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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**Quality of petrol and diesel fuel used for road transport in the European Union:
Eighth annual report
(Reporting year 2009)**

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Quality of petrol and diesel fuel used for road transport in the European Union: Eighth annual report (Reporting year 2009)

EXECUTIVE SUMMARY

Directive 98/70/EC¹ sets minimum technical specifications on health and environmental grounds for fuels to be used for vehicles equipped with positive-ignition and compression-ignition engines. Fuel quality is environmentally important because it affects engine pollution emissions and thus air quality. It also affects the ease and cost with which desired pollution and greenhouse gas emission limits can be achieved by manufacturers.

Non-respect of the fuel specification can lead to increased emissions (for example excess oxygenates can increase NO_x emissions) and might damage engine and exhaust after-treatment systems (for example excess sulphur damaging catalysts) leading to greater air pollution. In order to ensure compliance with the fuel quality standards mandatory under this Directive, Member States are required to introduce fuel quality monitoring systems.

Article 8 of Directive 98/70/EC requires the Commission to publish an annual report on fuel quality in the Member States. This eighth Commission Report summarises Member States' submissions on the quality of petrol and diesel, as well as the volumes sold, for 2009. All Member States except Luxembourg, which had failed to deliver a report in the previous two years, submitted a full report for 2009. Luxembourg has provided fuel sales data, but carried out no sampling in 2009, meaning that their report is incomplete according to the Directive's requirements. In 2010 it has been reported that Luxembourg has started to sample.

The timeliness of the submission of reports has improved considerably in 2009. Fourteen Member States submitted their 2009 report before the annual deadline, of the remaining thirteen reports submitted, all except two were received less than one month after the reporting deadline.

Fuel quality monitoring in 2009 showed that the specifications for petrol and diesel laid down in Directive 98/70/EC are in general met and again few exceedances were identified. For petrol the main parameters where exceedances were identified were research/motor octane number (RON/MON)², summer vapour pressure³, distillation/evaporation at 100/150°C⁴ and

¹ Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC O.J. L 350, 28.12.1998, p. 58.

² Research Octane Number (RON) is a quantitative measure of the maximum compression ratio at which petrol can be used in an engine without some of the mixture self igniting in the engine. Self ignition leads to excess fuel consumption and an increase in Volatile Organic Compound and Carbon Monoxide emissions.

³ Vapour pressure is a measure of the propensity of the fuel to evaporate. It is regulated in summer because temperatures at that time of year can lead to high emissions of Volatile Organic Compounds,

the maximum sulphur content. For diesel the main parameters where exceedances were identified were sulphur content, distillation 95% point and cetane number.

As exceedances are relatively rare and most Member States take action to remove non-compliant fuel from sale, the Commission is not aware of any negative repercussions on vehicle emissions or engine functioning due to these exceedances. However, the Commission urges Member States to continue to take action to ensure full compliance so that such problems do not arise in the future. The Commission will continue monitoring compliance with the fuel quality requirements laid down in the Directive.

Low sulphur content helps reduce air pollution and the introduction of new engine technology. Under Directive 2003/17/EC, a new specification for automotive road fuels came into force on 1 January 2009 which limits the sulphur content of all automotive road fuels in the EU to 10 ppm (sulphur-free fuels). This represents the first year of reporting since this conversion and, accordingly, the average sulphur content fell in 2009 and is substantially below the level reported in 2004, as shown in Table 1:

Table 1: Annual trend in average sulphur content in petrol and diesel fuels

EU	Average sulphur content, ppm*								
Fuel/Year	2001	2002	2003*	2004*	2005*	2006**	2007***	2008***	2009***
<i>Petrol</i>	68	51	37	38	19	18	18	14	6
<i>Diesel</i>	223	169	125	113	25	22	23	18	8

* Excludes France, who did not report in 2003 - 2005

** Excludes Malta, who did not report in 2006.

*** Excludes Luxembourg, who did not report in 2007, 2008 or fully in 2009

National fuel quality monitoring systems still differ considerably. However, the Directive's requirements are expected to promote homogeneity and to improve the quality of reporting.

which are a precursor of ground level ozone. Exceedances will result in increased Volatile Organic Compound emissions.

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The distillation parameter establishes the proportion of the fuel that evaporates at 100°C and 150°C. It limits the range of lighter components that can be blended in the petrol. Exceedances could lead to vapour locks and driveability problems.

2. INTRODUCTION

The specifications for petrol and diesel sold in the European Union are laid down in the annexes to Directive 98/70/EC. From 1 January 2005 only one set of fuel specifications has applied. The Directive requires Member States to report summaries of the quality of fuels sold in their territories. From 2004 onwards, Member States are required to report on their monitoring in accordance with European Standard, EN 14274⁵, or with systems with an equivalent degree of confidence. Article 8 of Directive 98/70/EC, as amended by Article 1(5) of Directive 2003/17/EC, requires the Commission to publish the results of Member States' fuel quality reporting. In compliance with this request, this eighth Commission Report summarises the quality of petrol and diesel, as well as the volumes sold, in the EU for the year 2009. Previous years' reports can be found on the Commission's web pages⁶.

3. NATIONAL MONITORING SYSTEMS

Commission Decision 2002/159/EC and European Standard EN 14274, have enhanced the usefulness of the information and facilitated analysis of EU fuel trends. The quality of the monitoring systems' design, compliance with limit values and information provided in report submissions is continuing to improve. However, there are still a few key areas for improvement, summarised as follows:

Member States are encouraged to continue to improve the timeliness of the submissions.

Several Member States do not fulfil sufficient sampling numbers for all fuels or are not sampling in sufficient numbers at refuelling stations (as opposed to depot/refinery) to meet with the requirements of European Standard EN 14274⁷, see Figure 2. Any such samples should be additional to the minimum number of samples required at refuelling stations.

Where Member States use their own national systems, they should be fully described in order to verify whether they comply with the European Standard. This description should show the monitoring system's equivalency in statistical confidence to EN 14274.

Member State reports are assessed according to the appropriate seasonal periods to ensure

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

⁶ <https://circabc.europa.eu/w/browse/5e89b837-2bec-4284-b9fe-c156271268f7>

⁷ EN 14274 sets minimum sampling numbers for each fuel (dependant on the statistical model used and sales proportion). The standard specifies a minimum number of samples to be taken per fuel grade:

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

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

comparability for EU-wide reporting. Where a Member State has chosen to utilise a different seasonal period to that specified, appropriate information should be provided in the national annex within the Fuel Quality Monitoring report.

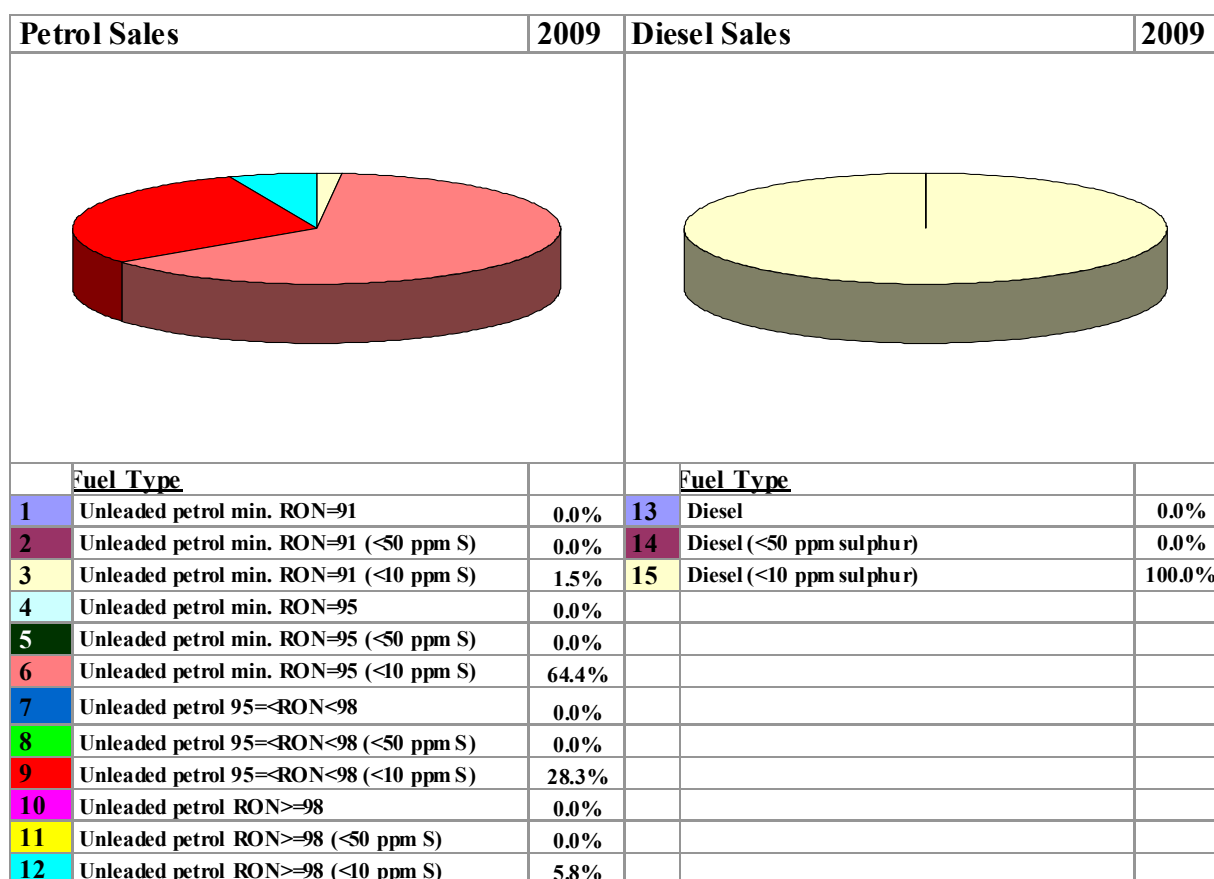
Some Member States' basic numeral data appears to be inconsistent. These errors are not insurmountable but delay reporting.

4. 2009 REPORTING

4.1 Fuel qualities and volumes

In contrast to earlier years, the new sulphur content limit of a maximum of 10 ppm for all automotive road fuels has precipitated a switch from RON 95 (<50 mg/kg) to RON 95 (<10 mg/kg) petrol. Concerning the octane number, the majority of petrol sales in 2009 comprised RON 95 at 64,4% of total petrol fuel sales. Of the remainder, 28,3% was 95=<RON<98, 5,8% of EU petrol sales were of RON 98 and a small amount, 1,5%, of petrol sales were RON 91. See Figure 1 and the table in the Annex for full details by Member State.

Figure 1: 2009 EU fuel sales proportions by fuel type (%)*



Similarly to 2001 to 2008, France, Germany, Italy, Spain and the United Kingdom had the greatest volume of fuel sales in 2009 (Figure 4). Diesel sales are dominant in almost all Member States. However, the relative sales of petrol and diesel vary significantly.

Since 2001 there has been increased homogeneity in the number of grades of fuel reported to be available across the EU (see Figure 5). Distinction between grades has mainly been a result of different octane levels (RON category). In 2009, only six Member States reported having three petrol grades available with the remainder reporting two petrol grades (no Member State has reported the availability of only one petrol fuel grade).

Before 2009, only two diesel grades were available for use in automotive road vehicles in the European Union: low sulphur and sulphur free. As expected, Member States have transitioned to 100% sulphur free diesel fuels in time for the new mandatory sulphur content limit.

Figure 6 presents the average sulphur content of petrol and diesel grades by Member State across the EU. The average sulphur content of diesel in Cyprus, Czech Republic, Bulgaria, Slovakia and Romania exceeds the new mandatory limit of 10ppm for either petrol or diesel.

Figure 2: Fuel Quality monitoring sampling rate across the EU in 2009 (average number of samples per fuel grade)

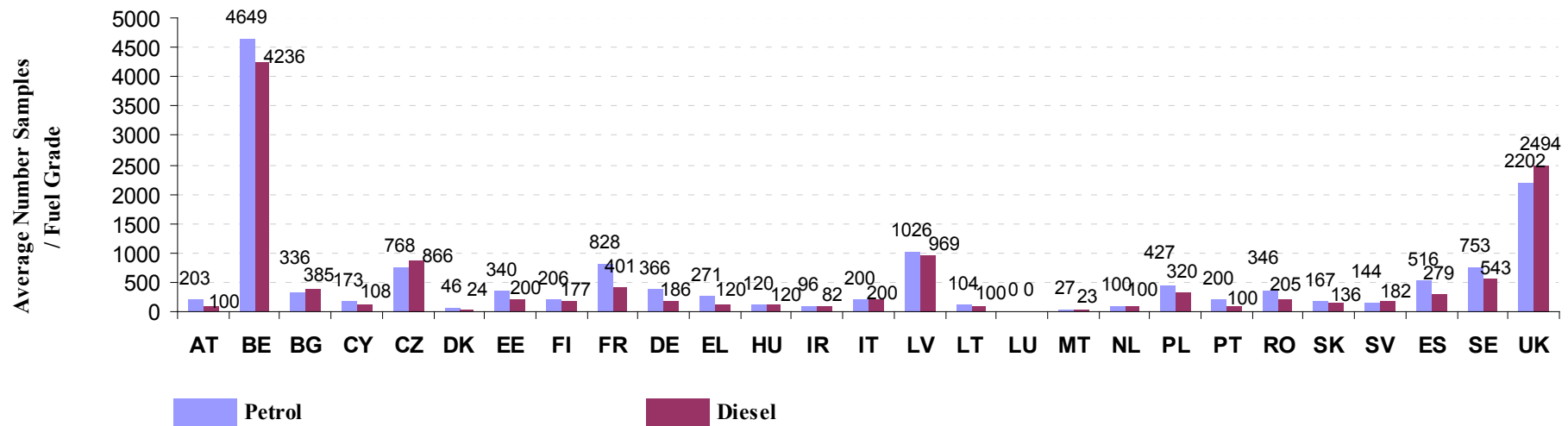


Figure 3: Number of fuel samples per million litres in 2009 (by Member State) (%)

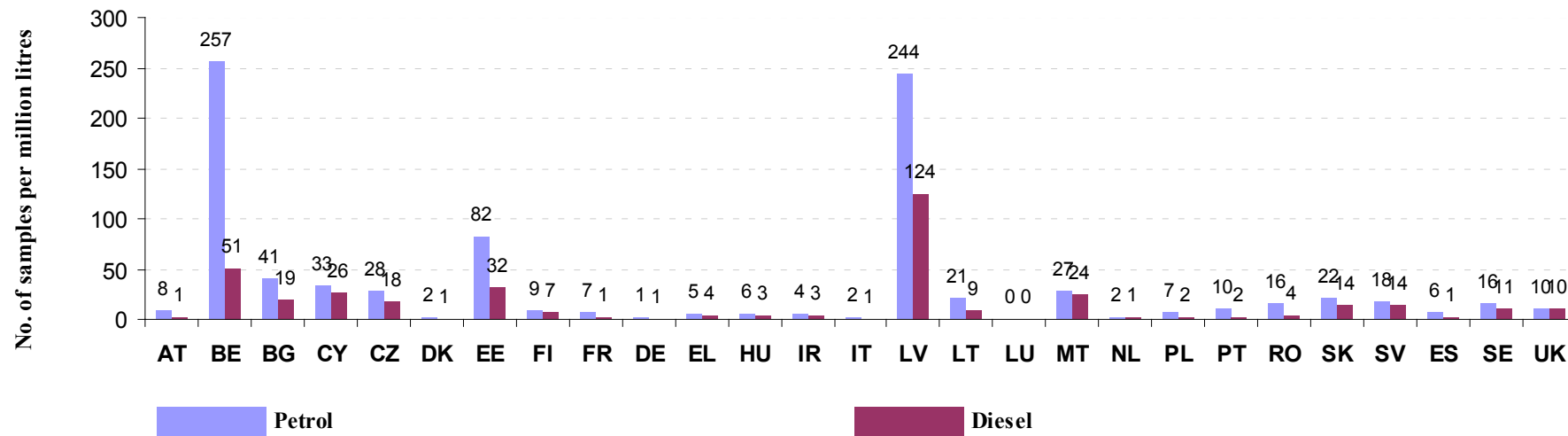


Figure 4: National fuel sales in 2009 by fuel type across the EU (million litres)

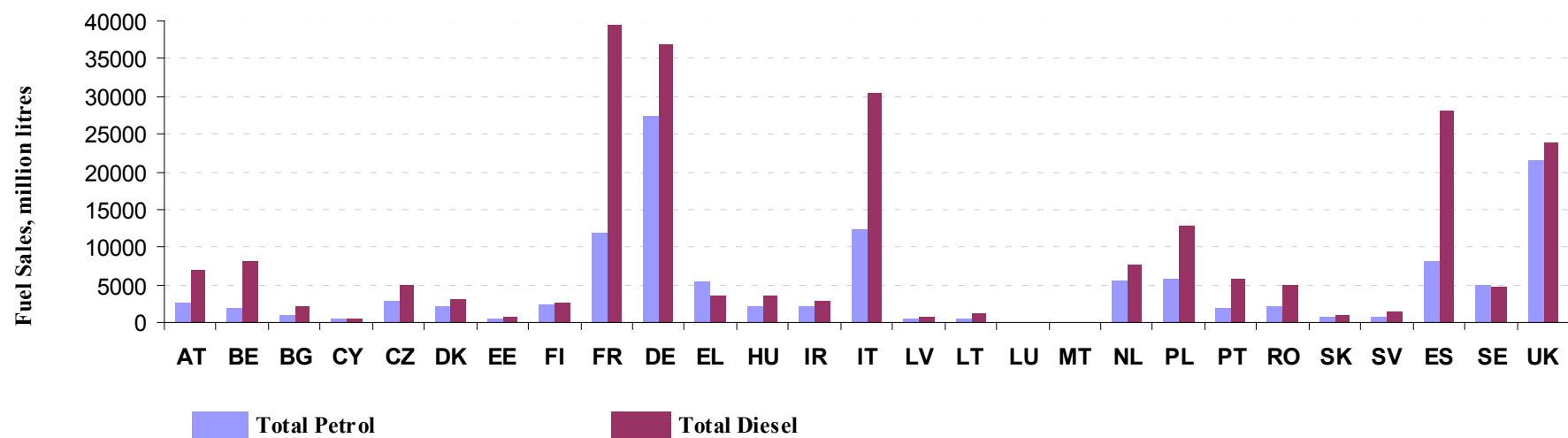


Figure 5: Number of fuel grades available nationally by fuel type across the EU in 2009

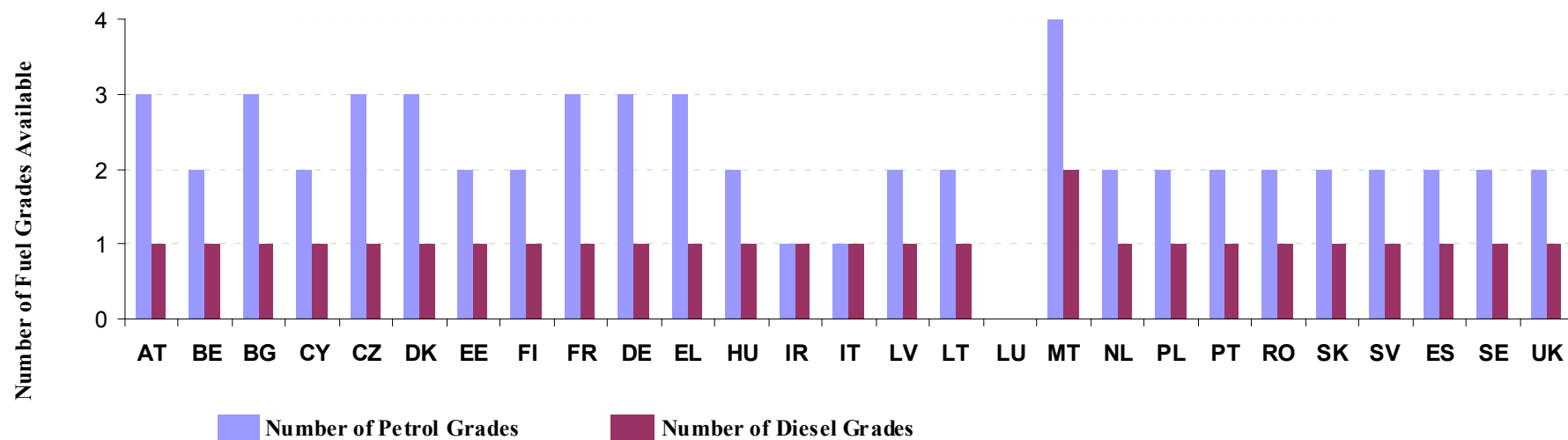
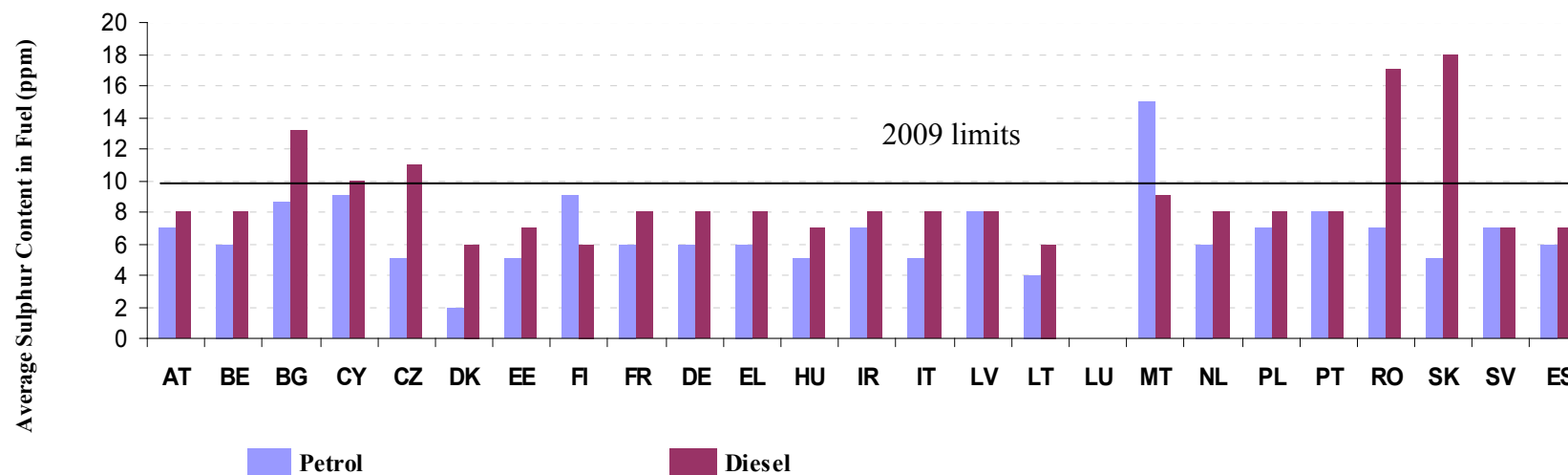


Figure 6: Average sulphur content of petrol and diesel grades across the EU (%) in 2009



Note: several Member States are shown to be above the limit for the sulphur content of diesel. In all cases this is the result of a very few samples in number but very high in value. The causes have been identified and rectified as appropriate. This trend should be closely observed in the future as this is the first year that sulphur content is reduced to the limit of 10 ppm.

4.2 Compliance with Directive 98/70/EC in 2009

Table 2 summarises the compliance of Member States with Directive 98/70/EC in 2009. It reports both the results of the analysis of samples against limit values and the compliance of the reporting format and content. As in 2001 to 2008, some Member States provided incomplete and/or late information and this affected the quality of the compliance assessment.

Pursuant to Article 9a, it is the responsibility of the Member States to determine the penalties applicable to breaches of the Directive. Details of any action taken with regard to limit value non-compliance are included where provided in the individual country chapters of the detailed report for 2009⁸.

Twenty Member States provided complete reporting across the range of parameters specified for monitoring in the Directive. Figure 3 gives fuel samples taken per million litres of fuel sold in 2009. This gives a comparison across the Member States on an equivalent basis and shows that, proportionate to fuel sales, Belgium, Latvia and Estonia sample in the highest quantities.

For petrol, eight Member States reported that all samples were fully compliant with Directive 98/70/EC (compared to five in 2008). Summer Vapour Pressure (DVPE) test results showed more samples to be out of specification than for other parameters, with 174 samples found to be out of specification. Of the remaining parameters, 37 RON or MON, 13 distillation limits and 59 sulphur content samples were reported to exceed Directive specifications. An additional 58 samples exceeded limit values for parameters marked as "Other" (less environmentally or fuel quality sensitive parameters including lead content, oxygenates and oxygen content).

For diesel, ten Member States reported that all diesel samples were compliant with Directive 98/70/EC (compared to eleven in 2008). The parameters of concern were sulphur content (170 non-compliant samples), distillation 95% point (34 samples) and cetane number (10 samples). An increase in non-compliant diesel samples is largely attributable to the increase in non-compliant sulphur content samples during the first year of the mandatory conversion to sulphur free fuels (and reducing the sulphur content limit from 50ppm to 10ppm).

Table 2: Summary of Member State compliance with 98/70/EC for 2009 reporting.

Member State	Limit value non-compliance ⁽¹⁾ (95% confidence limits) (Non-compliant samples / Total samples)		Incomplete reporting (Number of parameters not measured / Total)		Late report (Due by 30/6/2010) ⁽²⁾	Notes
	Petrol	Diesel	Petrol	Diesel		
Austria	4 / 203				<1 month	
Belgium	73 / 4649	44 / 4236				(3)
Bulgaria	55 / 336	87 / 385	3 / 18		<1 month	(28)
Cyprus	25 / 173	5 / 108			<1 month	(20) (21)
Czech Republic	35 / 768	23 / 866				(22)
Denmark					<1 month	
Estonia	12 / 340	>2 / 200			<1 month	
Finland	6 / 206					(4) (5)

⁸ <https://circabc.europa.eu/w/browse/5e89b837-2bec-4284-b9fe-c156271268f7>

France	50 / 828	13 / 401		1 / 5		(6) (7)
Germany	>10 / 366	>2 / 186			<5 months	(8)
Greece		4 / 120	6 / 18			
Hungary	1 / 120					(23)
Ireland	6 / 96	4 / 82				(9) (10)
Italy						(11) (12)
Latvia	2 / 1026	1 / 969				(24)
Lithuania						
Luxembourg	-	-	-	-	<1 month	(13)
Malta	>2/27		-	-	>5 months (report submitted in December 2010)	
Netherlands	>3 / 100	1 / 100			<1 month	(14) (15)
Poland	13 / 427	4 / 320				(25) (26)
Portugal	8 / 200	3 / 100			<1 month	(16)
Romania	31 / 346	17 / 205				(29)
Slovakia		7 / 136				(27)
Slovenia		>1 / 182			<1 month	
Spain					<1 month	
Sweden			6 / 11			(17) (18)
UK	7 / 2202		6 / 12		<1 month	(19)
No. Countries	17	17	5	2	13	

Detailed notes on this table can be found on pages 203-206 of the detailed report for 2009

5. CONCLUSIONS

Fuel quality has a strong links to both CO₂ and air quality emissions, as well as the ease and cost with which pollutant and greenhouse gas emission limits can be achieved by vehicle manufacturers.

The monitoring of fuel quality in 2009 shows that the specifications for petrol and diesel laid down in Directive 98/70/EC are in general met and very few exceedances were identified. The progressive adoption of standard EN 14272 by Member States is leading to greater consistency in the data available for assessment of the various fuel quality parameters and Member States have been making efforts to improve their understanding of reporting requirements.

As exceedances are relatively rare and most Member States take action to remove non-compliant fuel from sale, the Commission is not aware of any negative repercussions on vehicle emissions or engine functioning due to these exceedances. However, the Commission urges Member States to continue to take action to ensure full compliance so that such problems do not arise in the future. The Commission will continue monitoring compliance with the fuel quality requirements laid down in the Directive and propose appropriate and proportionate action where necessary.

Average sulphur content fell again in 2009 and is substantially below the level reported before as 2009 represents the first year of reporting since the mandatory conversion to sulphur free fuels (<10ppm) under the Directive 2003/17/EC.

ANNEX: 2009 EU fuel sales by fuel type (million litres)

ID No.	Million litres	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	UK
	Fuel grade	AT	BE	DK	FI	FR	DE	EL	IE	IT	LU	NL	PT	ES	SE	UK
1	Unleaded petrol min. RON=91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Unleaded petrol min. RON=91 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Unleaded petrol min. RON=91 (<10 ppmS)	202	0	453	0	0	1282	0	0	0	1	0	0	0	0	0
4	Unleaded petrol min. RON=95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Unleaded petrol min. RON=95 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Unleaded petrol min. RON=95 (<10 ppmS)	2226	0	0	2118	9533	0	4860	2152	12424	449	5479	0	7262	4647	20417
7	Unleaded petrol 95=<RON<98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Unleaded petrol 95=<RON<98 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Unleaded petrol 95=<RON<98 (<10 ppmS)	0	1367	1748	0	0	25356	253	0	0	0	103	1745	0	0	1179
10	Unleaded petrol RON>=98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Unleaded petrol RON>=98 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Unleaded petrol RON>=98 (<10 ppmS)	66	445	3	167	2323	758	378	0	0	116	0	206	869	177	0
	Petrol (regular)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Petrol (<50 ppm sulphur)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Petrol (<10 ppm sulphur)	2494	1812	2204	2285	11856	27396	5491	2152	12424	566	5582	1951	8131	4824	21596
	Total Petrol	2494	1812	2204	2285	11856	27396	5491	2152	12424	566	5582	1951	8131	4824	21596
13	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Diesel (<50 ppm sulphur)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Diesel (<10 ppm sulphur)	7120	8293	3044	2576	39488	36965	3407	2840	30419	2019	7633	5741	28157	4765	23908
	Total Diesel	7120	8293	3044	2576	39488	36965	3407	2840	30419	2019	7633	5741	28157	4765	23908

ID No.	Million litres	Cyprus	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Slovakia	Slovenia	Bulgaria	Romania	European Union	European Union
	Fuel grade	CY	CZ	EE	HU	LV	LT	MT	PL	SK	SI	BG	RO	EU	% Total
1	Unleaded petrol min. RON=91	0	0	0	0	0	0	0	0	0	0	0	0	1	0,00%
2	Unleaded petrol min. RON=91 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	2	0,00%
3	Unleaded petrol min. RON=91 (<10 ppmS)	0	35	0	0	0	0	0	0	0	0	0	0	1976	1,54%
4	Unleaded petrol min. RON=95	0	0	0	0	0	0	0	0	0	0	0	0	4	0,00%
5	Unleaded petrol min. RON=95 (<50 ppmS)	0	0	0	0	0	0	20	0	0	0	0	0	25	0,02%
6	Unleaded petrol min. RON=95 (<10 ppmS)	468	0	375	1951	0	497	67	5212	752	714	825	0	82434	64,39%
7	Unleaded petrol 95=<RON<98	0	0	0	0	0	0	0	0	0	0	0	0	7	0,01%
8	Unleaded petrol 95=<RON<98 (<50 ppmS)	0	0	0	0	0	0	4	0	0	0	0	0	12	0,01%
9	Unleaded petrol 95=<RON<98 (<10 ppmS)	0	2671	0	0	389	0	8	0	0	0	0	1337	36165	28,25%
10	Unleaded petrol RON>=98	0	0	0	0	0	0	0	0	0	0	0	0	10	0,01%
11	Unleaded petrol RON>=98 (<50 ppmS)	0	0	0	0	0	0	0	0	0	0	0	0	11	0,01%
12	Unleaded petrol RON>=98 (<10 ppmS)	50	56	41	75	31	3	0	627	17	85	0	874	7379	5,76%
	Petrol (regular)	0	0	0	0	0	0	0	0	0	0	0	0	22	0,02%
	Petrol (<50 ppm sulphur)	0	0	0	0	0	0	24	0	0	0	0	0	50	0,04%
	Petrol (<10 ppm sulphur)	518	2762	416	2026	420	500	75	5839	769	799	825	2211	127954	99,94%
	Total Petrol	518	2762	416	2026	420	500	99	5839	769	799	825	2211	128026	100,00%
13	Diesel	0	0	0	0	0	0	0	0	0	0	0	0	13	0,01%
14	Diesel (<50 ppm sulphur)	0	0	0	0	0	0	30	0	0	0	0	0	44	0,02%
15	Diesel (<10 ppm sulphur)	419	4899	632	3458	783	1063	67	12935	983	1338	2077	4838	239882	99,98%
	Total Diesel	419	4899	632	3458	783	1063	97	12935	983	1338	2077	4838	239926	100,00%