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Foreword

This document (CEN/TR 15738:2008) has been prepared by Technical Committee CEN/TC 19 “Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin”, the secretariat of which is held by NEN.

Introduction

In Europe the subject of a common standard for heating fuels is not new. This topic often arises in times of change related to heating fuel qualities or stronger market competition.

In discussions in the early 2000s on new low-sulfur light heating oil (LHO) qualities the question of a common European standard for LHO was raised again in the mineral oil industry. In 2001, GEME, Non-Road Fuels Task Force of CONCAWE (The Petroleum Companies Organization for Conservation of Clean Air and Water in Europe), released a report on fuel specifications [1]. This report contains an overview on market volumes, specifications and distribution systems for middle distillates including LHO at that time. The resulting conclusions showed significant differences in the markets and that the most cost effective solution in 2001 was to adopt the situation as it was, i.e. different approaches in different Member States.

In joint meetings of the common Technical Board (TB) of the Association of European Heating Industries (EHI) and Eurofuel (The European Heating Oil Association) the question of a common European LHO standard was again discussed. The reason for pursuing the discussion about standardization work on LHO was argued by EHI in the context of harmonization within the European markets. Therefore the need for a common European standard analogous to EN 590 [2] for automotive diesel fuel was envisaged.

Furthermore, the finalization of standardization work for FAME in 2003 as a blending component for heating fuels, and as a heating fuel itself, supported the question “Why doesn't European standard exist for LHO?” This question was pushed by some market participants mainly by members of Eurofuel but also by some members of the mineral oil industry. Based on this the subject of a common European standard for heating fuels was discussed at the CEN/TC 19 plenary meeting in Oslo, 1-3 June 2005. The result of the discussion is reported in CEN/TC 19 document N 1254 as resolution 51: “CEN/TC 19 requests the WG 25 convenor to report back on requirements, feasibility and needed deliverables concerning a European Standard on liquid (heating) fuel before July 2006”.

Receiving that request, CEN/TC 19/WG 25 started, after reconvening the group in April 2006 (see Annex A), to collect information and data. The conclusions of the report were presented at the CEN/TC 19 plenary meeting in May 2007 and thereafter being balloted for Technical Committee Approval. The text being accepted, some of the informative data on taxes were updated to the most recently available information.

Within this report the ideas of the European mineral oil industry and those from EHI have been considered.

1 Summary

Although the EUROSTAT definition of “medium distillates” includes residual fuel oil, the technical experts in CEN/TC 19/WG 25 (see Annex A) decided that this was outside of the scope of the study and that it was not necessary to develop a CEN standard for residual fuel oils.

Technically it would be ambitious, although not impossible, to establish a common European LHO standard. However, other considerations must be taken into account when deciding on a common LHO standard.

The majority of the WG 25 members see no real benefit or necessity for standardising LHO on a European level. Multiple uses of LHO qualities in some countries is well serviced by the existing supply chain, while for other countries it would require separate processing or additional infrastructure installation. The impact on refinery process technology as well as on refinery economics has to be evaluated on a European level (crude selection, investments in plant technology, separated storage facilities). A cost benefit analysis would be needed to justify such a large investment.

A common European LHO standard could affect national legislation/regulation in many Member States. Therefore a political decision applying an EC Mandate may be required giving a clear indication that the necessary changes in national legislation/regulation will be applied by each member state. This question is far beyond WG 25 working content limits. The scope of WG 25 is limited to deal with standardisation of heating fuels and related technical questions.

There is a belief that harmonisation of LHO standards could reduce production costs for oil heating equipments. It could ease export of oil heating equipment within Europe and open up new markets to manufacturers. However, the vast majority of experts of WG 25, based on the information made available by EHI, do not accept these as enough justification to establish a European LHO standard as it will not fully address the concerns expressed.

It is the WG 25 opinion that improving the reference fuel specification described in EN 267 [3] for this application would assist in type approval for the equipment manufacturers. Thus, it would address the concern of the heating equipment industry.

2 Scope

This report gives background information about LHO market volumes, fuel specifications, regulations, taxes, duties, logistics and distribution systems for LHO in different European countries.

It assesses the necessity, and whether it is appropriate, to recommend the development of a CEN standard for liquid heating fuels.

3 Market information

NOTE All market statistical data submitted in this report are based on publications of the International Energy Agency (IEA) and Eurostat. Data reported for Switzerland were submitted by the Swiss Federal Statistical Office. All data had been summarized by the Austrian Energy Agency (AEA) in a special report [4].

3.1 Definitions

According to the European Energy Balances[1], the group “medium distillates” covers three main product groups:

[1] Definitions taken from "The Eurostat Concepts and Definitions Database“.

a) gas oil / diesel: primarily a middle distillate with a distillation range of 180 °C to 380 °C, used as transport diesel (road and non-road diesel), for heating and for other gas oil purposes (marine, rail traffic, agriculture and petrochemical feed stock), blending components are included.

b) kerosene / jet fuels: covers kerosene-type jet fuels and other kerosene, these fuels are atmospheric distillates having a volatility intermediate between those of gasoline and gas oil, with a distillation range generally between the limits of 100 °C and 300 °C, includes kerosene blending components.

c) residual fuel oil: covers heavy fuel oils including residual components with a kinematic viscosity above 10 cSt at 80 °C (>6 cSt/100 °C), the flash point is always above 50 °C, the density higher than 0,9 g/cm³.

For the product range concerned in this document the term light heating oil, LHO, is used.

Although the definition of “medium distillates” includes residual fuel oil, the technical experts in CEN/TC 19/WG 25 decided that this was outside of the scope of the study and that it was not necessary to develop a CEN standard for residual fuel oil. Therefore, the data for residual fuel oils has not been included in this report (for details of justification see also 7 and 8).

The product groups “gas oil/diesel” and “kerosene/jet fuels” are described further on as “middle distillates” (MD) in this report.

The data from Eurostat is referenced both by sectors and on country basis. The definition of the different sectors from Eurostat is given below[2] :

— households: covers the consumption of fuels used for space heating, cooking and water heating;

— road transport: covers diesel used in passenger cars, commercial vehicles and public service vehicles, including those operated by railway companies;

— inland navigation: covers the consumption of fuels used by inland commercial shipping and leisure craft;

— rail transport: covers the consumption by railways and urban transport systems;

— air transport: covers quantities consumed in aircraft in national and international air traffic;

— industry: covers the consumption of MD in all industrial sectors with the exception of the “Energy sector”;

— services: covers the consumption by public administration and private services;

— agriculture: covers the quantities consumed by agriculture, including engines used for agricultural transportation.

3.2 Volumes

The different uses of MD cannot be compared directly by country in detail as each country has its own classification system due to differing usage, tax and national specifications. Therefore the Eurostat statistics can only provide an approximate overview of the different uses of MD in Europe. The data from 2004 is the latest complete data set reported.

Table 1 shows the final energy consumption of the product groups “gas oil / diesel” and “kerosene / jet fuels” in 2004 within the EU 25. A split into different consumption sectors allows some allocations of the fuels used and is shown in Table 2. The European Energy Balances do not provide separate statistics for gas oil and diesel. In order to estimate the consumption of diesel and gas oil for each sector some assumptions have to

[2] Definitions taken from "The Eurostat Concepts and Definitions Database“.

be made. Energy stream analysis allows rough estimations. As the use of LHO in the sectors agriculture and industry are not reported separately, the amount could only be estimated.

Table 1 — MD 2004 consumption in the EU 25

MD 2004	kt	%
kerosene / jet fuels	51 398	16,5
gas oil / diesel	260 821	83,5
total	312 219	100,0

After some discussion the experts of WG 25 decided to share the use of MD in the sectors of agriculture and industry between diesel and gas oil in a ratio of 80/20 as the best assumption on the basis of all available information. The amount of MD for the sector services will be shared between diesel and gas oil in the ratio of about 40/60.

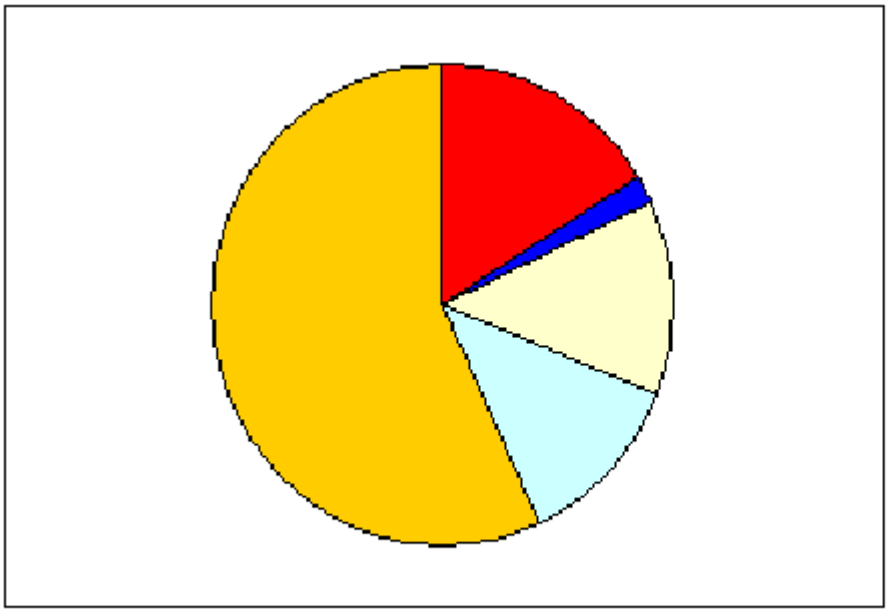
Table 2 — MD consumption during 2004 in the EU25 within different sectors (kt)

Sector	Diesel kt	Gas oil kt	Kerosene kt
Road transport[3]	164 671	-	-
Households	-	41 336	3 495
Services	7 669	10 810	617
Agriculture	12 362	3 091	-
Industry	11 768	2 942	1 645
Inland navigation	3 711	-	-
Railway	2 461	-	-
Air transport	-	-	45 641
Total	202 642	58 179	51 398

Using the above assumptions, the total consumption of MD (gas oil and kerosene) for heating purposes can be allocated to the consumer groups: households, partially agriculture, industry and services. The total amount within EU 25 in 2004 is therefore about 58 000 kt, that is a share within MD of about 18 % (i.e. Figure 1) [4].

As Switzerland is not a member of EU 25 but a significant user of LHO, 5 051 kt must be added to the consumption tables in 2004. Similarly for Norway an additional 595 kt LHO and 125 kt kerosene for heating purposes [5] has to be considered. Summarising the assessed data, heating oils within Europe in 2004 on the product bases of kerosene and LHO had a total market share of about 20 % within the MD segment or an estimated quantity of about 64 000 kt.

[3] Some small amounts are used as heating oil.



Key

A Gas oil for heating 16 %
B Kerosene for heating 2 %
C Kerosene for air transport 13 %
D Gas oil for other use 12 %
E Gas oil for transport 57 %

Figure 1 — Share of MD for heating purposes within EU 25 in 2004 in %

It can also be seen that there are significant differences in the individual markets, with Germany and France using by far the largest quantity of LHO (over 50 % of the total EU demand). Figure 2 shows the estimated share of consumption of MD (gas oil and kerosene) for heating purposes per country in the EU 25, including Switzerland and Norway in 2004 in kilo tonnes.

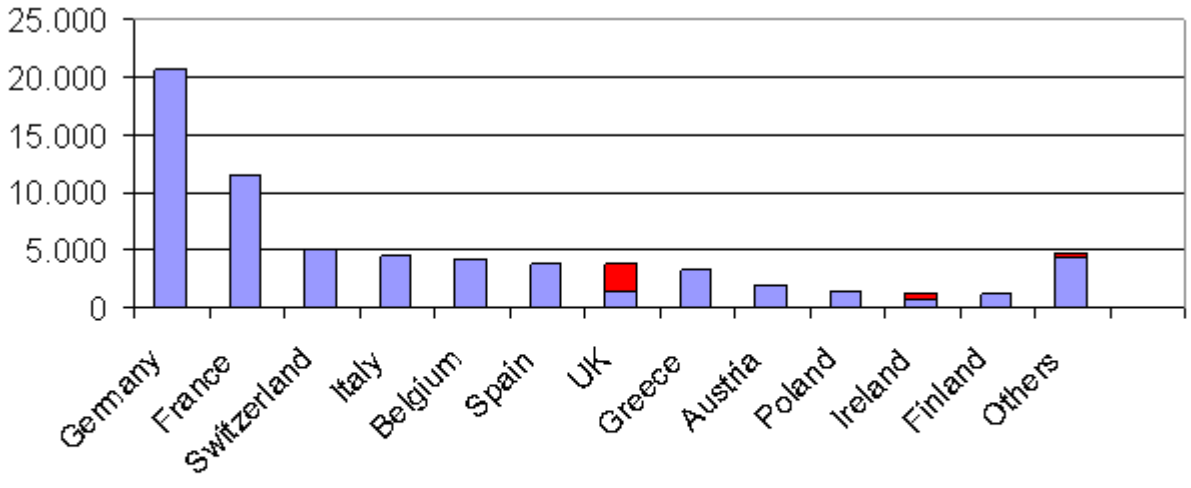
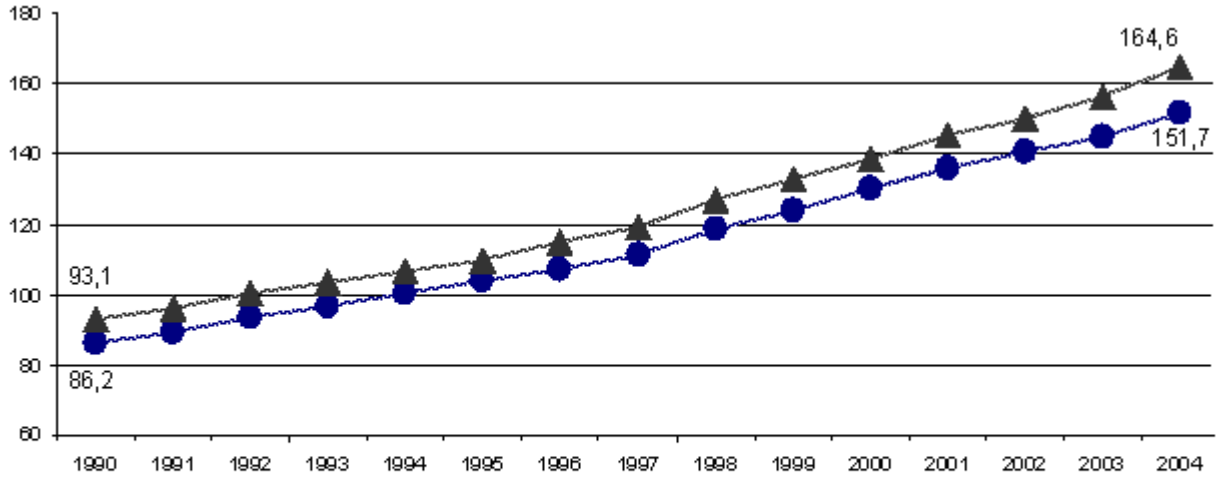


Figure 2 — Estimated share of consumption in kt of MD for heating purposes in 2004

The evaluation of the European MD market shows a significantly increasing use of diesel for road traffic. Figure 3 shows that diesel consumption in the road traffic sector in EU 25 had increased by 77 % in the period from 1990 to 2004[4]. This development was significantly related to an increasing demand for road transport services (goods and passengers) and an increasing rate of individual mobility[5]. According to the International Energy Outlook 2006 [6] it is expected that this development will continue for the next decade.



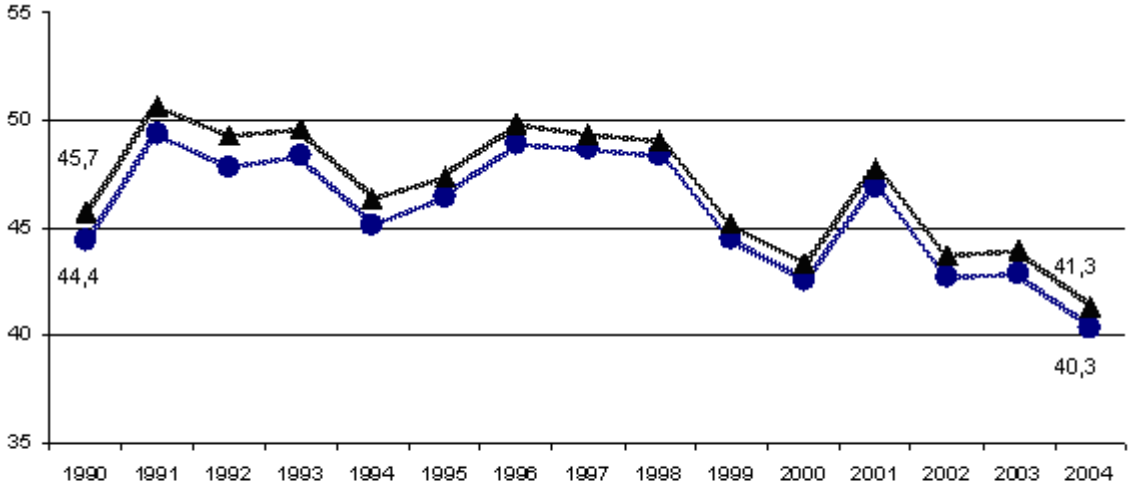
Key
- EU 15 Δ EU 25

Figure 3 — Consumption in kt of diesel in road transport in the EU

Compared to road transport the consumption of heating oils has declined within the period from 1990 to 2004. This can clearly be seen, for example, in the households sector [4] (e.g. Figure 4).

[4] Source: Eurostat, Austrian Energy Agency

[5] E.g. in the EU 15 the total transport of goods increased by 14 % from 1993 to 2004 and the share of road transport in the total transport of goods increased from 75,6 % to 79,2 % in 2004 (source: EUROSTAT).



Key

- EU 15 Δ EU 25

Figure 4 — Consumption in kt in the sector household of heating oil on basis of gas oil in the EU

Although the consumption of heating fuels also depends on a year's climate conditions, particularly during winter, the level in 2004 was about 10 % below the 1990 level. Some of the decline is due to substitution by other fuels e.g. natural gas and energy saving technologies such as condensing systems. It can be assumed that this trend will continue as today's European energy policy prefers increasing consumption of renewable energy for the production of heat also in the household sector [7].

3.3 Market of burner and boiler equipment

Some statistic information about the European Market of oil fired residential heating systems has been submitted by European Heating Industries (EHI), technical secretary.

According to the current Eco-design of Boilers & Combi-boilers study [8] in Europe about 20 million oil heating systems are in operation at this time.

Per year, about 900 000 oil fired units (burner and boiler) will be newly installed or replaced.

4 Fuel specifications including alternative components

4.1 Europe

In Europe separate standards for the main products in the sector of MDs already exist, especially those for transport, diesel and jet fuel. For diesel it is the European standard, EN 590 [2]; the jet fuel standard is an international one, ASTM D 1655 [9] kerosene type and AFQRJOS [6] JET A1 respectively. Also the requirements for MD marine fuels have been harmonized within an international standard, ISO 8217 [10].

[6] Aviation Fuel Quality Requirements for Jointly Operated Systems.

4.2 Alternative components

Additionally for alternative MD components on the basis of FAME, used either as a blending component or as a neat product for road or heating applications, European standards had been elaborated separately. This standardization work was initiated on the basis of an EC mandate (M/267) given in 1997 and finished in 2003. These standards are now in force as EN 14214 [11], FAME for automotive use and EN 14213 [12], FAME for heating purposes.

In the US “Standard Specification for Biodiesel Fuel (B100) Blend Stock for Middle Distillate Fuels”, ASTM D 6751 [13], has been established for FAME and is similar to the European specifications EN 14213 and EN 14214.

Quite a comprehensive overview on possible different liquid and alternative fuels for heating purposes for the upcoming years is given in a report of CEN/BT/WG 149, “Liquid and Gaseous Alternative Fuels” [14].

4.3 Heating oils

Concerning heating oils, currently no generally harmonised quality requirements or standards exist on the European level. Some Member states of the EC have elaborated national standards for LHO, some have other regulations. These are given, for example, by customs authorities or others, such as those defined by the mineral oil industry itself (e.g. Finland). Another point of complexity arises with the offering of different LHO low-sulfur qualities in some countries (Germany, Austria, Switzerland, Belgium, Sweden and Norway).

In Annex B a summary of today’s existing LHO specifications within Europe is given. For example, in the United Kingdom, Italy and Poland, national standards have been established covering all different heating oil qualities within one single standard. This is quite similar to the situation in the United States of America where ASTM D 396 [15] covers all grades of heating oils intended for use in various types of fuel burning equipment under various climatic and operating conditions.

Further, it can be seen that in some European countries LHO complying with the national heating oil standard can be used for non-heating purposes, for example as a fuel for non-road diesel engines, stationary diesel engines or in agricultural devices. These qualities are often differentiated by different dyes/markers and/or different duty rates (see also 5).

5 Legislation

5.1 Introduction

Certain quality parameters and also emission limits for heating oils are defined separately by some EC countries. This is often achieved by national laws or as part of national standards.

EC Directives define in some cases requirements for product quality and must be transposed into the national regulations of the member states. Existing EC Directives which are in force having direct consequences on quality and use of LHO are given in 5.2.

Taxation has an impact on the marketed price and this has consequences regarding the preference for privileged energy sources within a country or region. National taxation levels can be quite different and have a big impact on the market price and the usage of the products.

5.2 European Directives

5.2.1 Environmental Directive

These concern the so-called "Sulfur content of certain Liquid Fuels Directive" (SLFD [16]). For LHO in the SLFD the sulfur content is not allowed to exceed over a defined maximum value:

— from July 2000: gas oil max. 0,20 % (m/m) sulfur;

— from 1 January 2008: gas oil max. 0,10 % (m/m) sulfur.

All national standards of members of the European Union are currently in line with this Directive.

For new member states, a transition time to fully meet the requirements will be agreed in each case.

5.2.2 Fiscal marking of gas oil and kerosene (Euromarker)

The tax related Directive (95/60/EC) [17] imposes the use of a common marker but allows additional national defined markers and dyes to be added.

The requirements for fiscal marking have been introduced to prevent tax fraud and to ease movement of the product throughout the EC countries. In the EC Decision of 2001 [18] the type of marker and concentration has been defined as 'Solvent Yellow' (SY 124) at a concentration of (min. 6,0 to max. 9,0) mg/l [19].

As SY 124 is a newly introduced marker, some practical experience, including questions on stability and detection, has been gained with the product in the market. Based on this experience, a decision has been made for an extension of its use until 2011 before SY 124 has to be proofed again [20].

In Annex C an overview is given of the markers and different dyes used today in different EC member states.

5.2.3 Future developments

In the ongoing update of the Fuels Quality Directive 1998/70/EC (2003/17/EC, [21]) for petrol and diesel fuel the Commission is proposing non-road diesel fuel to meet the max. 10 mg/kg sulfur specification by the latest 31 December 2009. If this takes place, non-road fuel in the whole EU will be either EN 590 or EN 590 with dye/marker. Then LHO qualities could thought to be specified only for heating use without engine related properties.

5.3 National Legislation

Legal references to a standard have to be made by including the publication date of the standard. A change to a new version of a referenced standard, or the establishment of a new European standard, will require adaptation of each national law.

In consequence this will lead to additional administration in adapting national legislation for each country. Therefore the political intention of the EC has to be scrutinized closely for the need to establish and implement such a new standard.

5.4 Tax regulations

5.4.1 Financial Directives

Minimum taxation on gas oils is regulated in the Council Directive 2003/96/EC [20]. The Energy Taxation Directive has been established in compliance with Community commitments to integrate environmental concerns into the energy taxation area and has the intention to improve the functioning of the Internal Market.

This EC Directive - adopted in 2003 - defines the fiscal structures and the levels of taxation to be imposed on energy products and electricity. It replaces, with effect from 1 January 2004, Council Directive 92/81/EEC (on the harmonisation of the structures of excise duties on mineral oils) and Council Directive 92/82/EEC (on the approximation of the rates of excise duties on mineral oils).

Recently low-sulfur qualities of LHO have been introduced into the market in some European countries. These products are partially specified in national standards or privileged by tax incentives against conventional heating fuels. The market shares of low-sulfur products are currently generally low, a small

percentage of the entire LHO market. Low-sulfur products are the preferred heating oil qualities for use in modern condensing heating systems with high energy efficiency.

An overview on sulfur content in LHO in different European countries is given in Annex D.

The 2003 Treaty of Accession provided for transitional arrangements and specific measures for Romania and Bulgaria. In addition, two additional Council Directives for specific arrangements were adopted on 29 April 2004 (Directive 2004/74/EC [22] and Directive 2004/75/EC) [23].

The European Commission has established “Excise Duty Tables” showing rates in force in the Member states of the European Union. The data provided in these tables were updated twice a year by the member states [24] (Table E.1, columns "Business" and "Non Business use”).

5.4.2 Mineral oil tax for LHO

According to the tax regulation Directive [22] a minimum tax for LHO of 21 EUR/1 000 l was established. This minimum tax is valid for business and non business use, as in some countries different taxes for different use have been decreed. Such differences occur in Germany, Malta and in Belgium in combination with the sulfur content of LHO (for details see Annex F).

In the tables provided by the EC [24], an additional CO_2 tax is already included in the taxes of some countries (for details see tables in 0), but this varies between member states.

5.4.3 Mineral oil tax kerosene for heating

For kerosene used for heating purposes, no minimum tax has been defined within the tax regulation Directive [22]. This condition is valid for both, business and non-business use.

5.4.4 Value added tax (VAT) on LHO and kerosene for heating purposes

Across Europe, the VAT rates within each country are defined by national laws and great differences exist between individual countries.

In the United Kingdom for example, for different uses of LHO and kerosene, a different VAT rate is applied (17,5 % for non-domestic use; the VAT rate for domestic use for deliveries of less than 2 300 l is 5 %) [25].

5.4.5 Tax incentives for LHO and kerosene for heating purposes

To promote heating oil qualities with lower sulfur content, some countries have introduced tax incentives as an alternative to changing the national standards (e.g. N, S, DK, and CH [26]). Annex F provides detailed information on different excise duty in relation to sulfur content of LHO for various European countries, Annex G such for kerosene used for heating purposes.

Tax incentives for low-sulfur LHO grades (max. 50 mg/kg S) are decreed in Germany starting at 2008-01-01 and are under discussion in Austria. The reason given for considering such support is to enable technology to accelerate the introduction of high energy efficiency condensing boilers that are supported by Directive 2002/91/EC [27].

In some countries a tax refund will be given if LHO is used for different purposes from heating (e.g. Belgium, Czech Republic) or during winter (e.g. Greece, Cyprus). Furthermore exemptions of duty for the use in agriculture or horticulture exist in Greece, Cyprus, and Luxemburg (details see 0).

6 Distribution systems

6.1 General

NOTE The analysis given in this Clause is based on data and standards available in 2006 and 2007. A revision of EN 590:2004 is planned for 2008, which may change the information, although such is not greatly expected.

A structured overview of existing distribution systems in different European countries is described in detail in the report from CONCAWE, GEME Non-road fuels task force [1] and will be for the main LHO consumer countries as follows. In many countries there would be minor exceptions for supplying all logistical and taxations reasons.

Actual distribution systems are described by country, grouped according to the method in which they supply the fuels to the consumers.

6.2 UK, Ireland, Netherlands and France

These Member States have essentially two distribution systems handling two separate grades as below:

1) diesel fuel (meeting or extending EN 590:2004 [2]) without dye/marker is specified for road applications;

2) separate gas oil grade with dye/marker is supplied at a lower duty rate for use as heating oil and for non-road engine applications (rail, agriculture, industry).

An important aspect in the UK is that the duty point is ex refinery/import terminal so that dye/marker has to be added at the refinery/import terminal rather than at the distribution terminals as in other countries. In a few special cases, UK Customs and Excise have granted concessions to allow road diesel (ULSD) to be dyed/marked downstream of the refinery for supply as non-road fuel, but this requires permission and justification. Next, the UK and Ireland use kerosene for domestic heating and cooking, which is a separate stream from gas oil and diesel fuel.

6.3 Spain

Spain's distribution system is similar to the former group above (UK, Ireland, Netherlands and France) except that it also has a third grade.

1) Gas oil A: EN 590:2004 [2] without dye/marker for road;

2) Gas oil B: EN 590:1993 [28] with red dye/marker for non-road (2 000 mg/kg sulfur);

3) Gas oil C: (no cetane specification, heavier grade) with blue dye/marker for heating oil.

6.4 Norway

Norway has also the additional complexity of two road grades and the requirements of the authorities are as follows:

— 50 mg/kg S max without dye/marker for road use (diesel),

— 500 mg/kg S max with dye/marker for non-road vehicles (diesel)., and

— 2 000 mg/kg S max with dye/marker for heating oil.

The grades in use are for the time being:

— 10 mg/kg S max without dye/marker for road use,

— 500 mg/kg S max with dye/marker for non-road vehicles (also used as heating oil in most places in summer), and

— 500 mg/kg / 2 000 mg/kg S max with dye/marker for heating oil and marine gas oil (in most places 500 mg/kg S max).

In summer the cold properties are the same for all grades. In winter the requirements are much stricter for road diesel and non-road diesel, than for heating oil and marine gas oil.

6.5 Germany, Austria, Italy and Greece

In these countries the following applies.

— EN 590:2004 diesel is supplied for both road and some or all non-road applications;

— In Italy, EN 590:2004 for non-road application is dyed / marked although, in a special case, no dyes/markers are required for railways;

— In Greece, EN 590:2004 for non-road applications is not dyed / marked. About non-road fuels mechanisms exist to be purchased at a lower duty rate. A similar situation exists in Germany and Austria, where agricultural applications are supplied with EN 590:2004 without dye/marker at a lower duty rate than road fuel by way of a tax refunding system;

— LHO is a separate grade supplied with dye/marker at a lower duty rate. In Austria, since 1991 the LHO sulfur content is at a general level of max. 1 000 mg/kg sulfur.

6.6 Finland

In Finland two grades, sulfur free EN 590:2004 and LHO with max. 1 000 mg/kg sulfur, are stored in terminals of oil companies. Dye and marker are added when tanker trucks are loaded so that three grades are distributed for the final customers:

1) EN 590:2004 for automotive use (high tax),

2) EN 590:2004 with red colour and Euromarker for non-road use and some environmentally conscious heating customers (taxed as LHO), and

3) LHO with red colour and Euromarker for heating (low tax).

Sulfur specification of non-road fuel is max. 50 mg/kg which in practice allows transportation with the same tanker trucks as LHO.

6.7 Belgium

In Belgium, there are currently three grades available.

1) EN 590:2004 for automotive use;

2) NBN T 52-716: 2004 [29] – part A that conforms to EN 590:2004 and contains red dye and Euromarker. The maximum sulfur content is set to 50 mg/kg. This grade is primarily intended for the market of heating condensing units. This grade is allowed to be used in non-road applications;

3) NBN T 52-716:2004 – part B is LHO with red dye and Euromarker. This grade is primarily intended for the heating market. This grade is allowed to be used in non-road applications.

6.8 Portugal

There is no national standard for heating oil or non-road gas oil. However, EN 590:2004 quality with dye is generally supplied for all gas oil applications due to the low heating oil volumes.

6.9 Denmark

Three different grades are available.

1) EN 590:2004, diesel for road use, as a result of tax incentives, road diesel is already at max. 10 mg/kg;

2) Non-road applications: Denmark has a special non road diesels quality (non EN 590:2004 quality) with max. 50 mg/kg sulfur;

3) LHO: For heating oil the sulfur content is max. 500 mg/kg, but also non-road gas oil with max. 50 mg/kg sulfur is used for heating purposes.

6.10 Sweden

Three different grades are available.

1) EN 590:2004, road diesel. As a result of tax incentives, road diesel is already at max. 10 mg/kg. Additionally the tax incentive is linked to limits on aromatics, PAH, distillation and density as well;

2) Non-road applications: Sweden supplies non-road application (excluding ships, rail and stationary engines) with road diesel quality (max.10 mg/kg S max). Products for ships, rail and stationary engines are dyed;

3) Heating oil: The sulfur content is max. 1 000 mg/kg and additionally tax incentive exists for sulfur below the maximum limit. Heating oil is dyed.

6.11 Poland

Diesel fuel without the addition of markers or dyes also for non-road applications is allowed in EN 590:2004. Proper levels of sulfur content in fuels for agricultural tractors as well as diesel fuel for non-road use can not be higher then 50 ppm. Such fuels are not marked and dyed.

For use in non-road engines LHO is delivered with lower tax excise than diesel fuel. Dyes and markers are introduced by LHO producers at concentrations given by EC regulations. Duty of dying is also demanded for marine fuels.

Conditions of production and distribution of LHO qualities are corresponding to demands of national quality standard. Details see Poland under Annex B. According to obligatory regulations, LHO are distributed in two grades characterized by different maximum sulfur content (2 000 mg/kg S max /3 000 mg/kg S max).

7 Statement of European Heating Industries

Heating systems, using LHO, have been commonly used in many EU countries since the early 1950s. The requirements for the installation were set on a national basis usually on safe operation to prevent harm to the consumer.

Additionally, correct and efficient operation of the appliances was essential as the customer needed assurance the heating and hot water system would always be available. These basic requirements are still valid today.

In the past, problems with equipment operation were often caused by lack of maintenance, poor housekeeping affecting the quality of LHO and sometimes the quality of LHO itself. As these fuel qualities are different from country to country the appliance industry reacted on a case to case basis.

Nowadays the legal requirements for the appliances are for more challenging specifications such as efficiency and emission levels. They have increased in such a way in numerous Member States that meeting these requirements has become very difficult. As an example the compliance with the NO_x-emission requirements is also related to the nitrogen content of the LHO used. This challenge is very difficult to meet for the manufacturers, as within present design of burners the physical limits have more or less been reached. It is the belief of the European Heating Industries (EHI) Association that it would be helpful and necessary for a harmonisation of the LHO used in Europe. If the appliance manufacturer can design for a uniform LHO throughout Europe, the safe and efficient operation on the appliance can be guaranteed.

In the foreseeable future, heating appliances requirements for the efficiency and emissions will increase notably. The appliances will need to have a high technical specification which in EHI's view will create difficulties without a European harmonised specification for the fuel. This may also create problems for customers which are not acceptable, particularly as more and more alternative fuels are coming on to the heating market.

8 Discussions and conclusion

8.1 General conclusion

It was agreed by the experts in WG 25 that there is principally no requirement to develop a standard for residual fuel oils due to the variations in quality in Member States and declining usage[7].

Regarding LHO, all of the data and information collected so far leads to the following comments and discussion about the feasibility, needs and required deliverables for a common European LHO standard.

8.2 LHO volume

Despite a total volume share of about 20 % of MD all over Europe, LHO can be seen mainly as a local / regional product for stationary use. It has, however, a strong regional importance but no great international attraction. Related to a further expected growth of MD consumption in the transport sector, and the parallel decreasing use for heating purposes, the share of LHO in the MD sector will continue to decrease in forthcoming years.

In some European countries LHO qualities are often used for none heating purposes like non-road, marine or agriculture fuel (as detailed in Clause 6).

8.3 Market

In Europe LHO is traded freely, and has been for many decades, although there are specification differences, the most obvious being the climatic limits. This does not appear to have created any particular operational, trading or customer difficulties. Hence there has not been a push from the oil refining industry or the oil traders to develop a harmonised LHO specification for Europe. However, there may be some minor benefits for oil distribution operators who supply close to borders where different specifications exist within their delivery zone. This is largely overcome today by additional storage or supplying LHO to the higher specification limits.

The conclusion is that the absence of a CEN standard for LHO does not create a specific barrier to free trade in these products.

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[7] This conclusion was supported by CEN/TC 19 in its resolution 2007/61.1 at its plenary meeting in Vienna, Austria of 25 May 2007.

8.4 LHO specifications

Many European countries have developed LHO standards for their own markets and a list of these national standards can be seen in Annex B. In some countries where no national standards exist for LHO national administrative or tax-related regulations are in force. These tend to specify environmental limits and single parameters for example distillation points to define the fuel.

Detailed analyses of these existing standards show widespread regional differences in specification requirements. The main differences between the standards are climatic conditions and local regulations. The local regulations include different fiscal/tax regulations and environmental limits based on more stringent environmental targets resulting in different product requirements.

Currently many oil trading markets use a common basis for contracts within the LHO product sector, usually the Intercontinental Exchange (ICE) product specification [30] is used (see Annex I). This has its basis in the DIN standard for LHO (DIN 51 603-1:2003 [31]), probably due to the fact that Germany has the largest LHO market in the EU and therefore imports very large quantities from other Member States and from outside the EU. However, trading is not limited to the ICE specification and other specifications are often used, depending on the final destination of the LHO.

8.5 LHO qualities

Today, the refining industry and the oil traders are operating adequately without a European LHO specifications. Therefore, the issue to be addressed is to assess whether a European LHO standard might contribute to an improved efficiency in the refining infrastructure and/or to ease the oil trading in Europe. Based on the conclusions reported previously, it appears that the introduction of a European standard may yield only very limited efficiency gains or in some instances negative effects.

Regulations on heating equipments, in particular in the field of emissions (SO_2, NO_x, CO_2) are becoming more and more stringent. These requirements, although initiated mainly through European Directives, are adopted in regulations that are addressing national or regional issues. As a consequence, this results in specific requirements for burner and heating equipment designs, but also for specific fuel requirements.

There is a belief that if a CEN fuel quality specification for very low sulfur LHO is developed, it would allow the market for more efficient domestic boilers to expand. However, there is very little evidence to support this assumption. A CEN standard for example does not create a market for a product, as an example EN 14213 [12], specification for FAME for heating oil. This was developed and published in 2003 but there are virtually none on the market for heating purposes.

In the context of the present multiple applications of LHO qualities, they are frequently used for non-heating purposes (e.g. non-road diesel, marine, railway, agriculture). This approach is adopted in many countries such as UK, France, Belgium, Netherlands, and Spain etc. The future of such a practice, although legally enforced, would be questioned if a European LHO standard developed. In some countries this would require significant investment in a new infrastructure for a specific LHO.

As discussed above and taking into account the complexity of this specific market, it is the CEN/TC 19/WG 25 experts' opinion that a European LHO specification, as with all standards, would need to be technically sound. It would need to be in accordance with both European and national regulations, in line with the market needs and requirements to prevent unnecessary constraints that might affect the market supply.

In conclusion, the effort involved and time taken to develop a CEN LHO specification would not yield sufficient reward or deliver the desired outcome for any sector involved in the LHO market.

8.6 LHO distribution systems

The LHO distribution situation in Europe is very complex and differs from region to region. In some countries LHO base qualities are often commonly used for the provision of product applications other than heating. Non-road fuels are commonly supplied as LHO with different dyes/markers and/or different duty rates.

Furthermore road diesel is on occasion for logistical reasons used for non-road, marine and heating applications.

8.7 National Regulations and taxes / duties

The product use is differentiated by duty mechanisms and identified technically by different markers and/or dyes which vary across Europe.

National and common European regulations exist, but will have no real influence on the decision to establishing a common European LHO standard. It may require changes to national standards where these are in conflict with a CEN standard for LHO and related national legislation. Additionally, when implementing a European standard all existing national laws with reference to national LHO standards have to be adapted according to the then settled European standard.

WG 25 expert's belief is that this is a significant technical barrier which is not easily overcome without a Mandate from the Commission.

8.8 European LHO standard or reference fuel

EHI manufacturers claim benefits for a common European LHO standard (i.e. Clause 7). Harmonisation of LHO standards will reduce production costs for oil heating equipment (via scale of economics). Additionally, it would ease export of oil heating equipment within Europe and open up new markets to manufacturers. This will increase competition, particularly in markets where only indigenous equipment manufacturers exist, and lower costs to the consumer.

However, the vast majority of experts of WG 25 do not accept these as enough justification to establish a European LHO standard as it will not fully address the concerns expressed. The main concern from the European heating industry is the requirement of obtaining type approvals in individual member states using different certification fuels.

To address these, WG 25 experts see the use of reference fuels for type approval of oil heating equipment as the most appropriate approach.

Therefore, harmonising these certification fuels solve the issue, reduce certification and production costs and favour European wide acceptance of the heating equipments in individual member states. However, these certification fuels are specified in EN 267 [3], but the parameters there are inadequate.

The responsibility for these reference or certification fuels for oil heating equipment is outside the scope of CEN/TC 19, but falls within the scope of CEN/TC 47[8].

[8] By resolution 2007/61.2, CEN/TC 19 has requested CEN/TC 47 to consider development of an improved reference fuel for type approval of oil heating appliances.

Annex A
(informative)

WG 25 “Specification of heating fuel” membership

The following members have been active in WG 25 and in drafting this document.

NAME	COMPANY
BOUDEWEEL Francis	ExxonMobil
BOULINGUIEZ Martine	Total
ENGELEN Benoit	Total Marketing Europe
FEUERHELM Hans-Thomas	DIN/FAM
HEGER Franz	OMV
HERMANS Pierre	ExxonMobil
KAMINSKA Maria	Polcargo International
LINKE Wilfried	Secretary of the Technical Commission EHI
LUBOWICZ Jan	Instytut Technologii Nafty
MAJOCH Arkadiusz	Instytut Paliw I Energii Obnawialne
MARTINEZ SANCHEZ Pedro Miguel	CEPSA
SAUNDERS Bob	BP Oil
SCHULWITZ Bruno	GMA
SCHWOLL Helmut	Danfoss
TITTARELLI Paolo	Stazione Sperimentale Combustibili
VIGO Mario	Unione Petrolifera
WORTLEY Peter	Federation of Petroleum Suppliers
WITT Siegmar	Shell Deutschland Oil
KÜCHEN Christian	IWO Deutschland
MIKKONEN Seppo	Neste Oil

Annex B
(informative)

LHO Standards overview

Table B.1 Product quality of middle distillate heating fuels, kerosene type

Country		Austria	Austria	Belgium	Belgium	Bosnia-Herzegovina	Bosnia-Herzegovina
National standard		ÖNORM C1109	ÖNORM C1109	---	NBNT 52-716	---	---
Standardisation Organisation		http://www.on-norm.at/	http://www.on-norm.at/	http://www.ibn.be/	http://www.ibn.be/	http://www.basmp.gov.ba/	http://www.basmp.gov.ba/
Issue		Dez.06	Dez.06	Apr.04	Apr.04	Sep.05	Sep.05
Remarks		low sulfur	standard	Gasoil chauffage extra acc. EN 590	Gasoil de chauffage	common commercial grade summer	common commercial grade winter
Property		Requirements	Requirements	Requirements	Requirements	Requirements	Requirements
Density at 15°C	g/cm³	max. 0,860	max. 0,860	0,820-0,845	0,830 - 0,870	0,820 - 0,860	0,820 - 0,860
Density at 20°C	g/cm³						
Gross calorific value	MJ/kg						
Net calorific value	MJ/kg	min. 42,0	min. 42,0		min. 44,4		
Flashpoint (Pensky-Martens, closed cup)	°C	> 55	> 55	>55	> 55	min. 55	min. 55
Flashpoint (Abel closed cup)	°C						
Flashpoint (Abel-Pensky, open cup)	°C						
Viscosity kinematic at 20°C	mm²/s	2,8 - 6,0	2,8 - 6,0		max. 6	2,5 - 6,0	2,5 - 6,0
Viscosity kinematic at 30°C	mm²/s						
Viscosity kinematic at 40°C	mm²/s			2,00-4,50			
Viscosity kinematic at 50°C	mm²/s						
Viscosity kinematic at 100°C	mm²/s						
Distillation recovery at 200°C	%(v/v)						
Distillation recovery at 250°C	%(v/v)			<65	max. 65		
Distillation recovery at 350°C	%(v/v)	min. 90	min. 90	min. 85	min. 85	min. 85	min. 85
Distillation recovery at 360°C	%(v/v)						
Distillation recovery at 370°C	%(v/v)						
Final Boiling Point	°C						
Dist. Temp. 10%Vol recovered	°C						
Dist. Temp. 65%Vol recovered	°C						
Dist. Temp. 80%Vol recovered	°C						
Dist. Temp. 90%Vol recovered	°C						
Dist. Temp. 95%Vol recovered	°C			max. 360			
Pourpoint	°C					max. -5	max. -12
Cloudpoint	°C						
Cold filter plugging point	°C	max. -8	max. -8		max. -10		
Carbon Residue (on 10% residue)	%(m/m)	max. 0,15	max. 0,15	max. 0,30	max. 0,30		
Sulphur content	%(m/m)				max. 0,20	max. 0,03	max. 0,03
Sulphur content	mg/kg	max. 50	50 - 1000	max. 50			
Nitrogen content	mg/kg						
Water content	mg/kg	max. 200	max. 200	max. 200	max. 200	max. 500	max. 500
Particulate Contamination	mg/l						
Total contamination	mg/kg	max. 24	max. 24	max. 24	max. 24	max. 30	max. 30
Ash %	%(m/m)	max. 0,01	max. 0,01	max. 0,01			max. 0,01
Copper corrosion	grade				max. 1		
Copper strip corrosion				class 1			
Neutralisation Number	mg KOH/100ml						
Strong Acid Number							
Sediment	%(m/m)						
Mechanical contamination	%(m/m)						
Water and sediment	% (v/v)						
Smoke Point	mm						
Char value	mg/kg						
Appearance							
Colour (Tax) Marker (Tax) Europe	mg/l	red 6mg/l - 9 mg/l SY 124 + red dye	red 6mg/l - 9 mg/l SY 124 + red dye		6mg/l - 9 mg/l SY 124	red min. 6 mg/l S.Y. 124	red min. 6 mg/l S.Y. 124
FAME content	%(v/v)	Not allowed	Not allowed	max. 5			
Cetane number				min. 51,0			
Cetane index				min. 46,0			
Polycyclic aromatic hydrocarbons	%(m/m)			max. 11			
Oxidation stability Lubricity, corrected wear scar diameter	g/m3			max. 25			
(wsd 1,4) at 60°C	µm	max. 460***		max. 460			
Electric conductivity Remarks	pS/m at 20°C				sulphur content from 1.1.2008: 0,10 % (m/m)		

*) calculated
**) footnote in the standard
***) additional requirement
SY: Solvent Yellow
SR: Solvent Red

Table B.1 Product quality of middle distillate heating fuels, kerosene type *(continued)*

Country		Bulgaria	Bulgaria	Croatia	Czech Rep.	Finland
National standard		BDS 9805	---	---	---	---
Standardisation Organisation		http://www.bds-bg.org/	http://www.bds-bg.org/	http://www.dznm.hr/	http://www.cni.cz	http://www.sfs.fi/
Issue		1982	May 03	Dez.05		Jan. 07
Remarks		Gasoil for industrial and domestic uses	Gasoil acc. EN 590 (Diesel)	Production standard INA N 02-015	Production standard	Production standard (jan. 2006) common commercial grade
Property		Requirements	Requirements	Requirements	Requirements	Requirements
Density at 15°C	g/cm³	stated	0,820 - 0,845	max. 0,860	max.0,864	0,820 - 0,870
Density at 20°C	g/cm³					
Gross calorific value	MJ/kg					
Net calorific value	MJ/kg	min. 41,868		min. 42		min. 35,3 MJ/liter
Flashpoint (Pensky-Martens, closed cup)	°C	min. 60	min.55	min. 55	min.56	min. 60
Flashpoint (Abel closed cup)	°C					
Flashpoint (Abel-Pensky, open cup)	°C					
Viscosity kinematic at 20°C	mm²/s	5,0 - 11,0		2,5 - 6,0	max. 7,7	
Viscosity kinematic at 30°C	mm²/s					
Viscosity kinematic at 40°C	mm²/s					2,0 - 4,0
Viscosity kinematic at 50°C	mm²/s					
Viscosity kinematic at 100°C	mm²/s					
Distillation recovery at 200°C	%(v/v)					
Distillation recovery at 250°C	%(v/v)		< 65			max. 65
Distillation recovery at 350°C	%(v/v)		min.85			min. 85
Distillation recovery at 360°C	%(v/v)					
Distillation recovery at 370°C	%(v/v)			min. 95		
Final Boiling Point	°C					
Dist. Temp. 10%Vol recovered	°C					
Dist. Temp. 65%Vol recovered	°C					
Dist. Temp. 80%Vol recovered	°C					
Dist. Temp. 90%Vol recovered	°C					
Dist. Temp. 95%Vol recovered	°C					
Pourpoint	°C	summer: not limited/ winter: max. -10		max. -12**	max.-10	
Cloudpoint	°C					max. -3
Cold filter plugging point	°C					max. -10
Carbon Residue (on 10% residue)	%(m/m)	max. 0,15	max. 0,30	max. 0,30		max. 0,3
Sulphur content	%(m/m)	max. 1,25	0,035	max. 0,20		max. 0,10
Sulphur content	mg/kg				max. 1000	
Nitrogen content	mg/kg					
Water content	mg/kg	max. 500	max.200	max. 350		max. 200
Particulate Contamination	mg/l					
Total contamination	mg/kg		max.24	max. 100		max. 24
Ash %	%(m/m)	max. 0,01	max. 0,02	max. 0,02		max. 0,01
Copper corrosion	grade					
Copper strip corrosion						max. 1
Neutralisation Number	mg KOH/100ml					
Strong Acid Number						
Sediment	%(m/m)					
Mechanical contamination	%(m/m)	max. 0,1				
Water and sediment	% (v/v)				< = 0,10	
Smoke Point	mm					
Char value	mg/kg					
Appearance					clear and liquid at 20°C	red, clear, bright
Colour (Tax)		red		red SR 19	red (1 g/hl)	red
Marker (Tax) Europe	mg/l			min. 6mg/l SY 124	6mg/l - 9 mg/l SY 124 + red dye	6mg/l - 9 mg/l SY 124 + 3 mg/l red dye
FAME content	%(v/v)				allowed	
Cetane number						
Cetane index					40	
Polycyclic aromatic hydrocarbons	%(m/m)					
Oxidation stability	g/m3					max. 25
Lubricity, corrected wear scar diameter (wsd 1,4) at 60°C	µm					
Electric conductivity	pS/m at 20°C				min. 150	
Remarks		10%Vol dist. at max. 180°C; 75%Vol dist. at max. 360°C		**) Apr. 16 - Sep 30 max. 0°C; Oct 1 - Oct 31 max. -6°C; Mar 1 - Apr 15 max. -6°C; Nov 1 - Feb 29 max -12°C	only additive allowed for electric conductivity: Stadis 450	sulfur legislated max. 0,10%m/m; if winter grade needed, dyed winter EN 590 delivered

*) calculated
**) footnote in the standard
***) additional requirement
SY: Solvent Yellow
SR: Solvent Red

Table B.1 Product quality of middle distillate heating fuels, kerosene type *(continued)*

Country		France	Germany	Germany	Great Britain	Great Britain	Great Britain
National standard		Industry Specification CSR 441	DIN 51603-1	DIN 51603-1	BS 2869	BS 2869	BS 2869
Standardisation Organisation		www.cpdp.org	http://www.din.de	http://www.din.de	http://www.bsi-global.com	http://www.bsi-global.com	http://www.bsi-global.com
Issue		Jan. 02	Sep.03	Sep.03	2006	2006	2006
Remarks		Fuel Oil Domestique TOTAL Spec	low sulfur	standard	Middle distillate fuel class A2 (diesel engines in agriculture and off-road)	Middle distillate fuel class D (atomizing burner fuels)	Kerosine class C1 (flueless appliances)
Property		Requirements	Requirements	Requirements	Requirements	Requirements	Requirements
Density at 15°C	g/cm³	0,830 - 0,880	max. 0,860	max. 0,860	min. 0,820		
Density at 20°C	g/cm³						
Gross calorific value	MJ/kg						
Net calorific value	MJ/kg		min. 42,6	min. 42,6			
Flashpoint (Pensky-Martens, closed cup)	°C	55 - 120	> 55	> 55	min. 56	min. 56	
Flashpoint (Abel closed cup)	°C						min. 43,0
Flashpoint (Abel-Pensky, open cup)	°C						
Viscosity kinematic at 20°C	mm²/s	3-7,5	max. 6,00	max. 6,00			
Viscosity kinematic at 30°C	mm²/s						
Viscosity kinematic at 40°C	mm²/s				2,0 - 5,5 (16.3. - 30.9.); 1,5 - 5,5 (1.10. - 15.3.)	1,5 - 5,5 (16.3. - 30.9.); 1,5 - 5,5 (1.10. - 15.3.)	
Viscosity kinematic at 50°C	mm²/s						
Viscosity kinematic at 100°C	mm²/s						
Distillation recovery at 200°C	%(v/v)						15,0 - 60,0
Distillation recovery at 250°C	%(v/v)	< 65	< 65	< 65	max. 65	max. 65	
Distillation recovery at 350°C	%(v/v)	> 85	min. 85	min. 85	min. 85	min. 85	
Distillation recovery at 360°C	%(v/v)						
Distillation recovery at 370°C	%(v/v)						
Final Boiling Point	°C						max. 280
Dist. Temp. 10%Vol recovered	°C						
Dist. Temp. 65%Vol recovered	°C						
Dist. Temp. 80%Vol recovered	°C						
Dist. Temp. 90%Vol recovered	°C						
Dist. Temp. 95%Vol recovered	°C						
Pourpoint	°C	< = -9					
Cloudpoint	°C	< = + 2	max. 3	max. 3			
Cold filter plugging point	°C	< = -4	max. -12 (CP 3)/-11 (CP 2)/-10 (CP 1)	max. -12 (CP 3)/-11 (CP 2)/-10 (CP 1)	max. -4 (16.3. - 30.9.); max. -12 (1.10. - 15.3.0)	max. -4 (16.3. - 30.9.); max. -12 (1.10. - 15.3.0)	
Carbon Residue (on 10% residue)	%(m/m)	< = 0,30	max. 0,3	max. 0,3	max. 0,30	max. 0,30	
Sulphur content	%(m/m)	< = 0,20		0,0050 - 0,20	max. 0,20	max. 0,20	max. 0,04
Sulphur content	mg/kg		max. 50				
Nitrogen content	mg/kg						
Water content	mg/kg	< = 200	max. 200	max. 200	max.200	max.200	free
Particulate Contamination	mg/l						
Total contamination	mg/kg		max. 24	max. 24	max. 24	max. 24	
Ash %	%(m/m)		max. 0,01	max. 0,01	max. 0,01	max. 0,01	
Copper corrosion	grade						
Copper strip corrosion					1 (3h at 100°C)	1 (3h at 100°C)	1 (3h at 100°C)
Neutralisation Number	mg KOH/100ml						
Strong Acid Number					zero	zero	
Sediment	%(m/m)						
Mechanical contamination	%(m/m)						
Water and sediment	% (v/v)						
Smoke Point	mm						min. 34
Char value	mg/kg						max. 10
Appearance							clear, bright, free from solid matter and undissolved water
Colour (Tax)		red (1 g/hl) (SR24)	red (SR 19)	red (SR 19)			
Marker (Tax) Europe	mg/l	min.7,3 mg/kg + max. 20% SY 124 + def. conc. red dye	min.7,3 mg/kg + max. 20% SY 124 + def. conc. red dye	min.7,3 mg/kg + max. 20% SY 124 + def. conc. red dye			
FAME content	%(v/v)	Not allowed	Not allowed	Not allowed	max. 5	max. 5	
Cetane number							
Cetane index		min. 40					
Polycyclic aromatic hydrocarbons	%(m/m)						
Oxidation stability	g/m3	< = 25					
Lubricity, corrected wear scar diameter (wsd 1,4) at 60°C	µm		max. 460***		max. 460 (only for LHO with max. 500 mg/kg sulfur)		
Electric conductivity	pS/m at 20°C						
Remarks							

*) calculated
**) footnote in the standard
***) additional requirement
SY: Solvent Yellow
SR: Solvent Red

Table B.1 Product quality of middle distillate heating fuels, kerosene type *(concluded)*

Country		Spain	Switzerland	Switzerland	Sweden	Sweden	Sweden	Sweden
National standard		---	SN 181160-2	SN 181160-2	SS 15 54 10	SS 15 54 10	SS 15 54 10	SS 15 54 10
Standardisation Organisation		http://www.aenor.es/	http://www.snv.ch	http://www.snv.ch	http://www.sis.se	http://www.sis.se	http://www.sis.se	http://www.sis.se
Issue		Jän.06	May 2006	May 2006	March 98	March 98	March 98	March 98
Remarks		Administrative Regulation RD 61/2006 Gasoleo C	low sulfur	Euro-Quality	Eo1/indoor storing	Eo1/outdoor storing	Eo2	Eo3A
Property		Requirements	Requirements	Requirements	Requirements	Requirements	Requirements	Requirements
Density at 15°C	g/cm³	max. 0,900	0,820-0,860	0,820-0,860	stated	stated	stated	stated
Density at 20°C	g/cm³							
Gross calorific value	MJ/kg							
Net calorific value	MJ/kg		min. 42,6	min. 42,6	stated	stated	stated	stated
Flashpoint (Pensky-Martens, closed cup)	°C	min. 60	min. 55	min. 55	min. 56	min. 56	min. 56	min. 56
Flashpoint (Abel closed cup)	°C							
Flashpoint (Abel-Pensky, open cup)	°C		---					
Viscosity kinematic at 20°C	mm²/s		max. 6,71 *)	max. 6,71 *)				
Viscosity kinematic at 30°C	mm²/s							
Viscosity kinematic at 40°C	mm²/s	max. 7,0	max. 4,00	max. 4,00	2,0 - 4,0	1,5 - 3,0	7,5 - 15	10 - 40
Viscosity kinematic at 50°C	mm²/s							
Viscosity kinematic at 100°C	mm²/s							
Distillation recovery at 200°C	%(v/v)							
Distillation recovery at 250°C	%(v/v)		max. 65	max. 65				
Distillation recovery at 350°C	%(v/v)		min. 85	min. 85				
Distillation recovery at 360°C	%(v/v)							
Distillation recovery at 370°C	%(v/v)				min. 95	min. 95		
Final Boiling Point	°C							
Dist. Temp. 10%Vol recovered	°C							
Dist. Temp. 65%Vol recovered	°C	min. 250						
Dist. Temp. 80%Vol recovered	°C	max. 390						
Dist. Temp. 90%Vol recovered	°C							
Dist. Temp. 95%Vol recovered	°C	stated						
Pourpoint	°C						max. 15	max. 21
Cloudpoint	°C	max. 4	max. 3	max. 3	max.0	max. -22		
Cold filter plugging point	°C	max. -6	max. -12 (CP 3)/-11 (CP 2)/-10 (CP 1)	max. -12 (CP 3)/-11 (CP 2)/-10 (CP 1)	max. -10	max. -32		
Carbon Residue (on 10% residue)	%(m/m)	max. 0,35	max. 0,05	max. 0,05	max. 0,2	max. 0,2	max. 0,4	max. 0,5
Sulphur content	%(m/m)	max. 0,2	max. 0,005	max. 0,2	< 0,10	< 0,10	max. 0,50	< 0,10
Sulphur content	mg/kg		max. 50	max. 2000				
Nitrogen content	mg/kg		max. 100		stated	stated	stated	stated
Water content	mg/kg		max. 200	max. 200	max. 200	max. 200	max. 1000	max. 500
Particulate Contamination	mg/l							
Total contamination	mg/kg		max. 24	max. 24	max.24	max.24		
Ash %	%(m/m)		max. 0,01	max. 0,01	max. 0,01	max. 0,01	max. 0,02	max. 0,05
Copper corrosion	grade				max. 1			
Copper strip corrosion		class 2						
Neutralisation Number	mg KOH/100ml				---			
Strong Acid Number								
Sediment	%(m/m)				max. 0,05	max. 0,05	max. 0,05	max. 0,05
Mechanical contamination	%(m/m)							
Water and sediment	% (v/v)							
Smoke Point	mm							
Char value	mg/kg							
Appearance			clear, red	clear, red				
Colour (Tax)			red	red	green	green	< = 4	
Marker (Tax) Europe	mg/l	6mg/l - 9 mg/l SY 124 + red dye	6mg/l - 9 mg/l SY 124 + red dye	6mg/l - 9 mg/l SY 124 + red dye	6mg/l - 9 mg/l SY 124	6mg/l - 9 mg/l SY 124		
FAME content	%(v/v)	not clearly excluded	not clearly excluded	not clearly excluded				
Cetane number								
Cetane index								
Polycyclic aromatic hydrocarbons	%(m/m)							
Oxidation stability	g/m3							
Lubricity, corrected wear scar diameter (wsd 1,4) at 60°C	µm		max. 460**					
Electric conductivity	pS/m at 20°C							
Remarks			max. 100 mg/kg Nitrogen: "Öko-oil" until end of 2006		Organic chlorine max. 6 mg/kg, PCB max.2 mg/kg	Organic chlorine max. 6 mg/kg, PCB max.2 mg/kg	Organic chlorine max. 6 mg/kg, PCB max.2 mg/kg, lowest handling temp. 25°C	Organic chlorine max. 6 mg/kg, PCB max.2 mg/kg, lowest handling temp. 30°C

*) calculated
**) footnote in the standard
***) additional requirement
SY: Solvent Yellow
SR: Solvent Red

Annex C
(informative)

Regulations regarding markers and dyes

Table C.1 National markers and dyes for LHO

country	national marker	dye color	dye product	dye concentration	source of information
member of WG 25					
Austria	none	red	SR 19		BGBl. II Nr. 450/2001
Belgium					Ministerial Decree of 10 July 2002 published in: Official Journal of the 13nd of July, page 31459
France		red		1g/hl	
Germany		red	N-Ethyl-1-(4-phenylazophenylazo)naphtyl-2- amin	4,1g/1000 l at 15	§2 Abs. 1 EnergieStG, 8/2006
Germany		red	N-Ethylhexyl-1-(tolylazotolyazo)naphthyl-2-amin	5,5g /1000 l at 15	§2 Abs. 1 EnergieStG, 8/2006
Germany		red	N-Tridecyl-1-(tolylazotolylazo)naphthyl-2-amin	6,1g/1000 l at 15	§2 Abs. 1 EnergieStG, 8/2006
Germany		red	or a mixture of these red dyes with equivalent colouring effect		§2 Abs. 1 EnergieStG, 8/2006
Italy	none	red	SR 161	4,00 g/100 kg	Law May 13, 2005
Poland		red			
Spain		blue			ORDEN PRE/3493/2004 of 22 October
United Kingdome	quinizarine	red			Finance Act from the 1950's
other European contries (data from literature)					
Bosnia-Herzegowina		red			
Bulgaria		red			
Croatia		red			
Romania		red	ASTM color 2		
Slovenia		red			
Switzerland		red			
Sweden		green			
Finland		red		3,00g/1000l	Regulation 8/5/2004

Annex D
(informative)

LHO sulfur content

Table D.1 gives an overview on sulfur content in LHO as laid down in national regulations or standards in different European countries in % (*m/m*) or mg/kg[9].

Table D.1 Sulfur content in LHO in % (*m/m*) (mg/kg)

Country	Standard	Regulation	**1,25**	**0,5**	**0,3**	**0,2** 2 000	**0,1** 1 000	**0,04**	**0,035** 350	**0,005** 50
Austria	ÖNORM C1109						X			X
Belgium	NBNT 52-716; EN 590					X				X
Bulgaria	BBS 9805; EN 590		X							
Croatia	INA N 02-015					X				
Finland		Degree 766/200					X			
France		Industry specification CSR 411				X				
Germany	DIN 51603-1					X				X
Italy	UNI 6579					X				
Poland	PN C 96024				X	X				
Slovenia	SIST 1011					X				
Spain		Administrative Regulation RD 61/2006				X				
Switzerland	SN 181160-2					X				X
Sweden	SS 15 54 10			X			X			
UK	BS 2869					X		X		

[9] In Bulgaria (BDS 9805, 1982) in 2006 a maximum content of 1,25 % (*m/m*) sulfur was still allowed. But additionally a low sulfur gas oil grade for heating purposes has been standardized on basis of EN 590 with a maximum content of 0,035 % (*m/m*) sulfur. Joining EU in 2007 Bulgaria will be up to the standard in due course.

Annex E
(informative)

Excise duty tables of gas oil

Figure E.1 shows as an example the excise duty tables for gas oil as valid per January 2008 [32].

		Gas oil											
		Propellant				**Industrial/Commercial** use			**Heating** – Business use			**Heating** – Non business use		
		CN 2710 1941 to 2710 1949				CN 2710 1941 to 2710 1949			CN 2710 1941 to 2710 1949			CN 2710 1941 to 2710 1949		
Minimum excise duty adopted by the Council on 27-10-2003 (Dir. 2003/96/EC)		302 EUR per 1000 litres (Annex I of Directive 2003/96/EC)				21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)			21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)			21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)		
MS	National Currency	Excise duty NatCurr	EUR	VAT %		Excise duty NatCurr	EUR	VAT %	Excise duty NatCurr	EUR	VAT %	Excise duty NatCurr	EUR	VAT %
BE	EUR	>=50 mg/kg*	332,8947	21,00		>=50*	21,00	21,00	>=50*	18,4854	21,00	>=50*	18,4854	21,00
		<50 mg/kg* norm	317,8947	21,00		<50*	21,00	21,00	<50*	17,1022	21,00	<50*	17,1022	21,00
		<50 mg/kg* bio	302,00	21,00										
BG	BGN	600,00	306,78	20,00		*600,00	*306,78	20,00	*50,00	*25,56	20,00	50,00	25,56	20,00
CZ	CZK	9950,00	361,32	19,00		9950,00	361,32	19,00	9950,00	361,32	19,00	9950,00	361,32	19,00
DK	DKK	2719,00	364,72	25,00		2719,00	364,72	25,00	2126,00	285,18	25,00	2126,00	285,18	25,00
DE	EUR	>10 mg/kg*	485,70	19,00			*255,60	19,00		44,99	19,00		61,35	19,00
		<=10 mg/kg*	470,40	19,00										
EE	EEK	5165,00	330,10	18,00		960,00	61,36	18,00	960,00	61,36	18,00	960,00	61,36	18,00
EL	EUR		*293,00	19,00			**293,00	19,00		293,00	19,00		293,00	19,00
ES	EUR		*302,00	16,00			84,71	16,00		84,71	16,00		84,71	16,00
FR	EUR		*428,40	19,60			56,60	19,60		56,60	19,60		56,60	19,60
IE	EUR	*<=50mg/kg	*368,05	21,00			47,36	13,50		47,36	13,50		47,36	13,50
IT	EUR		*423,00	20,00			**126,90	20,00		403,21	20,00		403,21	20,00
CY	EUR		*245,00	15,00			**245,00	15,00		***124,73	15,00		***124,73	15,00

Figure E.1 — European excise duties of gas oil situation as at 2008/01/01

		Gas oil											
		Propellant				**Industrial/Commercial use**				**Heating – Business use**				**Heating – Non business use**			
		CN 2710 1941 to 2710 1949				CN 2710 1941 to 2710 1949				CN 2710 1941 to 2710 1949				CN 2710 1941 to 2710 1949			
Minimum excise duty adopted by the Council on 27-10-2003 (Dir. 2003/96/EC)		302 EUR per 1000 litres (Annex I of Directive 2003/96/EC)				21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)				21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)				21 EUR per 1000 litres. (Annex I of Directive 2003/96/EC)			
MS	National Currency	Excise duty			VAT %	Excise duty			VAT %	Excise duty			VAT %	Excise duty			VAT %
			NatCurr				NatCurr	EUR			NatCurr	EUR			NatCurr	EUR	
LV	LVL		*193,00	274,15	18,00		15,00	21,31	18,00		15,00	21,31	18,00		15,00	21,31	18,00
LT	LTL		947,00	274,27	18,00		947,00	274,27	18,00		73,00	21,14	18,00		73,00	21,14	18,00
LU	EUR	>10 mg/kg		305,3548*	15,00			21,00	15,00	**RDC		**0	12,00	**RDC		**0	12,00
		<=10 mg/kg		302,0000*				21,00	15,0	**RDC		**0	12,00	**RDC		**0	12,00
HU	HUF	*a)	85000,00	338,08	20,00		85000,00	338,08	20,00		85000,00	338,08	20,00		85000,00	338,08	20,00
		*b)	88900,00	353,59	20,00												
		*c)	93000,00	369,90	20,00												
		*d)	96900,00	385,41	20,00												
MT	EUR			*332,40	18,00			*332,40	18,00			332,40	18,00			96,79	18,00
							[illegible]61,00	142,09	18,00								
							[illegible]0	0	0								
NL	EUR	<=10 mg/kg*		376,31	19,00			**46,56	19,00			**46,56	19,00			**46,56	19,00
		> 10 mg/kg*		386,62	19,00												
AT	EUR	*a)		347,00	20,00	*a)		347,00	20,00			98,00	20,00			98,00	20,00
		*b)		375,00	20,00	*b)		375,00	20,00								

Figure E.1 — European excise duties of gas oil situation as at 2008/01/01 (*continued*)

Annex F
(informative)

Excise duty in relation to sulfur content

This Annex gives in Table F.1 details on some of the Member States' excise duties in relation to the sulfur level in LHO [16].

Table F.1 Excise duty details

Country	Sulfur content	Excise duty	Remarks
Belgium	> = 50 mg/kg < 50 mg/kg	EUR 18,485 4/1 000 l EUR 17,102 2/1 000 l	Gas oil heating – business use: A business with an environmental objectives agreement or arrangement: excise duty EUR 9,242 7 (> = 50 mg/kg) or 8, 551 1 (< 50 mg/kg), see Annex H.
Sweden	0,1 % (m/m)	SEK 27 (EUR 2,90)/m^3	The sulfur tax on liquid fuels – such as diesel oils, heating gas oils and heavy fuel oils is SEK 27 (EUR 2, 90) per m3 of oil for each tenth of a per cent by weight of the sulfur content.
Switzerland	< 0,1% (m/m) > 0,1 % (m/m)	10,14 SFR/1 000 l [17]	
Norway	per 0,25 % (m/m)	7 ore/litre	Sulfur-tax on mineral oil is 7 øre/litre per 0,25 % weight units of sulfur (S). There is no sulfur-tax on mineral oil with less than 0,05 % weight units of sulfur [16].

Annex G
(informative)

Excise duty tables of kerosene

Figure G.1 shows the excise duty tables for kerosene as valid per January 2008 [32].

		Kerosene											
		Propellant use			**Industrial/Commercial** use			**Heating** business use			**Heating** non-business use		
		CN 2710 1921, CN 2710 1925 (Article of Directive 2003 /EEC)			CN 2710 1921, CN 2710 1925			CN 2710 1921, CN 2710 1925			CN 2710 1921, CN 2710 1925		
Minimum excise duty adopted by the Council on 27-10-2003 (Dir. 2003/96/EC)		302 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			21 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			0 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			0 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)		
MS	Nat Curr	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %
BE	EUR		580,4427	21,00		21,00	21,00		17,9475	21,00		17,9475	21,00
BG	BGN	535,00	273,55	20,00	*535,00	*273,55	20,00	*50,00	*25,56	20,00	50,00	25,56	20,00
CZ	CZK	9950,00	361,32	19,00	9950,00	361,32	19,00	9950,00	361,32	19,00	9950,00	361,32	19,00
DK	DKK	3067,00	411,41	25,00	3067,00	411,41	25,00	2126,00	285,18	25,00	2126,00	285,18	25,00
DE	EUR		654,50	19,00		654,50	19,00		654,50	19,00		654,50	19,00
EE	EEK	5165,00	330,10	18,00	5165,00	330,10	18,00	5165,00	330,10	18,00	5165,00	330,10	18,00
EL	EUR		320,00	19,00		320,00	19,00		320,00	19,00		320,00	19,00
ES	EUR		315,79	16,00		315,79	16,00		78,71	16,00		78,71	16,00
FR	EUR		416,90	19,60		25,40	19,60		56,60	19,60		56,60	19,60
IE	EUR	Over 50mg sulphur/kg	420,44	21,00		*	13,50		0,00	13,50		0,00	13,50
		Under 50mg sulphur/kg	368,05	21,00		*	13,50		0,00	13,50		0,00	13,50
IT	EUR		337,49	20,00		101,25	20,00		337,49	20,00		337,49	20,00
CY	EUR		*245,00	15,00		**245,00	15,00		***124,73	15,00		***124,73	15,00
LV	LVL	*193,00	274,15	18,00	15,00	21,31	18,00	15,00	21,31	18,00	15,00	21,31	18,00
LT	LTL	*947,00	274,27	18,00	947,00	274,27	18,00	947,00	274,27	18,00	947,00	274,27	18,00

Figure G.1 — European excise duties of kerosene situation as at 2008/01/01

		Kerosene											
		Propellant use			**Industrial/Commercial** use			**Heating** business use			**Heating** non-business use		
		CN 2710 1921, CN 2710 1925 (Article of Directive 2003 /EEC)			CN 2710 1921, CN 2710 1925			CN 2710 1921, CN 2710 1925			CN 2710 1921, CN 2710 1925		
Minimum excise duty adopted by the Council on 27-10-2003 (Dir. 2003/96/EC)		302 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			21 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			0 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)			0 EUR per 1000 litres. (Annex I of Directive 2003/96/EEC)		
MS	Nat Curr	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %	Excise duty NatCurr	Excise duty EUR	VAT %
LU	EUR		302,00	15,00		21,00	15,00		*RDC**	15,00		*RDC**	15,00
HU	HUF	111800,00	444,67	20,00	111800,00	444,67	20,00	111800,00	444,67	20,00	111800,00	444,67	20,00
MT	EUR		*332,40	18,00		332,40	18,00		332,40	18,00		332,40	18,00
					*31,00	72,21	18,00						
					P0	0	18,00						
NL	EUR	<=10 mg/kg* > 10 mg/kg*	376,31 386,62	19,00		**46,56	19,00		**46,56	19,00		**46,56	19,00
AT	EUR		355,00	20,00		355,00	20,00		355,00	20,00		355,00	20,00
PL	PLN	1822,00	483,29	22,00	1822,00	483,29	22,00	232,00	61,54	22,00	232,00	61,54	22,00
PT	EUR		308,04	21,00		308,04	21,00		110,64	12,00		110,64	12,00
RO	RON	1261,742	375,91	19,00	1261,742	375,91	19,00	1261,742	375,91	19,00	1261,742	375,91	19,00
SI	EUR		302,4400	20,00		151,2200	20,00		21,0000	20,00		21,0000	20,00
SK	SKK	14500,00	427,44	19,00	-	-	19,00	-	-	19,00	-	-	19,00
FI	EUR		390,50	22,00		390,50	22,00		390,50	22,00		390,50	22,00
SE	SEK	Class 1 4160,00	452,47	25,00	3647,00	396,67	25,00	3647,00	396,67	25,00	3647,00	396,67	25,00
		Class 2 4413,00	479,99	25,00									
		Class 3 4546,00	494,45	25,00									
UK	GBP	503,50	722,02	17,50	*96,90	138,95	17,50	0	0	17,50	0	0	17,50

Figure G.1 — European excise duties of kerosene situation as at 2008/01/01 (*continued*)

Annex H
(informative)

Excise duty for LHO

This Annex gives details on the Member States' excise duties for both non-business and business use.

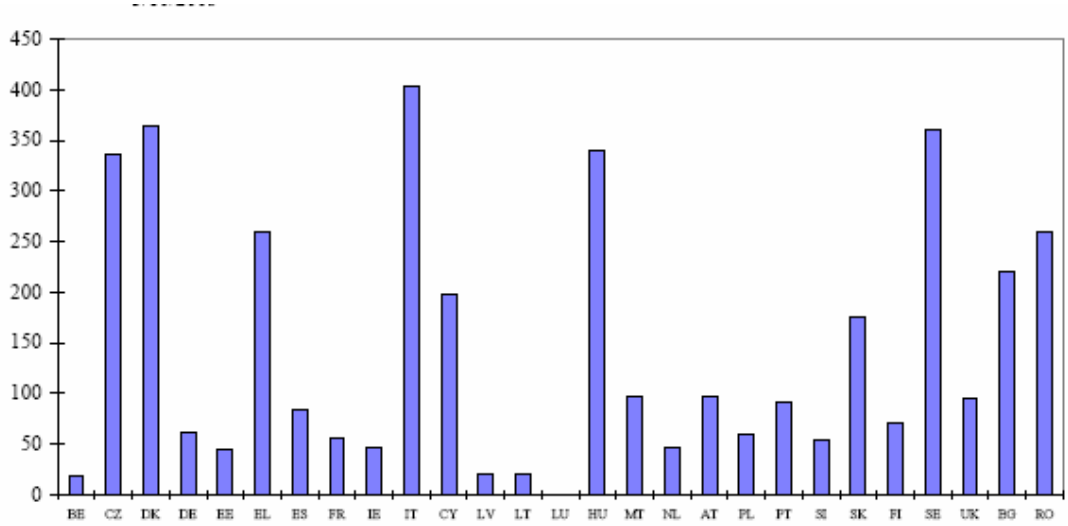

Figure H.1 Excise duties for EU 27 in Euro at 2005-10-03 for non-business use

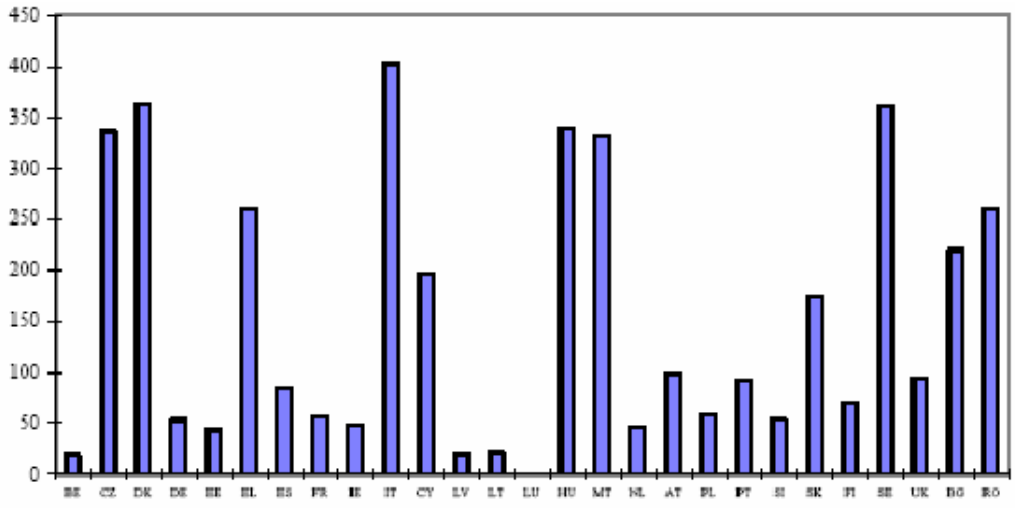

Figure H.2 Excise duties for EU 27 in Euro at 2005-10-03 for business use

Annex I
(informative)

Gas oil quality specification

Table I.1 show the Intercontinental Exchange (ICE) product specification which is common use. Mostly ASTM test methods are defined in this specification, but European alternatives are indicated in italics where available.

Table I.1 — Intercontinental Exchange (ICE) product specification

Specification	Units	Limits	Test method
Density at 15 ºC	kg/litre	max 0,860 min. 0,820	ASTM D 1298 / *EN ISO 3675* (in a vacuum), or ASTM D 4052 (in a vacuum)
Distillation evaporated at 250º C evaporated at 350º C	% (*V/V*)	 max. 65 min. 85	ASTM D 86 / *EN ISO 3924*
Colour		max 2,0	ASTM D 1500
Flash Point, Pensky Martens closed cup	ºC	min. 55	ASTM D 93 / *EN ISO 2719*
Total sulfur	% (*m/m*)	max 0,10	ASTM D 1552 , ASTM D 2622, ASTM D 4294, EN ISO 8754
Kinematic viscosity	cSt at 20ºC	max 6,0	ASTM D 445 / *EN ISO 3104*
Cloud point	ºC	max + 3	EN 23015
Cold filter plugging point	ºC if cloud point ≤ 3 °C if cloud point ≤ 2 °C if cloud point ≤ 1 °C	 ≤ -12 °C ≤ -11 °C ≤ -10 °C	EN 116
Oxidation stability	mg/100 ml	max. 3	ASTM D 2274 / *EN ISO 12205*
Cetane index		min. 45	ASTM D 976/80 / *EN ISO 4262*
Sediment	mg/kg	max. 24	DIN 51419
Water	mg/kg	max. 200	ASTM D 1744
Strong acid number	mg KOH/g	max. 0,1	ASTM D 974 / *ISO 6618*
Halogenated hydrocarbons	mg/kg	not detected	DIN 51577-3

Bibliography

[1] Summary of fuel specifications, volumes and distribution systems, 2001, CONCAWE, report of Non-Road Fuels Task Force.

[2] EN 590:2004, Automotive fuels - Diesel - Requirements and test methods.

[3] EN 267:1999, Automatic forced draught burners for liquid fuels.

[4] Proidl, H; Sattler, M; Demand for Medium Distillates in the European Union, Austrian Energy Agency, Vienna, Sept. 2006.

[5] Statistic Norway, Norsk Petroleuminstitutt, www.np.no/ktml2/files/uploads/Engelsk%20Statistikk/Oil%20product%20demand.xls.

[6] Energy Information Administration, International Energy Outlook 2006, Report: DOE/EIA-0484(2006), June 2006, www.eia.doe.gov/oiaf/ieo/enduse.html.

[7] Council of the European Union, Council Conclusions on Biomass, 2735th Transport, Telecommunications and Energy Council Meeting, Luxemburg, 8-9 June 2006.

[8] Eco-design of Boilers & Combi-boilers, http://www.ecoboiler.org/

[9] ASTM D 1655: Standard Specification for Aviation Turbine Fuels

[10] ISO 8217:2005, Petroleum products - Fuels (class F) - Specifications of marine fuels

[11] EN 14214:2003, Automotive fuels - Fatty acid methyl esters (FAME) for diesel engines - Requirements and test methods

[12] EN 14213:2003, Heating fuels - Fatty acid methyl esters (FAME) - Requirements and test methods

[13] ASTM D 6751: Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels

[14] The need for European Standard for liquid and gaseous alternative fuels, December 2004, report of CEN/BT WG 149, available from CEN, Rue de Stassart 36, Brussels, Belgium.

[15] ASTM D 396, Standard Specification for Fuel Oils.

[16] Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulfur content of certain liquid fuels and amending Directive 93/12/EEC of 22 March 1993 relating to the sulfur content of gas oil

[17] Council Directive 95/60/EC of 27 November 1995 on fiscal marking of gas oils and kerosene

[18] Commission Decision 2001/574/EC of 13 July 2001 establishing a common fiscal marker for gas oils and kerosene (notified under document number C(2001) 1728)

[19] Commission Decision 2006/428/EC of 22 June 2006 establishing a common fiscal marker for gas oils and kerosene (notified under document number C(2006) 2383)

[20] Council Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity

[21] *Directive 2003/17/EC of the European Parliament and of the Council of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC*

[22] *Council Directive 2004/74/EC of 29 April 2004 amending Directive 2003/96/EC as regards the possibility for certain Member States to apply, in respect of energy products and electricity, temporary exemptions or reductions in the levels of taxation*

[23] *Corrigendum to Council Directive 2004/74/EC of 29 April 2004 amending Directive 2003/96/EC as regards the possibility for Cyprus to apply, in respect of energy products and electricity, temporary exemptions or reductions in the levels of taxation* (OJ L 157, 30.4.2004).

[24] Excise Duty Tables, Ref 1.023, July 2006, established by directive 2003/96/EC, http://ec.europa.eu/taxation_customs/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties-part_II_energy_products-en.pdf.

[25] *Verordnung über die Lenkungsabgabe auf "Heizöl Extraleicht" mit einem Schwefelgehalt von mehr als 0,1 Prozent (HELV)*, 12.11.1997, http://www.admin.ch/ch/d/sr/8/814.019.de.pdf.

[26] *Energy Efficiency In Norway 1990 – 2002*, Institute for Energy Technology, Report based on the ODYSSEE data base on energy efficiency indicators and the MURE database on energy efficiency policy measures with support from SAVE, 2004 p 8-9, http://www.odyssee-indicators.org/Publication/PDF/norway_r04.pdf.

[27] *Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings*

[28] EN 590:1993, *Automotive fuels - Diesel - Requirements and method of test*.

[29] NBN T 52-716:2004, *Petroleum products - Domestic heating fuel – Specification*s.

[30] ICE Gas oil Futures Contract, https://www.theice.com/publicdocs/Gas_Oil_futures_contract_specification.pdf.

[31] DIN 51 603-1:2003, Liquid fuels - Fuel oils - Part 1: Fuel oils EL; Specifications.

[32] *EXCISE DUTY TABLES, Part II – Energy products and Electricity*, REF 1.026 rev.1, January 2008, http://ec.europa.eu/taxation_customs/index_en.htm

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