EN ISO 12156-1; viscosity at 40 °C, in accordance with BDS EN ISO 3104+AC; distillation characteristics, in accordance with BDS EN ISO 3405; cold filter plugging point, in accordance with BDS EN 116; sulphur content, in accordance with BDS EN ISO 20884, and FAME content, in accordance with BDS EN 14078.

Fuel Quality Monitoring System administration

The organisations responsible for management and implementation of the FQD are the Ministry of Environment and Water, and SAMTS-DG QCLF.

The DG QCLF takes samples of transport and heating liquid fuels, while the Executive Agency 'Maritime Administration' takes samples from vessels; both organisations then send samples for testing in an accredited laboratory. Control is carried out by inspections of distributed fuels and their accompanying documents and by imposing administrative measures when non-compliance is identified.

The Bulgarian monitoring system was established with the help of the European standard BDS EN 14274:2003 for small countries. Until 2014, statistical model B was used; since 2015, statistical model A has been used.

The DG QCLF is a public body responsible for taking actions where infringements are found in liquid fuel control. Every month, every 3 months and every year, the DG QCLF provides data on the SAMTS website on the number of inspections, the number of cases of non-compliance, and the number and type of administrative measures imposed during the reference period.

The source of information on the consumption of fuels in the country and by regions is the National Revenue Agency.

National legislation that transposed the Fuel Quality Directive

European liquid fuel quality legislation has been introduced into Bulgarian legislation by the Clean Ambient Air Act, the Energy from Renewable Sources Act and the Regulation on the quality requirements,

conditions, order and control of liquid fuels. The Clean Ambient Air Act and the Regulation on the quality requirements, conditions, order and control of liquid fuels implement the requirements of Directive 98/70/EC and Standards EN 228 and EN 590. The Energy from Renewable Sources Act imposes requirements for the blending of liquid fuels with a biocomponent for transport. According to Article 47 of the Energy from Renewable Sources Act, those who provide the market with liquid fuels are obliged to provide diesel fuel with a minimum of 6 % (v/v) biodiesel.

Reporting periods

The 'summer period' in Bulgaria is from 16 April to 15 October; the 'winter period' is from 16 October to 15 April.

The following transition periods have been determined:

- petrol winter–summer transition:
from 16 April to 31 May;
- petrol summer–winter transition:
from 16 October to 30 November;
- diesel fuel summer–winter transition:
from 16 October to 30 November.

By implementing Decision of 7 April 2014, the European Commission approved the request of Bulgaria for derogation from the maximum vapour pressure of petrol containing bioethanol for the summer period, in accordance with Article 3(4) and (5) of Directive 98/70/EC for liquid fuels quality. This Decision enables petrol containing ethanol with a maximum vapour pressure of 60 kPa to be placed on the market in the summer period, with the respective vapour pressure waiver permitted, as referred to in Annex III to the Directive, on condition that the ethanol used is biofuel.

Results included in the report are for samples taken and tested in the summer and winter periods, with the exception of three samples of RON 95 petrol and five samples of diesel fuel taken in the summer-winter transition period from petroleum depots and a refinery. This was because, in the relevant Bulgarian legislation, there are no transition periods concerning seasonal specifications for manufacturers and importers.

4.3.3 Sales

Table 4.8 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E10 (Unleaded petrol RON 95 E10)	7.0	609 869 266	457 402	60	57	19 of 19
Unleaded petrol (minimum RON ≥ 98) E10 (Unleaded petrol RON ≥ 98 E10)	7.0	45 539 561	34 905	9	6	18 of 19
Total petrol		656 408 827	492 307	69	63	
Diesel fuel B7 (Diesel fuel B7)	6.0	2 258 040 885	1 919 335	67	66	6 of 7
Total diesel		2 258 040 885	1 919 335	67	66	

4.3.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.9 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.9 Unleaded petrol (minimum RON = 95) E10 (Unleaded petrol RON 95 E10)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	3	50.9	1	117

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.4 Croatia

4.4.1 Country details

Responsible organisation: Croatian Agency for the Environment and Nature
 Country size: Small
 Summer period: 1 May to 30 September
 FQMS used: EN 14274 Statistical Model C
 Location of sampling: Terminals and petrol stations

- Analysis of fuel samples: laboratory accredited by Standard ISO/IEC 17025 (a legal entity certified by the Croatian Accreditation Agency).
- Types of locations at which sampling is carried out: terminals and petrol stations.
- Samples of heavy fuel oil, heating oil and gas oil are in accordance with the 'Fuel quality monitoring programme', which is under the responsibility of the Ministry of Environmental and Nature Protection. The Ministry sets out the 'Fuel quality monitoring programme' a year in advance.

4.4.2 Fuel quality monitoring service

Sampling

- Control and sampling: inspection body type A accredited by Standard ISO/IEC 17020 (a legal entity certified by the Croatian Accreditation Agency).

- Frequency of sampling and selection of sampling points are in accordance with the 'Fuel quality monitoring programme'.

- Sampling from terminals is in accordance with Standard HRN EN ISO 3170.
- Sampling from petrol stations is in accordance with Standard HRN EN ISO 14275.
- Determining sulphur content is in accordance with Standard EN ISO 8754 or 14596.
- Reference method used for precision of the testing method and the interpretation of test results is in accordance with Standard HRN EN ISO 4259.

National legislation that transposed the Fuel Quality Directive

The FQD was transposed into Croatian legislation by the Regulation on the quality of petroleum-derived liquid fuels (Official Gazette No 113/2013, 76/2014, 56/2015).

Reporting periods

Seasonal periods in Croatia are as follows:

- summer: from 1 May to 30 September;
- winter: from 1 October to 30 April.

Fuel Quality Monitoring System administration

Croatia submitted the annual fuel quality data report on 7 July 2017 for 2016.

Samples were taken and tested regardless of the transition periods and the results of analyses were reported as usual throughout the year.

4.4.3 Sales

Table 4.10 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) (RON =95)	0.0	705 215 377	532 438	86	72	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) (RON =98)	0.0	16 624 645	12 552	4	2	19 of 19
Unleaded petrol (minimum RON ≥ 98) (RON =100)	0.0	17 511 456	13 221	2	2	18 of 19
Total petrol		739 351 478	558 211	92	76	
Diesel fuel B7 (B7)	0.0	1 840 876 598	1 555 540	92	105	7 of 7
Total diesel		1 840 876 598	1 555 540	92	105	

4.4.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.11 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.11 Unleaded petrol (minimum RON = 95) (RON = 95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure		< 60	45.0	67.8	2	85
— aromatics	% v/v	< 35	24.0	36.3	1	158

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.5 Cyprus

4.5.1 Country details

Responsible organisation:	Ministry of Energy, Commerce, Industry and Tourism
Country size:	Small
Summer period:	16 April to 15 October
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

4.5.2 Fuel quality monitoring service

Sampling

The Ministry of Energy, Commerce, Industry and Tourism (MECIT) is responsible for sampling, analysis and reporting. Analysis of samples is performed by the MECIT mobile laboratory and the laboratory of the Cyprus Petroleum Storage Company (CPSC).

Samples of all fuel grades were taken by MECIT inspectors from petrol stations, the depot at Larnaca, vehicles and other private installations of large consumers on a daily basis. The statistical and analytical results of the 2016 fuel quality report include samples from retail sites. In 2016, the MECIT mobile laboratory carried out almost all the tests required for monitoring fuel quality at petrol stations. The laboratory of the CPSC conducted a number of tests for verification purposes.

Fuel Quality Monitoring System administration

The MECIT Energy Service is the competent authority for monitoring the quality of fuels marketed in Cyprus.

The data and analysis in the report are from samples of petrol and diesel taken from retail stations in areas under the effective control of the government of Cyprus. Samples were taken by MECIT inspectors from retail sites (petrol refuelling stations) on a daily surveillance programme, prepared by the Chief Inspector and/or their assistant. Where non-compliant samples are discovered, the Chief Inspector is responsible for forbidding the sale of non-compliant fuels at retail sites and their use in private installations and for enacting the prosecution of those responsible for the tank. Cyprus is considered a single region. The supply of petrol and diesel is carried out by three companies, and distribution and retail are carried out by six marketing companies. Cyprus has no refinery.

National legislation that transposed the Fuel Quality Directive

The provisions of the FQD that correspond to the fuel specifications have been transposed into national law by Law 148(I)/2003 as amended by Decrees (KDP) P.I.252/15 plus P.I.200/16, P.I.102/15, P.I.326/13, P.I.328/13 and P.I.6/2014.

Reporting periods

The summer period is from 16 April to 15 October, and the winter period is from 16 October to 15 April. The transition period from summer to winter and vice versa is set at 6 weeks. Samples are taken and tested during these transition periods. Changes in vapour pressure within the transition periods are monitored (if the results are gradually complied with the seasonal specifications) and reported within the annual fuel quality report.

4.5.3 Sales

Table 4.12 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum 95 ≤ RON < 98) (Unleaded RON 95)	0.0	453 007 840	333 094	63	68	19 of 19
Unleaded petrol (minimum RON ≥ 98) (Unleaded RON 98)	0.0	27 896 320	20 512	57	59	19 of 19
Total Petrol		480 904 160	353 606	120	127	
Diesel fuel B7 (Eurodiesel)	7.0	344 889 600	287 408	68	67	6 of 7
Total Diesel		344 889 600	287 408	68	67	

4.5.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.13 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.13 Unleaded petrol (minimum RON \geq 98) (unleaded petrol RON 98)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	54.5	62.4	1	57

Diesel fuel grades

Table 4.14 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.14 Diesel fuel B7 (Eurodiesel)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	3.9	24.5	1	114

4.6 Czech Republic

4.6.1 Country details

Responsible organisation:	Ministry of Industry and Trade
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

4.6.2 Fuel quality monitoring service

Sampling

The FQMS is coordinated by the Ministry of Industry and Trade of the Czech Republic (MIT) for the whole country. The Czech Trade Inspection Authority (CTIA), which acts under the jurisdiction of the MIT, performed the sampling of liquid and gas fuels at the service stations, in cooperation with the Accredited Inspection and Certification Authority, for laboratory testing of all samples during 2016. Fuel samples were tested monthly throughout 2016. The controlling process of all fuel samples was carried out in accordance with European Standards EN 228 and EN 590, and also the amendments of the Czech Standards ČSN EN 228:2013 and ČSN EN 590:2014.

Fuel Quality Monitoring System administration

Fuel sampling was performed in accordance with the requirements of national and European legislation and general FQMS standards. The FQMS is used as a controlling system in accordance with the Czech Standard ČSN EN 14274:2013 and Czech versions of European Standards EN 228:2012 and EN 590:2013 for petrol and diesel, namely ČSN EN 228:2013 and ČSN EN 590:2014. If the Czech Trade Inspection Authority controller finds non-compliance in the fuel quality at a service station, the sale of fuels is banned until rectification is carried out; there is also the possibility of financial sanctions, in accordance with Act No 311/2006 Coll. for fuels and petrol stations. The national legislation is transposed by the rules and obligations of the FQD. The CTIA is a government institution that comes under the jurisdiction of the MIT. The annual data collected during the previous year's fuel quality monitoring are provided by the CTIA in the form of an annual report to the coordinating office, the MIT's Department of Gas Industry and Liquid Fuels. This department is responsible for the relevant working agenda and for reporting to the European Commission. The FQMS has been carried out under the management of the Department of Gas Industry and Liquid Fuels since 2001. Since the Czech Republic's accession to the EU in May 2004, the national FQMS has been adapted to the conditions of the EU system and is compatible

with it. In addition, it has been developed in accordance with the current requirements of the FQMS.

Currently, there are two refineries and around 31 distribution terminals in the Czech Republic. The figures on annual fuel analysis were provided by the MIT's Department of Data Support and Analyses Unit, in cooperation with the Czech Statistical Office.

National legislation that transposed the Fuel Quality Directive

The FQD is transposed by national legislation in accordance with Air Protection Act No 201/2012 Coll. and national energy legislation. Fuel quality has been monitored by Decree No 133/2010 Coll. on requirements for fuels, monitoring of fuel composition

and fuel quality and their records as amended, combined with Act No 311/2006 Coll. for fuels and petrol stations, as amended, in accordance with Trade Licensing Act No 455/1991 Coll., as amended and Act No 353/2003 Coll. on Excise Duties as amended.

Reporting periods

In 2016, 2 549 samples were checked at service stations across the country. In total, 413 samples of petrol and 564 samples of diesel were checked in the summer period, and 579 samples of petrol and 621 samples of diesel, plus eight samples of arctic diesel, were checked in the winter period. The results of sampling in the transition periods have been included for two seasons — spring and autumn.

4.6.3 Sales

Table 4.15 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Regular unleaded petrol (minimum RON = 91) E5	4.3	33 000	25	4	10	19 of 19
Unleaded petrol (minimum RON = 95) E5	4.2	2 081 512 000	1 558 220	381	537	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5	4.9	56 865 000	42 751	28	32	19 of 19
Unleaded petrol (minimum RON ≥ 98) E+ (E85)	76.1	5 131 000	4 004	0	0	0 of 19
Total petrol		2 143 541 000	1 605 000	413	579	
Diesel fuel B7 (<i>Motorova nafta</i>)	5.7	5 668 617 000	4 732 728	564	621	7 of 7
Diesel fuel B+4 (> 7% FAME ≤ 30 %) (<i>Smesna motorova nafta</i>)	28.8	92 000	78	0	0	0 of 7
Diesel fuel B+4 (FAME > 30 %)	100.0	220 000	194	0	0	0 of 7
Total diesel		5 668 929 000	4 733 000	564	621	

4.6.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.16, 4.17 and 4.18 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.16 Regular unleaded petrol (minimum RON = 91) E5

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	57.1	78.5	1	4

Table 4.17 Unleaded petrol (minimum RON = 95) E5

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	93.9	97.5	3	918
Motor octane number	-	> 85 (3)	84.2	86.0	1	918
Vapour pressure	kPa	< 60	51.7	81.2	1	381
Sulphur content	mg/kg	< 10	3.0	22.9	1	918

Table 4.18 Unleaded petrol (minimum RON ≥ 98) E5

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	3.1	33.6	1	60

Diesel fuel grades

Table 4.19 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.19 Diesel fuel B7 (*Motorova nafta*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Distillation – 95 % point	°C	< 360	329.00	388.6	2	1 185
FAME content	% v/v	< 7 (4)	0.29	7.8	1	1 185

4.7 Denmark**4.7.1 Country details**

Responsible organisation: Danish Environmental Protection Agency
 Country size: Small
 Summer period: 1 June to 31 August
 FQMS used: EN 14274 Statistical Model C
 Location of sampling: Service stations

Fuel Quality Monitoring System administration

No changes since the last detailed breakdown of the FQMS.

National legislation that transposed the FQD

No changes since the last detailed breakdown of the FQMS.

Reporting periods

No changes since the last detailed breakdown of the FQMS.

4.7.2 Fuel quality monitoring service**Sampling**

No changes since the last detailed breakdown of the FQMS ⁽⁸⁾.

⁽⁸⁾ See description at <https://www.eea.europa.eu/publications/eu-fuel-quality-monitoring-2015>

4.7.3 Sales

Table 4.20 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Regular unleaded petrol (minimum RON = 91) E5 (Oktan 92 unleaded)	5.0	259 406 000	194 555	49	50	19 of 19
Unleaded petrol (minimum RON = 95) E5 (Oktan 95 unleaded)	5.0	1 540 719 000	1 155 539	50	50	19 of 19
Total petrol		1 800 125 000	1 350 094	99	100	
Diesel fuel B7 (Miljødiesel (sulphur < 0.01 %))	7.0	3 216 496 000	2 701 857	50	50	6 of 7
Total diesel		3 216 496 000	2 701 857	50	50	

4.7.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.21 and 4.22 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.21 Regular unleaded petrol (minimum RON = 91) E5 (Oktan 92 unleaded)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 70	66.6	81.1	9	49
— aromatics	% v/v	< 35	28.5	36.4	7	99

Table 4.22 Unleaded petrol (minimum RON = 95) E5 (Oktan 95 unleaded)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 70	67.0	75.5	6	50
— aromatics	% v/v	< 35	7.9	37.8	11	100

Diesel fuel grades

Table 4.23 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.23 Diesel fuel B7 (Miljødiesel (sulphur < 0.01 %))

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	3.7	16.2	3	100

4.8 Estonia

4.8.1 Country details

Responsible organisation:	Ministry of Environment
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Refuelling stations

4.8.2 Fuel quality monitoring service

Sampling

Sampling is undertaken in accordance with standard EN 14275 by the Estonian Environmental Research Centre, which is also responsible for the analysis and reporting of results. Samples are taken only from retail fuel stations. Sampling points are selected so that most of the refuelling stations are covered within a period of 2 years. Sampling is undertaken so that summer/winter period samples are evenly distributed throughout a particular period.

Fuel Quality Monitoring System administration

The Estonian Ministry of Environment is responsible for managing and implementing the FQD. Fuel sampling

and analysis is contracted privately to the Estonian Environmental Research Centre and the annual report deadline is 30 May each year. When non-compliant samples occur, the public bodies responsible for taking action are the Estonian Environmental Inspectorate and the Estonian Tax and Customs Board. These two bodies are informed immediately by email and by post. If necessary, new samples are taken by the Tax and Customs Board. The system was designed in 2004–2005 using EN 14274 Statistical Model C.

National legislation that transposed the Fuel Quality Directive

Elements of the FQD requirements are described in Ministry of the Environment Regulation No 73 of 20 December 2016.

Reporting periods

The winter period is from 1 December to 28/29 February. The summer period is from 1 May to 30 September. Transition periods are from 1 October to 30 November and from 1 March to 30 April. No samples were taken during the transition periods.

4.8.3 Sales

Table 4.24 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Regular unleaded petrol (minimum RON = 91)	0.0	280 758	209	115	64	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (RON95)	1.3	292 600 832	217 988	85	56	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (RON98)	0.1	31 846 224	23 725	0	0	0 of 19
Total petrol		324 727 814	241 922	200	120	
Diesel fuel B7 (D)	0.0	810 686 278	675 302	90	60	6 of 7
Total diesel		810 686 278	675 302	90	60	

4.8.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.25 and 4.26 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.25 Regular unleaded petrol (minimum RON = 91)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	93.8	96.9	3	179
Motor octane number	-	> 85 (3)	84.2	86.0	2	179
Vapour pressure	kPa	< 60	60.7	89.6	1	179

Table 4.26 Unleaded petrol (minimum 95 =< RON < 98) E5 (RON95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	59	89.5	3	141

Diesel fuel grades

Table 4.27 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.27 Diesel fuel B7 (D)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	0	15.6	1	150

4.9 Finland

4.9.1 Country details

Responsible organisation:	Finnish Customs Laboratory
Country size:	Small
Summer period:	1 June to 31 August
FQMS used:	EN 14274 Statistical Model A
Location of sampling:	Service stations

4.9.2 Fuel quality monitoring service

Sampling

The Finnish Ministry of the Environment is responsible for the transposition of the FQD into national legislation, approving plans and giving general guidance. Finnish Customs is responsible for practical implementation and fuel quality monitoring. In case of non-compliant samples, the analysis will be repeated

as soon as possible. If non-compliance is confirmed, customs contact the fuel supplier/oil company to obtain a detailed account. If a clear reason for non-compliance cannot be determined, if there is no sign of intentional offending action, and if the case is not considered to be relevant, a written procedure is often considered appropriate and sufficient. When non-compliant samples are repeatedly found, remarks or formal complaints may also be issued. According to paragraph 175 (Rectification of a violation or negligence) of the Environmental Protection Act 527/2014 (previously 86/2000), a supervisory authority may prohibit a party from continuing or repeating a procedure violating existing regulations, or order a party to fulfil its duty in some other way. The Ministry of the Environment is informed about actions taken. If there is a risk that non-compliant fuel might cause damage to vehicles (lead, sulphur) and the fuel is still on the market, the fuel supplier can be ordered to remove the product from the market. According to paragraph 183 (Decision to prohibit or require action

on substances, preparations, products, equipment and machines), the Ministry of the Environment may prohibit a manufacturer, importer or other market supplier from continuing operations that contravene existing regulations by:

- prohibiting the trading, sale or other supply of products that are in violation of existing regulations;
- requiring the offender to bring the product into compliance with the regulations or otherwise meet its obligations.

If a product has been placed on the market, the Ministry may require the party acting contrary to the existing regulations to remove the product from the market.

Model A (Standard SFS EN 14274:2013) was used. The country was divided into three macro-regions with similar sales volumes and variability factors. There were two refineries and 19 terminals in operation. The three macro-regions had approximately 650, 750 and 460 retail sites, respectively, making a total of about 1 860.

Fuel Quality Monitoring System administration

The supervision of fuel quality is based on Environmental Protection Act 527/2014 (previously 86/2000), the Government Decrees on the quality requirements for petrol and diesel fuel (1206/2010 and 797/2015) and an agreement between the Ministry of Environment and Finnish Customs (38/481/2001).

According to the agreement, Finnish Customs prepares a yearly sampling plan, which is to be approved by the Ministry of Environment. Finnish Customs is in charge of the practicalities of supervision. The national district organisation of Finnish Customs takes liquid fuel samples in accordance with the sampling plan, and the samples are analysed at the Customs laboratory or by subcontractors whose competence has been confirmed. The supervision aims to comply, when applicable, with the requirements of Standard EN 14274:2013 model A.

National legislation that transposed the Fuel Quality Directive

An 'arctic' derogation was granted in 2011. The summer period runs from 1 June to 31 August, during which time the maximum vapour pressure allowed is 70 kPa. For details, see Commission Decisions K(2011) 714 final and K(2011) 3772 final, and the Finnish notification letter on the Fuel Quality Vapour Pressure Derogation (original notification dated 17 February 2010, supplementary information 26 June 2010 and 6 September 2010). The sampling was split into winter and summer periods, to take minimum numbers of samples in both periods. The results of samples taken during the transition period are reported within the annual fuel quality report.

Reporting periods

Samples have been taken during the transition period and test results have been reported in the annual fuel quality report.

4.9.3 Sales

Table 4.28 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E10 (Moottoribensiini 95 E10)	Maximum 10	1 266 981 000	950 236	53	65	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (Moottoribensiini 98 E5)	Maximum 5	690 145 000	517 609	52	65	19 of 19
Total petrol		1 957 126 000	1 467 845	105	130	
Diesel fuel B7 (Dieselöljy)	Maximum 7	3 002 484 000	2 542 177	54	67	6 of 7
Total diesel		3 002 484 000	2 542 177	54	67	

4.9.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.29 and 4.30 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.29 Unleaded petrol (minimum RON = 95) E10 (Moottoribensiini 95 E10)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	< 95 (2)	94.40	96.60	1	40
— aromatics	% v/v	< 35	22.79	36.98	5	118

Table 4.30 Unleaded petrol (minimum RON ≥ 98) E5 (Moottoribensiini 98 E5)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
— aromatics	% v/v	< 35	25.73	38.43	12	117

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.10 France

4.10.1 Country details

Responsible organisation: Ministère de la Transition écologique et solidaire
 Country size: Large
 Summer period: 1 May to 30 September
 FQMS used: EN 14274 Statistical Model A
 Location of sampling: Service stations

4.10.2 Fuel quality monitoring service

Sampling

This information was provided in the national language.

Fuel Quality Monitoring System administration

This information was provided in the national language.

National legislation that transposed the Fuel Quality Directive

This information was provided in the national language.

Reporting periods

This information was provided in the national language.

4.10.3 Sales

Table 4.31 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (SP95)	Maximum 5	4 034 793 200	3 046 269	114	100	19 of 19
Unleaded petrol (minimum RON = 95) E10 (SP95-E10)	Maximum 10	3 469 711 300	2 619 632	93	98	19 of 19
Unleaded petrol (minimum RON = 95) E+ (E85)	Maximum 85	95 929 300	75 593	0	0	0 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (SP98)	Maximum 5	2 148 147 600	1 621 851	0	0	0 of 19
Total petrol		9 748 581 400	7 363 345	207	198	
Diesel fuel B+4 (> 7 % FAME ≤ 30 % (Gazole))	Maximum 8	40 797 881 300	34 474 210	115	100	6 of 7
Total diesel		40 797 881 300	34 474 210	115	100	

4.10.4. Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.32 and Table 4.33 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.32 Unleaded petrol (minimum RON = 95) E5 (SP95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	52.5	65.5	7	114
Sulphur content	mg/kg	< 10	0.1	10.6	1	214

Table 4.32 Unleaded petrol (minimum RON = 95) E10 (SP95-E10)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	93.80	99.10	1	191
Vapour pressure	kPa	< 60	56.80	62.40	4	93
Oxygen content	% m/m	< 3.7	0.46	4.15	1	191

Diesel fuel grades

Table 4.34 summarises the parameters for which exceedances were reported for the diesel fuel grades measured

Table 4.34 Diesel fuel B+4 (> 7 % FAME ≤ 30 % (Gazole))

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
FAME content	% v/v	< 7 (4)	4.2	8.8	2	194

4.11 Germany

4.11.1 Country details

Responsible organisation:	Federal Environment Agency (UBA)
Country size:	Large
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model B
Location of sampling:	Service stations

4.11.2 Fuel quality monitoring service

Sampling

No changes have been made to the sampling system.

The organisations responsible for the sampling, analysis and reporting at regional level are the 16 governments of the federal states (*Bundesländer*) or their federal state agencies.

The results of the regional sampling are forwarded to the *Umweltbundesamt* (Federal Environment Agency — UBA), where data are collected and subsequently consolidated into a report.

The sampling was carried out only at refuelling stations.

The frequency of the sampling is shown on the data sheets.

Selection of the sampling points is the responsibility of each of the 16 governments of the federal states, and it differs from state to state. The quality of petrol and diesel fuels is tested by the competent authorities of the federal states. The overall monitoring of fuel quality also falls within the responsibilities of the competent federal state authorities, which are district administrations, lower administrative authorities, districts, and non-district or independent municipalities. The method for selecting fuel stations may be rotation, random selection or another way, taking into account population distribution and regional aspects.

The test methods used to sample the different parameters are presented on the datasheets.

Fuel Quality Monitoring System administration

No changes have been made to the system; it is designed as follows:

The competent authorities of the federal states monitor the quality of petrol and diesel fuels and are responsible for fuel quality monitoring in general. These authorities include district administrations, lower administrative authorities, districts, non-district municipalities and independent towns.

DIN EN 14274 (Annex C) lays down that model B applies to Germany (non-macro region): Germany is divided into 16 political regions which do not comply with fuel distribution patterns. As Germany is categorised as a large country with regard to the FQMS, the minimum number of samples is 200 per fuel and period (summer and winter). The proportions sampled for the various regions and the resulting number of samples is stipulated in the General Administrative Regulation on the Tenth Federal Emission Control Act (10th BImSchV), Annex 20. For fuels with less than 10 % market share, DIN EN 14274-2003 (D) defines a smaller number of samples. Please find additional

information on the number of samples for fuels with minor market shares for each region at <http://www.verwaltungsvorschriften-im-internet.de/pdf/BMU-IGI6-20120904-SF-A020.pdf>.

The regions have to convey their results to the Federal Environment Agency by 30 April of the following year, which produces a general report. The Federal Environment Agency passes this report on to the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, and to the European Commission.

The governments of the German federal states and/or the lower ranking government agencies are responsible for taking action in the case of non-compliant samples.

The design of the system was defined in DIN EN 14274-2003 (D). It was adopted into legislation by the 10th BImSchV in 2008.

The number of refineries in Germany was 13. The number of refuelling stations was 14 152 at the end of 2016.

National legislation that transposed the Fuel Quality Directive

No changes have been made to the system. The elements of the Directive are transposed into the German Tenth Ordinance Implementing the Federal Immission Control Act (10th BImSchV).

Reporting periods

For petrol, the summer period is from 1 May to 30 September. The winter period is from 16 November to 15 March. Transition periods are from 1 October to 15 November and from 16 March to 30 April. For diesel, the summer period starts on 15 April and ends on 30 September. The winter period starts on 16 November and ends on 28 February. Transition periods are from 1 October to 15 November and from 29 February/1 March to 14 April.

Samples may be taken during the whole year, preferably in the summer or winter period. For diesel fuel only, a small number of samples were taken during the transition period in March but, since the cold filter plugging point (CPFF) is not reported, none of the parameters reported should be influenced.

4.11.3 Sales

Table 4.35 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Super)	5.0	20 250 148 436	15 098 530	208	197	19 of 19
Unleaded petrol (minimum RON = 95) E10 (Super E10)	10.0	3 087 583 226	2 302 105	199	187	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (Super plus)	5.0	1 122 609 883	837 019	27	27	19 of 19
Total petrol		24 460 341 545	18 237 654	434	411	
Diesel fuel B7 (Dieselkraftstoff)	7.0	45 102 533 910	37 901 289	201	200	6 of 7
Total diesel		45 102 533 910	37 901 289	201	200	

4.11.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.36 and 4.37 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.36 Unleaded petrol (minimum RON = 95) E5 (Super)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60.0	55.50	69.9	2	208
Oxygen content (petrol with 5 % (v/v) or less ethanol content)	% (m/m)	< 2.7	1.43	3.4	1	290
— ethanol	% v/v	< 10.0	1.80	9.3	4	404

Table 4.37 Unleaded petrol (minimum RON = 95) E10 (Super E10)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	93.5	97.9	1	291
Motor octane number	–	> 85 (3)	84.1	87.1	1	373
Vapour pressure	kPa	< 60	48.3	80.5	9	169
Sulphur content	mg/kg	< 10	1.0	14.9	1	374

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.12 Greece

4.12.1 Country details

Responsible organisations:	General Chemical State Laboratory, Directorate of Energy Industrial and Chemical Products
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model A
Location of sampling:	Refuelling stations

4.12.2 Fuel quality monitoring service

Sampling

Greece is classified as a small country under the criteria in Article 3.2 of the Hellenic Organization for Standardization (ELOT) EN 14274, taking into account fuel sales levels. Statistical model A applies to Greece. In this model, to plan fuel sampling activities, the country is divided into three geographical regions. Region A consists of Attica. Region B includes Thessaly, Macedonia, Epirus, Thrace and Thessaloniki. Region C includes Sterea Ellada, Evia, the Ionian Islands, the Peloponnese, Crete and the Aegean Islands. For Region A, the competent body for taking fuel samples is the Fuel Distribution and Storage Inspectorate of the Ministry of the Environment and Energy. For Regions B and C, the competent bodies for taking fuel samples are the inspection teams from the Chemical Services of the General Chemical State Laboratory, working in collaboration with the regional customs authorities.

Refuelling stations are used as sampling locations. Sampling locations are chosen at random.

The number of samples to be tested in each period (summer and winter) for each grade of fuel with annual sales accounting for at least 10 % of the fuel market is at least 50.

The number of samples to be tested in each period (summer and winter) for each grade of fuel with annual sales accounting for less than 10 % of the fuel market are calculated using the following formula:

$$N(x) = M \times M(x)$$

where $N(x)$ is the number of samples taken from fuel x , where sales account for less than 10 % of the fuel market, $M(x)$ is the proportion of sales accounted for by fuel x (calculations are made on a rough basis based on past data), and M is the proportion of sales accounted for by the main category of fuel to which fuel x belongs.

Based on the sales percentage of various grades of fuels in each region, the Directorate of Energy, Industrial and Chemical Products sets the minimum number of fuel samples to be taken from refuelling stations in the area. The Directorate of Energy, Industrial and Chemical Products has the option to issue a decision requiring that samples taken in each period include fuel samples from each refinery. Care is taken to ensure that samples are taken in a uniform manner across the entire year.

The competent authorities for sampling send the samples to the central fuel inspection laboratories of the General Chemical State Laboratory, which are ISO 17025 accredited. The samples received from Regions A and C are examined by the Chemical Service of Piraeus and the Aegean, while the samples from Region B are examined by the Macedonia-Thrace Chemical Service. The laboratories monitor compliance with the requirements of Decision No 316/2010 and Decision No 77/2016, relating to petrol and diesel fuels, based on analytical methods set out in ELOT EN 228 and ELOT EN 590. The central fuel inspection laboratories send the test results to the competent authorities, for sampling, and to the Directorate of Energy, Industrial and Chemical Products. Where the fuel samples do not meet the specifications, the relevant sanctions shall be imposed by the competent authorities. The Directorate of Energy, Industrial and Chemical Products uses the results in the sample testing reports for statistical purposes, to prepare and submit the annual fuel quality report to the European Commission.

Fuel Quality Monitoring System administration

The competent authority for the system that monitors fuel quality (automotive petrol and diesel) is the Directorate of Energy, Industrial and Chemical Products of the General Chemical State Laboratory. The system was designed using model A of ELOT EN 14274, taking into account fuel sales. ELOT has adopted EN 14274 without making changes. The system was implemented in Greece with State Supreme Chemical Council Decision No 316/2010 (Government Gazette 501/B/2012), as amended by State Supreme Chemical Council Decision No 77/2016 (Government Gazette 4217/B/2016). Fuel sampling is carried out by public authorities. If non-compliant samples are discovered, the sampling authority is responsible for taking action. Failure to comply with the provisions of the legislation results in the sanctions specified in Article 10 of State Supreme Chemical Council Decision No 316/2010 (Government Gazette 501/B/2012), as amended by State Supreme Chemical Council Decision No 77/2016 (Government Gazette 4217/B/2016). In Greece, there are four refineries and approximately 7 000 refuelling stations.

National legislation that transposed the Fuel Quality Directive

Directive 2009/30 (with the exception of Articles 7(a) to 7(e) of Directive 98/70/EC, as amended by Article 1 of Directive 2009/30/EC) was transposed into Greek law with State Supreme Chemical Council Decision No 316/2010 (Government Gazette 501/B/2012), as amended by State Supreme Chemical Council Decision No 77/2016 (Government Gazette 4217/B/2016).

Reporting periods

The monitoring system is implemented twice a year, once for the summer period (from 1 May to 30 September) and once for the winter period (from 1 October to 30 April). No 'arctic' derogation has been granted.

4.12.3 Sales**Table 4.38 Total sales and sample number**

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) (95 RON)	0.0	3 075 934 038	2 299 261	50	50	14 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) (LRP (96 RON))	0.0	2 360 504	1 764	4	4	13 of 19
Unleaded petrol (minimum RON ≥ 98) (Super unleaded (100 RON))	0.0	158 878 616	118 762	3	3	13 of 19
Total petrol		3 237 173 158	2 419 787	57	57	
Diesel fuel B7	7.0	3 042 741 180	2 533 082	50	50	4 of 7
Total diesel		3 042 741 180	2 533 082	50	50	

4.12.4 Exceedances of the fuel quality limits**Petrol fuel grades**

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

Table 4.39 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.39 Diesel fuel B7

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Density at 15 °C	kg/m ³	> 820	811.0	840.1	1	100
FAME content	% v/v	< 7	5.7	7.8	6	98

4.13 Hungary

4.13.1 Country details

Responsible organisation:	ÁMEI Zrt.
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

Fuel sampling and testing have been contracted to ÁMEI Zrt.

The annual data set is provided by 31 March for the previous year.

Test results, including non-compliance samples, are reported quarterly to the NFM.

Statistical model C (small country) was chosen for design and implementation.

4.13.2 Fuel quality monitoring service

Sampling

The organisation responsible for sampling, analysis and reporting is ÁMEI Petroleum Products Quality Inspection Company, which has a contract with the Ministry of National Development (NFM). Fuel samples were taken from retail stations that had been randomly selected from the list of refuelling station made by the National Tax and Customs Administration (NAV).

Hungary's system is equivalent to the system proposed by the European Committee for Standardization (CEN).

On evaluating the system, Hungary determines all parameters requested by the Directive.

Fuel Quality Monitoring System administration

The NFM is responsible for managing and implementing the FQD.

Hungary has one oil refinery and several distribution terminals. Since import via road transport to retail stations is considerable, fuels at retail stations were also sampled.

National legislation that transposed the Fuel Quality Directive

Based on the Directive, National Decree of 30/2011 NFM (valid from 28 June 2011) is in place.

Reporting periods

No sampling is undertaken in transition periods, i.e. from 1 March to 30 April and from 1 October to 14 November.

4.13.3 Sales

Table 4.40 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (ESZ-95)	5.0	1 711 000 000	1 280 000	50	50	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (ESZ-98)	5.0	67 000 000	50 000	10	10	19 of 19
Total petrol		1 778 000 000	1 330 000	60	60	
Diesel fuel B7 (Dízelgázolaj)	7.0	3 937 000 000	3 291 000	60	60	7 of 7
Total diesel		3 937 000 000	3 291 000	60	60	

4.13.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.41 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.41 Unleaded petrol (minimum RON = 95) E5 (ESZ-95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	49.3	71.9	1	50
— aromatics	% v/v	< 35	24.9	37.0	2	100

Diesel fuel grades

Table 4.42 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.42 Diesel fuel B7 (Dízelgázolaj)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
FAME content	% v/v	< 7 (4)	0	7.3	1	120

4.14 Iceland**4.14.1 Country details**

Responsible organisation:	Environment Agency of Iceland
Country size:	Small
Summer period:	1 June to 31 August
FQMS used:	National system
Location of sampling:	Terminals

4.14.2 Fuel quality monitoring service**Sampling**

Fjölver surveyor and fuel inspection oversees the testing of each fuel batch delivery in Iceland.

Fuel Quality Monitoring System administration

In Iceland, each fuel batch delivery is controlled by Fjölver surveyor and fuel inspection. The test results

of the fuel products are directly compared with the agreed product requirements and are accepted if the results are within given specifications. The data for delivered fuel batches are reported to the competent authority, the Environment Agency of Iceland. There are four main fuel companies in Iceland: Atlantsolía ehf., Skeljungur hf., Olíverzlun Íslands hf. and N1 hf.

National legislation that transposed the Fuel Quality Directive

The requirements of the FQD are transposed into Icelandic Regulation No 960/2016 and National Law on Chemicals No 61/2013.

Reporting periods

The summer period in Iceland is from 1 June to 31 August. Samples are taken and tested during the transition period. The results of samples taken during the transition period are reported.

4.14.3 Sales**Table 4.43 Total sales and sample number**

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Unleaded petrol (RON > 95))	0.5	169 283 706	123 176	15	26	18 of 19
Total petrol		169 283 706	123 176	15	26	
Diesel fuel (Diesel fuel)	0.0	212 401 838	177 720	12	18	5 of 7
Total diesel		212 401 838	177 720	12	18	

4.14.4 Exceedances of the fuel quality limits

Petrol fuel grades

Tables 4.44 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.44 Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Unleaded petrol (RON>95))

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	93.50	95.50	13	41
— aromatics	% v/v	< 35	20.30	36.40	1	41
— benzene	% v/v	< 1	0.74	1.04	9	41
Sulphur content	mg/kg	< 10	2.20	10.00	1	41

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.15. Ireland

4.15.1. Country details

Responsible organisation:	Department of Communications, Climate Action and Environment
Country size:	Small
Summer period:	1 June to 31 August
FQMS used:	EN 14274 statistical model C
Location of sampling:	Refuelling stations

4.15.2. Fuel quality monitoring service

Sampling

Samples of petrol and diesel are taken by the Irish Petroleum Industry Association and are analysed by ITS Testing Services (UK) Ltd. Reporting is the responsibility of the Department of Communications, Climate Action and Environment. Samples are taken from refuelling stations. Selection of sampling points is on a random basis and is carried out throughout the year. For petrol samples, the following test methods were used: RON EN ISO 5164; MON EN ISO 5163; vapour pressure at 100 °C and 100 °C ISO 3405; olefins and aromatics ASTM D1319; benzene EN 238; other oxygenates, methanol, ethanol, iso-propanol, iso-butanol, tert-butanol, ethers (five or more carbon atoms) and other oxygenates EN 13132; sulphur content IP 490; and lead EN237. For diesel samples, the following methods were used: cetane number EN ISO 5165; density at 15 °C EN ISO 12185; distillation 95 % ISO 3405; polycyclic aromatics EN 12916; sulphur content IP 490; FAME BS EN 14078.

Fuel Quality Monitoring System administration

The Department of Communications, Climate Action and Environment has responsibility for managing and implementing the FQD. Samples of petrol and diesel are taken by the Irish Petroleum Industry Association and are analysed by ITS Testing Services (UK) Ltd. Reporting is the responsibility of the Department of Communications, Climate Action and Environment. Samples are taken from refuelling stations. Selection of sampling points is on a random basis and is carried out throughout a given year. Annual data are provided by the Irish Petroleum Industry for the winter period in January of each year and for the summer period in September of each year. When non-compliant samples are discovered, it is the responsibility of the Department of Communications, Climate Action and Environment to report, manage and monitor the non-compliance. All non-compliances are reported on the annual fuel quality report and follow-up action is also reported. Ireland uses EN 14274 statistical model C, as it is a small country. Whitegate Oil Refinery in County Cork is Ireland's only refinery. There are five distribution terminals in Ireland.

National legislation that transposed the Fuel Quality Directive

European Communities Act 1972 (Environmental Specifications for Petrol, Diesel Fuels and Gas Oils for use by non-road mobile machinery, including waterway vessels, agricultural and forestry tractors, and recreational craft) Regulations 2011 (SI No 155 of 2011).

Reporting periods

The summer period is from June to August. The winter period is from September to May. An 'arctic' derogation has been granted.

4.15.3 Sales

Table 4.45 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5	3.0	1 616 984 938	1 197 767	50	50	18 of 19
Total petrol		1 616 984 938	1 197 767	50	50	
Diesel fuel B7	4.0	3 376 375 720	2 854 079	50	50	6 of 7
Total diesel		3 376 375 720	2 854 079	50	50	

4.15.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.46 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.46 Unleaded petrol (minimum RON = 95) E5

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	61.7	73.1	2	50

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.16 Italy

4.16.1 Country details

Responsible organisation:	Ministry of Environment, Land and Sea
Country size:	Large
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model A
Location of sampling:	Refuelling stations

4.16.2 Fuel quality monitoring service

Sampling

The monitoring system was set up using statistical model A of EN 14274 (large country framework, five macro-regions). A total of 200 petrol samples and 200 diesel fuel samples were analysed. The distribution of samples throughout Italy was 29 % north-west, 14 % north-east, 27 % centre, 18 % south and 12 % islands. The testing required for fuel quality monitoring was performed by laboratories that regularly participate in one or more national inter-laboratory proficiency testing schemes and that are accredited in accordance with EN ISO 17025 or certified in accordance with ISO 9000 standards. The proficiency testing schemes include all test methods listed in the FQMS. In accordance with the requirements of EN 14274, analytical results for petrol and diesel fuel were reported

separately for each season and for each grade. Selection of sampling points is on a random basis; in 2016 the sampling was carried out only at refuelling stations. Samples of petrol and diesel are taken by independent supervisory bodies.

Fuel Quality Monitoring System administration

Italy established an FQMS in accordance with the requirements of the European Standard EN 14274:2003, by decree, on 3 February 2005. The 2016 national report was based on monitoring at sales outlets throughout Italy. Monitoring (sampling and measurements) was carried out by independent supervisory bodies on behalf of the main oil companies.

National legislation that transposed the Fuel Quality Directive

The FQD was transposed into national law by Legislative Decree No 66 of 21 March 2005.

Reporting periods

For petrol, the summer period is from 1 May to 30 September and the winter period is from 16 November to 15 March. For diesel, the summer period starts on 16 March and ends on 14 November, and the winter period starts on 15 November and ends on 15 March. No samples were taken during the transition period.

4.16.3 Sales

Table 4.47 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) (Unleaded petrol)	5.0	10 129 169 344	7 596 896	100	100	19 of 19
Total petrol		10 129 169 344	7 596 896	100	100	
Diesel fuel B7 (Diesel Fuel (< 10 parts per million sulphur))	7.0	29 952 877 617	25 159 914	100	100	6 of 7
Total diesel		29 952 877 617	25 159 914	100	100	

4.16.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.48 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.48 Unleaded petrol (minimum RON = 95) (Unleaded petrol)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	92.5	102.3	1	200
Motor octane number	-	> 85 (3)	82.8	95.4	2	200

Diesel fuel grades

Table 4.49 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.49 Diesel fuel B7 (Diesel Fuel (< 10 parts per million sulphur))

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Distillation — 95 % point	°C	< 360	333.5	370.6	4	200

4.17 Latvia

Fuel Quality Monitoring System administration

Not reported.

4.17.1 Country details

Responsible organisation: Ministry of Economics of the Republic of Latvia
 Country size: Small
 Summer period: 1 June to 31 August
 FQMS used: National system
 Location of sampling: Service stations

National legislation that transposed the Fuel Quality Directive

Not reported.

Reporting periods

Not reported

4.17.2 Fuel quality monitoring service

Sampling

Not reported.

4.17.3 Sales

Table 4.50 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (A-95)	0.1	233 861 438	178 904	18	58	16 of 19
Unleaded petrol (minimum RON = 95) E+ (E85)	0.9	77 118	61	5	20	16 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (A-98)	0.0	25 252 288	19 318	0	0	0 of 19
Total petrol		259 190 844	198 283	23	78	
Diesel fuel B5	0.0	621 699 401	519 119	23	99	6 of 7
Diesel fuel B7 (DD B5)	0.1	1 091 091 018	911 061	19	17	6 of 7
Total diesel		1 712 790 419	1 430 180	42	116	

4.17.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.51 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.51 Unleaded petrol (minimum RON = 95) E5 (A-95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	93.7	98	11	63

Diesel fuel grades

Table 4.52 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.52 Diesel fuel B5

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	2	16	1	106

4.18 Lithuania

4.18.1 Country details

Responsible organisation:	Ministry of Energy
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

4.18.2 Fuel quality monitoring service

Sampling

The Consumer Rights Protection Authority (SCRPA) is responsible for sampling and analysis. The Ministry of Energy is responsible for reporting. A total of 100 samples of petrol A-95 were taken at service stations.

Fuel Quality Monitoring System administration

The Ministry of Energy has responsibility for managing and implementing the FQD. Fuel sampling was carried out by the SCRPA, which is also responsible for taking action where non-compliant samples have been discovered. The system has been designed using statistical model C (EN 14274).

National legislation that transposed the Fuel Quality Directive

Standards EN 228 and diesel EN 590 have been transposed into national legal acts. All acts are related

to research of parameters of fuel and diesel samples, and have been fully transposed into Lithuanian legislation.

Reporting periods

Samples are taken during transition periods, as there are no filtering and cloud temperatures in the reports, and the indicators mentioned are also suitable for the winter period. Samples from 1 October to 30 November and from 1 March to 30 April are also covered by data from the winter period.

4.18.3 Sales

Table 4.53 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E10 (A-95 (RON 95))	5.09	285 756 671	214 889	50	50	19 of 19
Unleaded petrol (minimum RON ≥ 98) (A-98 (RON 98))	0.00	3 910 507	2 941	0	0	0 of 19
Total petrol		289 667 178	217 830	50	50	
Diesel fuel B7	> 7.00	667 980 757	564 443	50	50	7 of 7
Diesel fuel B+4 (> 7 % FAME ≤ 30 % (Diesel))		1 187 417 246	1 003 368	0	0	0 of 7
Total diesel		1 855 398 003	1 567 811	50	50	

4.18.4. Exceedances of the fuel quality limits

Petrol fuel grades

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.19 Luxembourg

4.19.1 Country details

Responsible organisation: Environmental Administration of Luxembourg
 Country size: Small
 Summer period: 1 May to 30 September
 FQMS used: National system
 Location of sampling: Service stations, terminals

4.19.2 Fuel quality monitoring service

Sampling

For 2016, the sampling, analysis and reporting of fuel quality was managed by three organisations. The samples were taken at depots and public refuelling stations. The sampling points were selected at random. Test methods are those specified in EN 228 and EN 590.

The samples have to be taken in accordance with the methods described in the European standards:

- EN 14275, if taken at fuel stations;
- EN ISO 3170, if taken at terminals.

Fuel Quality Monitoring System administration

The FQMS is under the responsibility of the Environmental Administration, part of the Department of Environment at the Ministry of Sustainable Development and Infrastructures.

Fuel sampling, analysis and reporting were each carried out by an agreed organisation. Within 1 week the results of the analysed parameters were transmitted to the Environmental Administration.

In the case of a non-compliant sample, the agreed organisation had to inform the Environmental Administration at once. After a written warning, the provider or operator had 48 hours to take the necessary measures. The provider or operator had to inform the Environmental Administration of the measures undertaken. A new sampling then had to be taken within 3 working days following the written warning.

In 2009, the Environmental Administration developed, in collaboration with the Austrian Federal Environment Agency, a concept to establish an FQMS for Luxembourg.

A 2-day workshop was held with the intention of bringing all stakeholders together and discussing various proposals, as well as establishing a possible way forward. In addition to the project partners, various representatives attended the meeting, including from the mineral oil industry, fuels laboratories and other EU countries where an FQMS has already been established.

The main outcomes were:

- it is possible to reduce the number of samples for diesel to a minimum of 86 samples a year, instead of 100 (EN 14274);
- it is possible to reduce the number of samples for petrol grades (RON 95, RON 98) to a minimum of 66 samples instead of 2 × 100 (EN 14274).

These measures could be taken without degrading the informative value and quality of the monitoring system. The following considerations were taken into account during design and implementation:

- country-specific data such as population, surface area, number of passenger cars and buses, number of petrol stations, fuel sales/grade;
- economy;
- supply points and distribution patterns of fossil fuels.

Luxembourg does not have its own refinery, therefore it is dependant on imports of petrol and diesel from other Member States, mainly from Belgium, the Netherlands and Germany (by truck, train or ship). Fuel stations in the border regions receive deliveries directly by road from terminals in Belgium (Liege, Feluy/Brussels) and Germany (Treves), and a few are supplied by the terminal in Mertert, whereas central fuel stations normally receive deliveries from a terminal in Bertrange (composed of several large tanks). The inland terminals in Bertrange and Mertert receive deliveries directly or indirectly by ship or train from refineries in Belgium, the Netherlands or Germany.

National legislation that transposed the Fuel Quality Directive

The FQD was entirely transposed into national law by the Grand-ducal Ordinance of 16 May 2012 concerning the quality of petrol and diesel fuels and the sustainable use of biofuels.

Reporting periods

The summer period extends from 1 May to 30 September and the winter period from 1 October to 30 April. No 'arctic' derogation has been granted.

The transition periods are regulated by the Grand-ducal ordinance 'Règlement grand-ducal du 16 mars 2012 concernant la qualité de l'essence et des carburants diesel et l'utilisation durable des biocarburants'. During the transition period no samples were taken or tested.

4.19.3 Sales

Table 4.54 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Euro 95)	5	317 995 243	235 316	31	31	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Euro 98)	5	73 770 852	55 328	31	31	19 of 19
Total petrol		391 766 095	290 645	62	62	
Diesel fuel B7 (Diesel)	7	1 811 102 366	1 521 326	31	31	6 of 7
Total diesel		1 811 102 366	1 521 326	31	31	

4.19.4. Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.55 and Table 4.56 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.55 Unleaded petrol (minimum RON = 95) E5 (Euro 95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Evaporated at 100 °C	% v/v	> 46	48.10	63.30	2	62
Evaporated at 150 °C	% v/v	> 75	83.00	91.00	1	62
Olefins	% v/v	< 18 (5)	5.43	14.66	2	62
Aromatics	% v/v	< 35	19.60	32.85	1	62
Ethers with ≥ 5 C atoms	% v/v	< 22	0.01	12.08	1	62

Table 4.56 Unleaded petrol (minimum 95 ≤ RON < 98) E5 (Euro 98)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Evaporated at 100 °C	% v/v	> 46	48.90	61.10	2	62
Evaporated at 150 °C	% v/v	> 75	80.40	91.60	1	62
Olefins	% v/v	< 18 (5)	1.65	11.00	1	62
Aromatics	% v/v	< 35	19.60	34.10	2	62
Ethers with ⇒ 5 C atoms	% v/v	< 22	2.82	14.16	2	62

Diesel fuel grades

Table 4.57 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.57 Diesel fuel B7 (Diesel)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Density at 15 °C (2)	kg/m ³	< 845	825.7	838.0	2	62
Distillation — 95 % point	°C	< 360	345.7	359.6	2	62

4.20 Malta

4.20.1 Country details

Responsible organisation:	Regulator for Energy and Water Services
Country size:	Small
Summer period:	Normal to normal
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

and 104 unleaded petrol EN 228, were sampled and analysed.

National legislation that transposed the Fuel Quality Directive

From August 2015 all the actions previously carried out by the Malta Resources Authority are now being carried out by the Regulator for Energy and Water Services (REWS). Because of this change, the national subsidiary legislation, the Quality of Fuels Regulations, is no longer S.L. 423.29 but S.L. 545.18.

4.20.2 Fuel quality monitoring service

Sampling

No information additional to that reported for the year 2015.

Reporting periods

Malta applies the 'normal' seasonal periods, taking 1 October to 30 April as winter and 1 May to 30 September as summer. Monthly fuel samples were taken throughout the whole calendar year, including the transition period.

Fuel Quality Monitoring System administration

No information additional to that reported for the year 2015. A total of 208 fuel samples, 104 diesel EN 590

4.20.3 Sales

Table 4.58 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum 95 ≤ RON < 98) (EN 228)	0.0	99 505 800	73 708	52	52	19 of 19
Total petrol		99 505 800	73 708	52	52	
Diesel fuel B7 (EN 590)	≤ 7.0	131 638 095	111 087	52	52	6 of 7
Total diesel		131 638 095	111 087	52	52	

4.20.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.59 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.59 Unleaded petrol (minimum 95 ≤ RON < 98) (EN 228)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	54.5	66.3	1	52

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.21 Netherlands

4.21.1 Country details

Responsible organisation:	ILT
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 statistical model A
Location of sampling:	Fuel service stations

Inspectorate at fuel service stations. The Dutch Customs laboratory is responsible for analysis.

Fuel Quality Monitoring System administration
Not reported.

National legislation that transposed to the Fuel Quality Directive
Not reported.

Reporting periods

A total of 13 samples were taken during the transition period. These samples were included in this report.

4.21.2 Fuel quality monitoring service

Sampling

The samples were taken by inspectors of the Dutch

4.21.3 Sales

Table 4.60 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5	10.0	5 249 000	3 937 000	55	53	17 of 19
Unleaded petrol (minimum RON ≥ 98) E5	0.0	69 000	69 000	0	0	0 of 19
Total petrol		5 318 000	4 006 000	55	53	
Diesel fuel B7	7.0	7 498 000	6 269 000	55	53	7 of 7
Total diesel		7 498 000	6 269 000	55	53	

4.21.4 Exceedances of the fuel quality limits

Petrol fuel grades

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

Table 4.61 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.61 Diesel fuel B7

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Distillation — 95 % point	°C	< 360	–	738	3	108

4.22 Norway

4.22.1 Country details

Responsible organisation:	Norwegian Environment Agency
Country size:	Large
Summer period:	1 June to 31 August
FQMS used:	National system
Location of sampling:	Service stations

4.22.2 Fuel quality monitoring service

Sampling

In Norway, the fuel quality monitoring system is based on data from Certificates of Quality. SGS has been engaged to take samples at petrol stations and perform laboratory analysis. Random samples (32 in summer and 32 in winter) were collected at petrol stations. In the summer period (July-August) the samples were taken in the south and east of Norway (Vestfold, Østfold, Akershus, Oslo), and in the winter period (November-December) the samples were taken in the west and central part of Norway (Rogaland, Hordaland, Sogn and Fjordane, Møre and Romsdal). The samples were collected from different companies, making sure that samples were taken from all companies present in the market. Samples were collected in accordance with EN 14274:2013.

4.22.3 Sales

Table 4.62 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95)	6.0	1 128 476 000	844 100	20	20	18 of 19
Unleaded petrol (minimum RON ≥ 98)	0.0	25 281 000	18 910	0	0	0 of 19
Total petrol		1 153 757 000	863 010	20	20	
Diesel fuel	12.0	3 103 599 000	2 585 297	12	12	5 of 7
Total diesel		3 103 599 000	2 585 297	12	12	

4.22.4. Exceedances of the fuel quality limits

Petrol fuel grades

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

Fuel Quality Monitoring System administration

The Norwegian Environment Agency is responsible for managing the FQMS. The Ministry of Climate and Environment is responsible for implementing the FQD. Fuel sampling is carried out by the laboratory SGS on behalf of the business sector. The Environment Agency is responsible for audits and follow-ups if non-compliance is detected. A national system developed by the business sector is used. The country is small and there are no regional differences in fuel qualities on the market. There are two refineries and 17 distribution terminals. The fuel quality report is usually provided by 30 June.

National legislation that transposed the Fuel Quality Directive

The FQD has been transposed into the Norwegian product regulation, which is under the Product Control Act ⁽⁹⁾.

Reporting periods

The summer period extends from 1 June to 31 August. Transition periods are 1-31 May and 1-30 September. The winter period extends from 1 October to 30 April.

The Norwegian Government has applied for an 'arctic' derogation, but this has not yet been granted. Fuel samples are taken during the summer and the winter periods but not during transition periods. The fuel quality on the market during transition periods will vary from one year to the next, depending on actual weather conditions.

⁽⁹⁾ <https://lovdata.no/dokument/SF/forskrift/2004-06-01-922>

4.23 Poland

4.23.1 Country details

Responsible organisation:	Urząd Ochrony Konkurencji i Konsumentów
Country size:	Large
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model B
Location of sampling:	Service stations

4.23.2 Fuel quality monitoring service

Sampling

The tasks related to the system administration are performed by the President of the Office of Competition and Consumer Protection, while scrutiny of fuel quality is carried out by the Trade Inspectorate. Samples taken during inspection are tested in laboratories that have accreditation certificates issued by the Polish Centre for Accreditation. Tests of fuel samples verify all or some of the parameters laid down in the legislation.

Poland has adopted an FQMS defined in EN 14274 (statistical model B). In the process of developing the new system, account was taken of the specific characteristics of the Polish fuel market, and special solutions were introduced to make it possible to initiate inspections not only on the basis of statistical factors but also on the basis of any information on fuel of poor quality. Thus, the system is to pursue yet another objective, namely to try to eliminate fuel that is not compliant with quality requirements laid down in the legislation and to prevent it from being placed on the market.

Taking into account the specifics of the Polish liquid fuel market, in particular those due to the low availability of RON 98, the minimum number of samples for each monitoring period is 60 (not 100). For RON 95 and diesel, the minimum number of samples for each monitoring period (summer and winter) is 200. So each year, for diesel and RON 95, the minimum number of samples is 400, and for RON 98 the minimum number of samples is 120.

Fuel Quality Monitoring System administration

The tasks related to the FQMS are performed by the President of the Office of Competition and Consumer Protection (the Administrator of the System), who is obliged among other things to:

- prepare the regular controls by determining the minimum number of places and samples to be taken (the system covers the whole fuel production and distribution chain — from fuel stations, through wholesalers and fuel bases, to fuel producers — and includes all types of fuel available on the market);
- direct Trade Inspectorate ad hoc controls of fuel quality, whenever information is received indicating the possibility of irregularities (in practice, this includes complaints from drivers, and information from the police and the Central Bureau of Investigation);
- organise the databases containing information about the controlled entities and the laboratories accredited by the Polish Centre for Accreditation;
- publish the results of fuel quality controls on the web page of OCCP, updated every month;
- issue the fuel quality control programme;
- issue the fuel quality weekly plans; and
- draft reports for:
 1. the European Commission (by 30 June each year) concerning:
 - quality of liquid fuels and liquid biofuels;
 - sulphur content in light heating fuel (on the basis of annual reports drawn up by the Chief Inspector of Trade Inspectorate), heavy heating fuel (on the basis of annual reports drawn up by the General Inspector of Environment Protection), and marine fuels used in ships (on the basis of annual reports drawn up by Directors of Maritime Offices);
 2. the Polish Council of Ministers (by 31 May each year) concerning:
 - quality of liquid fuels, liquid biofuels, liquefied petroleum gas (LPG) and compressed natural gas (CNG).

The Administrator of the System performs his or her tasks with the cooperation of the Trade Inspectorate, which carries out checks on fuel quality.

National legislation that transposed to the Fuel Quality Directive

From 1 January 2007 onwards, the Act of 25 August 2006 on fuel quality monitoring and scrutiny will constitute the legal basis for the system's operation. The scrutiny system covers the whole fuel distribution chain — from filling stations, through wholesalers and fuel bases, to fuel producers. All types of fuel available on the market are subject to scrutiny: petrol (unleaded 95 and 98); diesel fuels; liquid biofuels; LPG; CNG; and light heating fuel.

Fuel quality inspections are carried out within:

1. the European part of the system, aimed at monitoring the statistical quality of fuels (reporting on the fuel quality system for the European Commission) for petrol (unleaded petrol 95 and 98), diesel fuels and liquid biofuels available at filling stations and company filling stations; tests of samples of petrol and diesel fuels take into account all parameters affecting the environment (laid down in Directive 98/70/EC) and stations to be subject to inspection are selected at random);

2. the national part of the system, aimed at preventing the transport, storage, placing on the market and gathering in company filling stations of fuels that are not compliant with quality requirements laid down in the legislation.

Tests of fuel samples verify all or some of the parameters laid down in the legislation. The administrator of the fuel quality monitoring and control system determines the minimum number of business entities subject to inspection. However, it is also possible to initiate an inspection upon obtaining information about poor quality of fuels or circumstances indicating the possibility of poor quality of fuels (in practice, this includes complaints from drivers and information from the police and the Central Bureau of Investigation).

Reporting periods

- Summer period: 1 May to 30 September.
- Winter period: 1 October to 30 April.

4.23.3 Sales**Table 4.63 Total sales and sample number**

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (RON 95)	5.0	4 790 240 000	3 640 000	63	65	19 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (RON 98)	5.0	507 744 000	387 000	201	201	19 of 19
Total petrol		5 297 984 000	4 027 000	264	266	
Diesel fuel B7 (ON)	< 7.0	15 894 695 000	13 301 000	202	201	7 of 7
Total diesel		15 894 695 000	13 301 000	202	201	

4.23.4 Exceedances of the fuel quality limits**Petrol fuel grades**

Table 4.64 and 4.65 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.64 Unleaded petrol (minimum RON = 95) E5 (RON 95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	92.0	97.8	5	402
Motor octane number	–	> 85 (3)	83.6	87.8	2	402
Vapour pressure	kPa	< 60	51.4	89.5	2	402
— aromatics	% v/v	< 35	21.1	40.0	1	328

Table 4.65 Unleaded petrol (minimum RON \geq 98) E5 (RON 98)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	53.9	88.4	1	128
Sulphur content	mg/kg	< 10	3.0	14.5	1	128

4.23.4. Exceedances of the fuel quality limits

Diesel fuel grades

Table 4.66 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.66 Diesel fuel B7 (ON)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Distillation — 95 % point	°C	< 360	344	380.8	2	403

4.24 Portugal

4.24.1 Country details

Responsible organisation:	DGEG
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

4.24.2 Fuel quality monitoring service

Sampling

The bodies performing analysis are selected through a public tender held by the National Authority for the Fuel Market (ENMC) and sampling is performed by the ENMC itself.

The ENMC collects samples in filling stations across the country and throughout the year. The selection of filling stations is undertaken by the ENMC.

The methods of analysis used are those described in the FQD. The method used for each parameter can be found in the 'Test methods and analyses' tables of the reporting template, where the number of exceedances and their values are reported in the row corresponding to the method of analysis used.

Fuel Quality Monitoring System administration

The body responsible at national level for the FQMS is the Ministry of Economy. The Directorate General for Energy and Geology coordinates, prepares and submits the annual reports.

Analysis is performed by entities selected through public tender held by the ENMC.

The consumption or marketing of fuels that do not meet the specifications in force constitutes an infraction punishable by fine, which involves reporting to the authority responsible for prosecution. Non-compliant samples are reported to the Food Safety and Economic Authority (ASAE).

Two refineries supply the market, one in the north (Matosinhos Refinery) and the other in the south (Sines Refinery).

National legislation that transposed the Fuel Quality Directive

The transposition of the FQMS is set out in Articles 13 and 14 of Decree-Law No 89/2008 of 30 May, amended by Decree-Law No 142/2010 of 31 December and Decree-Law No 214-E/2015 of 30 September.

Reporting periods

- Summer period: 1 May to 30 September.
- Winter period: 1 November to 31 March.
- Transition period: April and October.

Analyses performed at filling stations in transitional periods and as defined in EN 14274:2003 are not considered for the purposes of the FQMS.

4.24.3 Sales

Table 4.67 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum 95 ≤ RON < 98) E5 (<i>Gasolina IO 95</i>)	3.1	1 308 873 000	976 419	262	318	19 of 19
Unleaded petrol (minimum RON ≥ 98) E10 (<i>Gasolina IO 98</i>)	3.1	101 737 000	76 710	18	59	19 of 19
Total petrol		1 410 610 000	1 053 129	280	377	
Diesel fuel B7 (<i>Gasóleo</i>)	6.5	5 185 022 000	4 355 446	282	385	6 of 7
Total diesel		5 185 022 000	4 355 446	282	385	

4.24.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.68 and Table 4.69 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.68 Unleaded petrol (minimum 95 ≤ RON < 98) E5 (*Gasolina IO 95*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	94.0	98.30	8	580
Motor octane number	-	> 85 (3)	84.0	88.00	3	580
Vapour pressure	kPa	< 60	53.3	75.40	42	262
— aromatics	% v/v	< 35	17.1	36.10	1	580
Oxygen content (petrol with 5 % (v/v) or less ethanol content)	% (m/m)	< 2.7	1.07	2.98	1	580

Table 4.69 Unleaded petrol (minimum RON \geq 98) E10 (*Gasolina IO 98*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	56.3	71.1	9	18

Diesel fuel grades

Table 4.63 summarises the parameters for which exceedances have been reported for the diesel fuel grades measured.

Table 4.70 Diesel fuel B7 (*Gasóleo*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	5.00	38.0	4	667
FAME content	% v/v	< 7 (4)	0.01	7.4	1	667

4.25 Slovakia

4.25.1 Country details

Responsible organisation:	VÚRUP, a.s. (Accredited Testing Laboratories and Accredited Inspection Body)
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations

4.25.2 Fuel quality monitoring service

Sampling

The organisation responsible for sampling, analysis and reporting is VÚRUP, a.s. (Accredited Testing Laboratories and Accredited Inspection Body, www.snas.sk). Fuel sampling was carried out at refuelling stations only.

Fuel sampling was carried out during both summer and winter periods, and the sampling locations were selected from a database of refuelling stations and on the basis of suggestions made by the Slovak Environmental Inspectorate (S.I.E.). The applied monitoring system is equivalent to the CEN system.

All the test methods used for individual petrol and diesel samples are reported in the 'Methods and Limits' table of the reporting template.

Fuel Quality Monitoring System administration

The public bodies responsible for managing and implementing the FQD are the Ministry of Environment

and the Slovak Inspection of Environment. Fuel sampling was carried out by a contracted institution (VÚRUP), accredited in accordance with EN ISO/IEC 17020 and EN ISO/IEC 17025, and selected by public competition. The annual data for sales of petrol and diesel in 2016 were provided by the Ministry of Environment at the end of April 2017. When non-compliant samples were discovered, S.I.E. was responsible for taking action and imposing financial penalties. S.I.E. is responsible for all processes, i.e. reporting, managing and monitoring all non-compliant samples discovered during monitoring. EN 14274 statistical model C has been applied since August 2004.

There is one national refinery (the Slovnaft refinery in Bratislava) and two distribution terminals.

National legislation that transposed to the Fuel Quality Directive

The FQD has been transposed into Slovak national law in the form of Directives of Ministry of Environment No 367 (3 November 2015) and No 228 (11 August 2014).

Reporting periods

Fuel samples were not taken and tested during the transition period. The fuel samples were taken and tested only during the summer period (from 1 May to 30 September) and the winter period (from 15 November to 28/29 February). Therefore, only the results of fuel samples taken during the summer and the winter periods are reported within this annual fuel quality report.

4.25.3 Sales

Table 4.71 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Super 95)	5.0	771 104 617	578 637	90	85	19 of 19
Unleaded petrol (minimum RON \geq 98) E5 (Super Plus 98)	1.6	16 477 416	12 381	14	20	19 of 19
Total petrol		787 582 033	591 018	104	105	
Diesel fuel B7 (Diesel)	8.7	1 780 499 525	1 494 551	108	92	6 of 7
Total diesel		1 780 499 525	1 494 551	108	92	

4.25.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.72 summarises the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.72 Unleaded petrol (minimum RON = 95) E5 (Super 95)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	91.2	97.6	1	175
Motor octane number	-	> 85 (3)	81.9	86.7	2	175
— evaporated at 150 °C	% v/v	> 75	70.8	94.3	1	175
— benzene	% v/v	< 1	0.7	1.08	2	175

Diesel fuel grades

Table 4.73 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.73 Diesel fuel B7 (Diesel)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Density at 15 °C	kg/m ³	< 845	828	845.8	3	200
FAME content	% v/v	< 7 (4)	0	8.7	2	200

4.26 Slovenia

4.26.1 Country details

Responsible organisation:	Slovenian Environment Agency
Country size:	Small
Summer period:	1 May to 30 September
FQMS used:	EN 14274 Statistical Model C
Location of sampling:	Service stations and depots

4.26.2 Fuel quality monitoring service

Sampling

Monitoring is carried out by the legal entities, which obtain authorisation from the Ministry of the Environment and Spatial Planning. The main condition for authorisation is that they are accredited by the Slovenian Accreditation as inspection bodies, in accordance with EN ISO/IEC 17020:2004, and as testing laboratories. They are responsible for the sampling plan, sampling and analysis of fuel (analysis is undertaken in testing laboratories accredited in accordance with EN ISO/IEC 17025:2005), and collecting and processing the data. The publicly available information on legal entities is at the website of the Slovenian Environment Agency: http://okolje.arso.gov.si/onesnazevanje_zraka/vsebine/kakovost-tekocih-goriv.

The Slovenian Environment Agency receives quarterly and annual reports from two independent inspection bodies. The samples of petrol fuels, diesel fuel and gas oil are taken each month throughout the year at refuelling stations and depots.

Fuel Quality Monitoring System administration

Legislation, implementation and reporting is exercised by the Ministry of the Environment and

Spatial Planning, and within this by the Slovenian Environment Agency.

Control of non-compliant samples and other discrepancies is exercised by the Inspectorate for the Environment and Spatial Planning and by the Slovenian Maritime Administration, under the Ministry of Infrastructure.

The FQMS in Slovenia is based on European Standard EN 14274:2003, utilising statistical model C (small country).

National legislation that transposed to the Fuel Quality Directive

The FQD was transposed into national law by the Environmental Protection Act (<http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1545>) and the following regulations:

- Decree on the physical and chemical properties of liquid fuels;
- Decree amending the Decree on the physical and chemical properties of liquid fuels;
- Rules on the monitoring of physical and chemical properties of liquid fuels;
- Rules amending the Rules on the monitoring of physical and chemical properties of liquid fuels.

Reporting periods

Nothing to report.

4.26.3 Sales

Table 4.74 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum 95 ≤ RON < 98) E10 (NBM 95)	≤ 5.0	505 404 025	379 098	54	47	19 of 19
Unleaded petrol (minimum RON ≥ 98) E10 (NBM 98/100)	≤ 5.0	49 005 575	36 754	12	12	19 of 19
Total petrol		554 469 600	415 852	66	59	
Diesel fuel B7 (B7)	≤ 7.0	1 632 942 881	1 404 331	62	70	6 of 7
Total diesel		1 632 942 881	1 404 331	62	70	

4.26.4 Exceedances of the fuel quality limits

Petrol fuel grades

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.27 Spain

4.27.1 Country details

Responsible organisation: Ministerio de Energía, Turismo y Agenda digital

Country size: Large
 Summer period: (*) to (*)
 FQMS used: EN 14274 Statistical Model A
 Location of sampling: Service stations and terminals

(*) Spain has a waiver for vapour pressure on gasolines, so vapour pressure limits can be increased depending on ethanol content, in accordance with EN 228.

4.27.2 Fuel quality monitoring service

Sampling

Samples have been taken from around 30 terminals covering the whole country, and from service stations in various regions.

Samples are taken from storage tanks at or near atmospheric pressure in accordance with ISO 3170:2004.

4.27.3 Sales

Fuel Quality Monitoring System administration

Statistical model A was used. The country has been divided into regions based around the locations of refineries and terminals. In some regions, there is greater potential for variation because fuel arrives by ship.

There are nine refineries. Samples are taken from around 30 terminals covering the whole country, including samples from every refinery. When fuels came into the country by ship, this has been taken into account.

Samples taken from service stations cover most of the country.

National legislation that transposed the Fuel Quality Directive

Fuel quality specifications have been transposed into Spanish law in Royal Decree RD 61/2006 and RD 1088/2010. Sampling and analysis specifications have been transposed in Article 7 of RD 61/2006.

Reporting periods

Samples of transition period have been taken and reported.

Table 4.75 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Gasolina 95)	0.8	5 823 180 851	4 379 032	100	100	19 of 19
Unleaded petrol (minimum RON ≥ 98) (Gasolina 98)	0.6	499 989 362	375 992	100	100	19 of 19
Total petrol		6 323 170 213	4 755 024	200	200	
Diesel fuel B7 (Gasóleo A)	3.5	26 647 261 538	22 516 936	100	100	7 of 7
Total diesel		26 647 261 538	22 516 936	100	100	

4.27.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.76 and Table 4.77 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.76 Unleaded petrol (minimum RON = 95) E5 (*Gasolina 95*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	55.4	77.9	2	184
— aromatics	% v/v	< 35	8.0	39.2	2	188

Table 4.77 Unleaded petrol (minimum RON >= 98) (*Gasolina 98*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	–	> 95 (2)	95.3	99.5	1	200

Diesel fuel grades

Table 4.78 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.78 Diesel fuel B7 (*Gasóleo A*)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Sulphur content	mg/kg	< 10	5.8	20.1	3	200

4.28 Sweden

4.28.1 Country details

Responsible organisation:	Swedish Transport Agency
Country size:	Small
Summer period:	South Sweden: 1 May to 15 September; North Sweden:
FQMS used:	16 May to 31 August
Location of sampling:	National system Terminals

4.28.2 Fuel quality monitoring service

Sampling

The Swedish fuel quality model is based on a national system. The Swedish Petroleum and Biofuels Institute compiles the data at terminals for this annual fuel quality report and on behalf of the Swedish Transport

Agency. The quality assessment system at the terminals consists of the compilation of quality data for all batches produced in Sweden and for all import batches for the Swedish market. The number of samples taken per fuel grade at the terminals is found in the reporting template. In 2016, 746 samples of unleaded petrol 95, 81 samples of unleaded petrol 98 and 856 samples of diesel were taken at terminals. Unleaded petrol 98 represents only about 3.3 % of the total sales of petrol in Sweden. The reported data represent more than 98 % of the sales of petrol and diesel in Sweden.

In August 2016 (representing summer quality), the Swedish Transport Agency, to assess the national monitoring system's comparability with the CEN system, carried out sampling at refuelling stations with the help of an accredited test laboratory. Five samples of unleaded petrol 95 and five samples of diesel were taken at five refuelling stations in five cities distributed across Sweden. The cities were (from north to south) Sundsvall, Stockholm, Jönköping, Lysekil/Uddevala

and Malmö. The refuelling stations also represented five different fuel companies. The samples were then analysed using the test methods in the FQD template for reporting and in accordance with the requirements in SS EN 14274:2003 and SS EN 14275:2003. The samples from the refuelling stations for both petrol and diesel showed good equivalency with this report, which is based upon fuel quality data for deliveries to terminals. The analysis report for cross-checking at refuelling stations in 2016 is available from the Swedish Transport Agency upon request.

Fuel Quality Monitoring System administration

This FQMS report is under the responsibility of the Swedish Transport Agency. The Swedish Biofuels Institute assists the Swedish Transport Agency with the compilation of fuel quality data at terminals. Sampling and subsequent analysis for additional national monitoring is carried out by accredited test laboratories.

The Swedish Transport Agency verified the reliability of the Swedish Petroleum and Biofuels Institute's compilation for this 2017 fuel quality report. Sampling at refuelling stations in August 2016 (representing summer quality), for both petrol and diesel, showed good conformity with the data from the terminals in this annual report. We are confident that the Swedish Petroleum and Biofuels Institute's compilation of fuel quality data gives an accurate picture of the situation in 2016. There are no indications that fuel quality was a problem in 2016.

Fuels and fuel quality are managed through the national law 'Drivmedelslag' (2011:319) and the regulation 'Drivmedelsförordning' (2011:346). In accordance with Section 14 of Drivmedelsförordning (2011:346), the Swedish Transport Agency supervises most national fuel regulation, including fuel quality, and is therefore responsible for taking action if non-compliant samples are discovered.

The main reason Sweden chose this national system is the considerable costs associated with extensive sampling in a large, sparsely populated Member State. There are also substantial annual costs associated with the analysis of a large number of samples per fuel grade required by the statistical model used by European Standard EN 14274:2003. This was agreed by the European Commission, the Directorate-General for Climate Action and the Swedish Ministry of the Environment and Energy, in October 2014, by means of EU-pilot 6321/14/CLIM.

There are three national refineries in Sweden producing automotive fuels and 32 distribution terminals.

National legislation that transposed the Fuel Quality Directive

The legislation of the FQD has been transposed into the national law Drivmedelslag (2011:319), the national regulation Drivmedelsförordning (2011:346) and regulations adopted by the Swedish Transport Agency. The latter requires appropriate information to be supplied to consumers concerning the biofuel content, and in particular the FAME content, of diesel fuel in accordance with Article 4(1) of the FQD. This is in accordance with EU-pilot 6321/14/CLIM. In addition, TSFS 2011:66 and TSFS 2015:14 contain a demand for information for customers about other additives (ethanol content in Article 3.3 and metallic additives in Article 8(a) of the FQD). The law Drivmedelslag (2011:319) was also amended to incorporate the limit of 2 mg per litre of methylcyclopentadienyl manganese tricarbonyl (MMT) in diesel fuel. This is in accordance with Article 8(a)2 of the FQD Directive 98/70/EC.

The law Drivmedelslag (2011:319) contains, among other things, the fuel specifications (Articles 3 and 4 of the FQD) and standard references, among them SS EN 228. The environmental classes for petrol (benzine) can be found in Sections 4–6. There are two environmental classes for petrol in Sweden. Petrol environmental class 1, in the law, equates to former national standard SS 155422. This standard is now included as a national appendix of EN 228. Petrol is found under the heading *Bensin i miljöklass 2* (petrol in environmental class 2), which equals EN 228 and Annex 1 of the FQD. Sweden also has three environmental classes for diesel. Environmental classes 1 and 2 for diesel equate to national standard SS 155435. The environmental classes for diesel can be found in Sections 8–10. Diesel environmental class 3 equates to EN 590 and Annex 2 of the FQD. For both petrol and diesel, environmental class 1 represents the largest volumes of those fuels sold on the Swedish market.

The specific regulation on annual FQMS reporting, Article 8 of the FQD, is found in Section 19 of the national law Drivmedelslag (2011:319) and in Section 7 of the national regulation Drivmedelsförordning (2011:346).

Reporting periods

Sweden, as per the definition in Article 2.5 of the FQD, belongs to the group of Member States with low ambient summer temperatures and has applied for and been granted a vapour pressure derogation for petrol with a maximum vapour pressure of 70 kPa during the summer period, in accordance with Article 3.5 of the FQD.

Transition periods between summer and winter grades of petrol vary between the northern and southern parts of Sweden. The summer and winter periods are regulated in the national law Drivmedelslag (2011:319) and the transition periods are taken into account in this fuel quality report.

Sweden has the same diesel fuel quality the whole year round. There are no winter and summer periods for diesel and no transition periods between winter and summer. The data reported for diesel are therefore only an administrative allocation to facilitate comparison between Member States.

4.28.3 Sales

Table 4.79 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Blyfri 95 Mk1)	≤ 5.0	3 197 385 858	2 398 039	348	398	13 of 19
Unleaded petrol (minimum RON ≥ 98) E5 (Blyfri 98 Mk1)	≤ 5.0	109 114 512	81 836	58	23	13 of 19
Total petrol		3 306 500 370	2 479 875	406	421	
Diesel fuel B7 (Diesel Mk1)	≤ 7.0	5 757 248 895	4 686 401	434	422	6 of 7
Total diesel		5 757 248 895	4 686 401	434	422	

4.28.4 Exceedances of the fuel quality limits

Petrol fuel grades

No exceedances of the petrol fuel quality limits were reported.

Diesel fuel grades

No exceedances of the diesel fuel quality limits were reported.

4.29 United Kingdom

4.29.1 Country details

Responsible organisation:	Department for Transport
Country size:	Large
Summer period:	1 June to 31 August
FQMS used:	National system
Location of sampling:	Refineries, terminals and refuelling stations

4.29.2 Fuel quality monitoring service

Sampling

Sampling is performed at refineries, terminals and refuelling stations. Samples are taken routinely throughout the year and across all regions of the United Kingdom. The numbers for each month are shown in the petrol and diesel sheets of the reporting template for the test results. For unleaded petrol

and diesel, the number of samples taken from retail stations goes beyond the requirements of any of the statistical models of EN 14274. Samples for Super unleaded petrol fall just short of these requirements, but this fuel sells in smaller volumes. Sample results from refineries and terminals contribute an extra 3 000 results. The test methods used for each parameter are in accordance with current EN 228 and EN 590 standards and are performed by certified laboratories of refiners or by independent test labs.

Fuel Quality Monitoring System administration

The Department for Transport has responsibility in the United Kingdom for implementing the FQD and also oversees the FQMS. The United Kingdom FQMS makes use of industry quality analyses on batches of fuel produced in, or imported into, the United Kingdom, plus samples taken at distribution terminals and service stations (to check for contamination in the distribution network). Owing to the very large number of samples involved, this approach provides the equivalent of a greater degree of confidence. There were six operational

fuel refineries and approximately 50 distribution terminals within the United Kingdom.

National legislation that transposed the Fuel Quality Directive

The FQD has been transposed into United Kingdom law under the Motor Fuel (Composition and Content) Regulations 1999 (SI No 3107) with amendments in 2001, 2003, 2007, 2010, 2012, 2013 and 2015.

Reporting periods

The United Kingdom has been granted the 'arctic' derogation for vapour pressure in petrol during the summer period. The summer period is between 1 June and 31 August, during which time the maximum vapour pressure allowed for petrol is 70 kPa. Vapour pressure samples are taken during the transitional period but are excluded from the fuel quality report because they are transitional.

4.29.3 Sales

Table 4.80 Total sales and sample number

Fuel grade (name)	Biofuel content (% v/v)	Total sales		Samples		Parameters measured
		Litres	Tonnes	Summer	Winter	
Unleaded petrol (minimum RON = 95) E5 (Unleaded 95 RON)	≤ 5.0	16 262 289 963	11 879 602	372	705	19 of 19
Unleaded petrol (minimum 95 ≤ RON < 98) (Super 97 RON)	≤ 5.0	916 138 062	674 186	93	229	19 of 19
Total petrol		17 178 428 025	12 553 788	465	934	
Diesel fuel B7 (Diesel)	≤ 7.0	30 176 207 741	25 278 609	1 581	1 087	7 of 7
Total diesel		30 176 207 741	25 278 609	1 581	1 087	

4.29.4 Exceedances of the fuel quality limits

Petrol fuel grades

Table 4.81 and Table 4.82 summarise the parameters for which exceedances were reported for the petrol fuel grades measured.

Table 4.81 Unleaded petrol (minimum RON = 95) E5 (Unleaded 95 RON)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Research octane number	-	> 95 (2)	94.2	99.90	3	1 077
Vapour pressure	kPa	< 60	57.5	72.10	3	372
Oxygen content (petrol with 5 % (v/v) or less ethanol content)	% (m/m)	< 2.7	0	2.88	1	854

Table 4.82 Unleaded petrol (minimum 95 ≤ RON < 98) (Super 97 RON)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Vapour pressure	kPa	< 60	55.1	73.3	3	89
— aromatics	% v/v	< 35	22.1	36.8	5	300
Oxygen content (petrol with 5 % (v/v) or less ethanol content)	% (m/m)	< 2.7	0.0	.	5	291
Sulphur content	mg/kg	< 10	1.5	11.7	1	135

Diesel fuel grades

Table 4.83 summarises the parameters for which exceedances were reported for the diesel fuel grades measured.

Table 4.83 Diesel fuel B7 (Diesel)

Parameter	Unit	Limit value	Minimum value measured	Maximum value measured	Number of samples outside TL	Total number of samples
Density at 15 °C	kg/m ³	< 845	822.7	845.6	1	2 653
Sulphur content	mg/kg	< 10	1.5	13	4	2 648

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