

Quality Protocol

Processed Fuel Oil (PFO)

End of waste criteria for the production and use of processed fuel oil
from waste lubricating oils



This Quality Protocol was funded by Defra and the Welsh Assembly Government (WAG) as a business resource efficiency activity. It was developed by the Environment Agency and WRAP (Waste & Resources Action Programme) in consultation with Defra, WAG, industry and other regulatory stakeholders. The Quality Protocol is applicable in both England and Wales. It sets out end of waste criteria for the production and use of processed fuel oil from waste lubricating oils.

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Foreword

Background

Uncertainty over the point at which waste has been fully recovered and ceases to be waste within the meaning of Article 1(1)(a) of the EU Waste Framework Directive (2006/12/EC) has inhibited the development and marketing of materials produced from waste which could be used beneficially without damaging human health and the environment. In some cases, this uncertainty has also inhibited the recovery and recycling of waste and its diversion from landfill.

Interpretation of EU legislation is ultimately a matter for the courts and there is now a substantial body of case law on the interpretation of the definition of waste in Article 1(1)(a) of the Waste Framework Directive. Drawing on the principles established in this case law, it is possible to identify the point at which certain wastes cease to be waste and thus when the Waste Framework Directive's waste management controls no longer apply. This identification is the purpose of the Waste Protocols Project.

More specifically, depending on the circumstances of the waste concerned, the project seeks to achieve the following outcomes:

- to produce a Quality Protocol identifying the point at which waste, having been fully recovered, may be regarded as a non-waste product that can be either reused by business or industry, or supplied into other markets, enabling it to be used without the need for waste management controls; and/or
- to produce a statement that confirms to the business community what waste management controls they must comply with.

Following the Court of Appeal judgement in *OSS Group Ltd v Environment Agency* (2007) the Court suggested that Defra and the Environment Agency should provide practical guidance for those affected on what it referred to as "the end of waste test"¹.

The Environment Agency decided that this guidance should take the form of a Quality Protocol, and established a Technical Advisory Group comprising relevant industry specialists and Government departments to examine this issue fully and provide the basis for such guidance. The methodology used was to be analogous to that applied to previous Quality Protocols produced by the Waste Protocols Project.

What is a Quality Protocol?

A Quality Protocol sets out end of waste criteria for the production and use of a product from a specific waste type. Compliance with these criteria is considered sufficient to ensure that the fully recovered product may be used without undermining the effectiveness of the Waste Framework Directive and therefore without the need for waste management controls. In addition, a Quality Protocol indicates how compliance may be demonstrated and points to good practice for the use of the fully recovered product.

The Quality Protocol further aims to provide increased market confidence in the quality of products made from waste and so encourage greater recovery and recycling.

¹The appeal concerned the limited question '...whether a lubricating oil, thus not originally used as a fuel, which becomes waste can thereafter be burnt other than as waste...'. The conclusion was that, in order for a waste to cease to be waste 'it should be enough that the holder has converted the waste material into a distinct, marketable product, which can be used in exactly the same way as an ordinary fuel, and with no worse environmental effects'.

1. Introduction

1.1 What is this Quality Protocol?

- 1.1.1 This Quality Protocol has been developed by *WRAP (Waste & Resources Action Programme)* and the *Environment Agency* in consultation with industry and other regulatory stakeholders. It is applicable in both England and Wales.
- 1.1.2 This Quality Protocol sets out end of waste criteria for the production and use of *processed fuel oil* (PFO) from *waste lubricating oils* (WLO). If these criteria are met, PFO will normally be regarded as having been fully recovered and to have ceased to be waste because:
- it has been converted into a distinct, marketable product;
 - it can be used in exactly the same way as the relevant virgin equivalent; and
 - it can be used with no worse environmental effects than that equivalent.
- 1.1.3 *Producers* and *users* are not obliged to comply with the Quality Protocol. If they do not, the fuel oils they produce will normally be considered to be waste and *waste management controls* will apply to their handling, transport and use. Furthermore, the Waste Incineration Directive will apply to their combustion.
- 1.1.4 Producers of PFO should note that this Quality Protocol does not affect the obligation to hold an *environmental permit* and comply with all of its conditions to store and process waste lubricating oils.
- 1.1.5 Producers of PFO should also note that by producing a fully recovered product they may be subject to further legal obligations, e.g. the registration of substances under REACH².

1.2 The purpose of the Quality Protocol

- 1.2.1 This Quality Protocol has four main purposes:
- i. to clarify the point at which PFO ceases to be waste and waste management controls, including the Waste Incineration Directive's controls, are no longer required;
 - ii. to provide users with confidence that the PFO they purchase conforms to an *approved standard*;
 - iii. to provide users with confidence that the PFO is suitable for use; and
 - iv. to protect human health and the environment.

1.3 Complying with the Quality Protocol

- 1.3.1 PFO will normally be regarded as having ceased to be waste, and therefore no longer subject to waste management controls, including the Waste Incineration Directive's controls, provided it:
- requires no further processing before use;
 - has been produced using only those input materials specified in Section 2; and
 - meets the requirements of an approved standard (see Section 2).
- 1.3.2 Producers must demonstrate that these criteria have been met. They will do this in the ways set out in Section 3, which include maintaining records.

²Waste is exempted from REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) (Regulation (EC) No 1907/2006) as it is covered by separate waste management controls. However, once waste has been fully recovered and ceases to be waste, waste management controls cease to apply and REACH may apply instead at that point. Unless specifically exempted (e.g. because a substance has already been registered), producers may need to register substances recovered from waste and placed back on the market and make available appropriate hazard and safety information, for example a suitable safety data sheet.

- 1.3.3 This Quality Protocol will be adopted as a technical regulation under *Technical Standards and Regulations Directive 98/34/EC* as amended³. We recognise that there may be codes of practice or standards which apply in *European Economic Area (EEA)* states other than the UK setting out requirements for the production and use of waste lubricating oil-derived fuels. We accept that waste lubricating oil-derived fuels may cease to be waste provided they have been produced in compliance with:
- a relevant standard or code of practice of a national standards body or equivalent body of any EEA State; or
 - any relevant international standard recognised for use in any EEA State; or
 - any relevant technical regulation with mandatory or de facto mandatory application for marketing or use in any EEA State.

These must provide levels of product performance and protection of human health and the environment which are equivalent to those required in this Quality Protocol.

- 1.3.4 An outline of the main stages and control mechanisms of the Quality Protocol is presented in Figure 1. These are described further in Sections 2 and 3.

1.4 When Quality Protocol compliant material may become waste

- 1.4.1 Producers and users of PFO should note that, even if the Quality Protocol is complied with, the material may become waste again and subject to waste management controls if it is at any stage:

- discarded or disposed of; or
- stored indefinitely with little prospect of being used.

- 1.4.2 In addition, if Quality Protocol compliant materials are mixed with waste materials, the resulting mix will be considered to be a waste and subject to waste management controls. However, if Quality Protocol compliant materials are mixed with other non-waste materials the resulting mix will not, as a result of this, be waste.

1.5 Failure to comply with the Quality Protocol

- 1.5.1 Where this Quality Protocol is not complied with, for example the PFO does not meet an approved standard, or the producer cannot demonstrate evidence of compliance, the PFO will normally be considered to be waste. In such circumstances, the producer or user must comply with the appropriate waste management and Waste Incineration Directive controls for the transportation, storage and use of the PFO and may be committing an offence if they do not do so.
- 1.5.2 Detailed guidance on waste management controls and the Waste Incineration Directive can be obtained from the Environment Agency's National Customer Contact Centre on 08708 506 506 or from its website (<http://www.environment-agency.gov.uk/subjects/waste/>)

³The Technical Standards and Regulations Directive 98/34/EC seeks to ensure the transparency of technical regulations and is intended to help avoid the creation of new technical barriers to trade within the European Community.

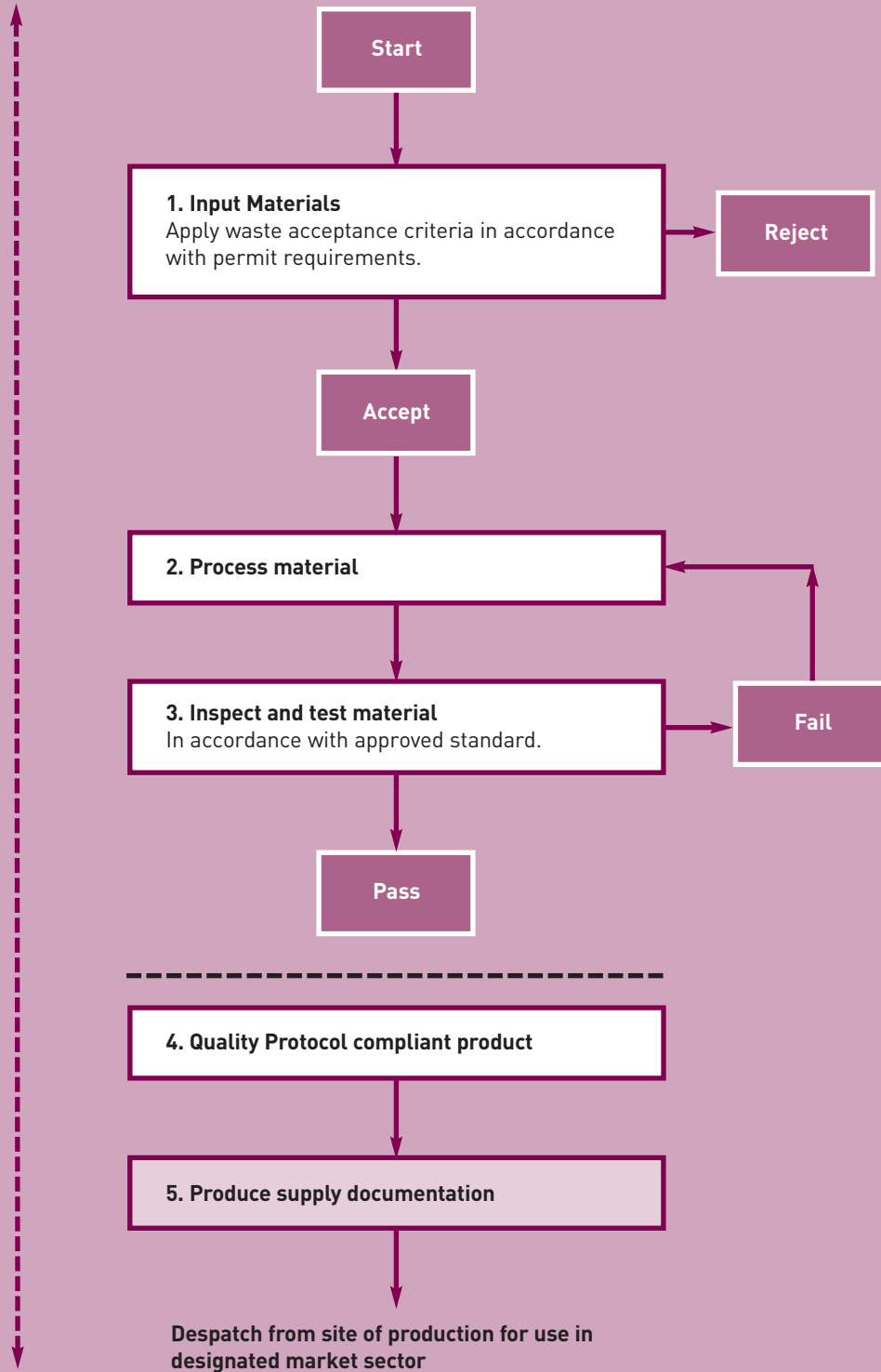
1.6 Updating the Quality Protocol

- 1.6.1 We plan to review and update this document every two years from the date of final publication.
- 1.6.2 However, this document may be subject to change before the review dates. Triggers for change could include:
- pollution incidents;
 - a change in the market;
 - a change in legislation or case law; and
 - a shift in the chemical composition or physical properties of waste lubricating oil inputs.
- 1.6.3 This Quality Protocol may be withdrawn if it becomes apparent that it is generally being misapplied and/or misused.

1.7 Importing and exporting Quality Protocol compliant material

- 1.7.1 Producers intending to export Quality Protocol compliant material should be aware that, although the material may cease to be waste in England and Wales, the country of destination may take a different view. Under the Waste Shipment Regulation (EC/1013/2006), if the competent authority in the country of destination considers the material to be waste, the controls specified in that Regulation will apply to the shipment.
- 1.7.2 Producers intending to import Quality Protocol compliant materials to England and Wales should be aware that if the country of dispatch regards the material as waste the controls set out in the Waste Shipment Regulation will apply to the shipment, even though the material may be regarded as having ceased to be waste in England and Wales.
- 1.7.3 As such it is prudent to check with the competent authority for the country of despatch or destination before importing or exporting PFO. A list of the relevant European competent authorities can be found at http://ec.europa.eu/environment/waste/shipments/pdf/list_competent_authorities.pdf?lang=_e

Figure 1 Main stages and control mechanisms of the Quality Protocol



Key
 Point at which material ceases to be waste

 Records management required
 <----->

2. Producing processed fuel oil from waste lubricating oils

2.1 Regulating the production process

2.1.1 The process of turning WLO into PFO is classified as a waste recovery operation and is subject to the waste management controls in the Waste Framework Directive and domestic legislation. This Quality Protocol does not affect the obligation by producers to hold an environmental permit that authorises the storage and processing of WLO and to comply with its conditions.

2.2 Criteria for producing PFO that has ceased to be waste

2.2.1 To comply with this Quality Protocol PFO must require no further processing before use. To do this the criteria outlined in Sections 2.3 and 2.4 must be met.

2.3 Input materials

2.3.1 The PFO must be produced using only those input materials specified in Appendix B of this Quality Protocol.

2.3.2 The waste lubricating oil processor should be mindful of the required standard for the processed fuel oil product when accepting waste lubricating oil as there will be limitations to what the process can achieve and therefore accept as feedstock. Appendix B therefore represents the minimum *acceptance criteria*.

2.4 Processed in accordance with the approved standards

2.4.1 The producer must comply with all the requirements of the approved standards. Appendix C lists the approved standards at the time of publishing this Quality Protocol. Additional standards may be approved by the Environment Agency for inclusion in this Quality Protocol when it is reviewed. Standards will be approved only if they contain the important elements set out in Appendix C.

2.4.2 Producers should be aware that the approved standards are subject to regular review and should ensure they comply with the latest version.

2.5 Additional customer specifications

2.5.1 In addition to the criteria set in Sections 2.3 to 2.4, a customer may also request additional requirements for the PFO to meet.

3. Providing evidence of compliance with the Quality Protocol

- 3.1 Producers must be able to demonstrate compliance with the requirements of this Quality Protocol.
- 3.2 Some of the specified records may already be required as part of the producer's environmental permit conditions. This Quality Protocol does not affect the obligations on producers to comply with the environmental permit conditions and requirement of the hazardous waste regulations.

3.3 Records management

- 3.3.1 Records must be kept of all incoming wastes intended for the purpose of producing PFO. As a minimum, a record of each load delivered to site must be kept giving:
 - date of receipt;
 - *European Waste Catalogue (EWC)* code and description;
 - place of origin (where known);
 - hazardous waste consignment note code;
 - quantity by weight/volume;
 - description to show that it is suitable for the process (see Section 2);
 - carrier's name and contact details;
 - supplier's name and contact details; and
 - whether the load was accepted.
- 3.3.2 Testing of PFO must be undertaken in accordance with the approved standards as outlined in Appendix C. Producers should retain records of all inspection and testing carried out for compliance with the approved standards.
- 3.3.3 Producers should also retain records of each sale or supply of PFO. This *supply documentation* must include the following elements:
 - date of supply;
 - customer's name, contact details and nature of business;
 - producer's name and contact details (including address of processing site);
 - intended use (see Section 4);
 - quantity supplied by weight/volume;
 - the approved standard with which the PFO supplied complies;
 - a statement that the PFO was produced in compliance with this Quality Protocol; and
 - information on good practice relating to the storage, transportation and use of PFO.
- 3.3.4 These requirements are additional to any statutory record-keeping obligations. However, some records may be used to fulfil both a regulatory obligation and evidence of compliance with the Quality Protocol.
- 3.3.5 For the purposes of this Quality Protocol the producer must keep and retain specified records for a minimum of four years.

4. Use of processed fuel oil

- 4.1 The purpose of this Quality Protocol is to clarify when fuels derived from WLO can cease to be waste. Any reference to BS2869:2006 or any other standard is made only in this context. This Quality Protocol is not guidance on PFO's suitability for use or indicative of performance in any particular application, appliance or equipment.
- 4.2 To comply with this Quality Protocol the PFO must comply with the appropriate standard in Appendix C.
- 4.3 Appendix C distinguishes between *distillate oil* (e.g. gas-oil) *equivalent* and *residual oil* (e.g. heavy fuel oil (HFO)) *equivalent*. A WLO derived fuel that meets all the given criteria for a distillate oil equivalent can be sold or supplied for use in any application where virgin oil use is allowed and appropriate.
- 4.4 A WLO derived fuel that meets all the given criteria for a residual oil equivalent can only be sold or supplied for use in any application where it is a direct substitute for a residual oil (e.g. HFO), i.e. it cannot be used where the use of HFO is not allowed or appropriate.

4.5 Fuels manufactured from waste

- 4.5.1 PFO is a 'fuel manufactured from waste' and its combustion will therefore be regulated under Section 1.1 of Part 2 of Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2007 (EPR).

Appendix A Definitions

In this Quality Protocol, the words and phrases below have the following meanings.

Term	Description
Acceptance criteria	Written procedures that set out the process for identifying types and quality of waste which may be accepted as an input to the production process. The process for rejecting loads will also be included in acceptance criteria.
Approved standard	The standards listed in Appendix C and any other standard approved by the Environment Agency for inclusion in this Quality Protocol.
Distillate oil equivalent	A petroleum distillate product meeting the standard set out in BS2869:2006, Class D fuel and the additional parameters set out in Appendix C of this Quality Protocol.
European Economic Area (EEA)	The EEA States consist of the members of the EU (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK) together with Iceland, Liechtenstein, Norway and Switzerland. Although the Channel Islands and the Isle of Man are part of the UK, they are not part of the EU and businesses registered there are subject to different licensing legislation.
Environment Agency	The Environment Agency is the leading public body for protecting and improving the environment in England and Wales. Its job is to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.
Environmental permit	<p>Environmental permits issued or exemptions registered under the Environmental Permitting (England and Wales) Regulations 2007, which came into force on 6 April 2008, or a position adopted by the Environment Agency in accordance with its guidance on the regulation of low-risk activities.</p> <p>From 6 April 2008, the following automatically became environmental permits:</p> <ul style="list-style-type: none"> ■ PPC permits issued under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended); and ■ Waste Management Licences (WMLs) issued under the Environmental Protection Act 1990 (as amended). <p>Exemptions from the need for a Waste Management Licence, registered under Regulation 18 and Schedule 3 of the Waste Management Licensing Regulations 1994 (as amended) will now come under Schedule 3 of the Environmental Permitting (England and Wales) Regulations 2007.</p>
European Waste Catalogue (EWC)	European Waste Catalogue (EWC 2002 and amendments) - comprehensive list of waste codes and descriptions based on waste source and type.
Producer(s)	The operators who undertake the production process.
Processed fuel oil (PFO)	Waste lubricating oil that has been processed in accordance with this Quality Protocol.
Residual oil equivalent	A residual petroleum product meeting the standard set out in BS2869:2006, Class E, F or G fuel and the additional parameters set out in Appendix C of this Quality Protocol.

Term	Description
Supply documentation	Records of who the processed fuel oil is supplied to, including the documentation accompanying each load or consignment of processed fuel oil. It will detail the chosen standard to which the product complies and states that the processed fuel oil was produced in conformance with this Quality Protocol.
Technical Standards and Regulations Directive 98/34/EC	Seeks to ensure the transparency of technical regulations and is intended to help avoid the creation of new technical barriers to trade within the European Community.
User(s)	The individuals or organisations that obtain processed fuel oil from a producer complying with this Quality Protocol.
Waste management controls	Controls under legislation that govern the treatment, handling, containment and storage of waste.
Waste lubricating oil(s)	Refers to any waste lubricating oil or other oils suitable for recovery as a mineral oil type fuel substitute, as set out in the European Waste Catalogue (attached as Appendix B).
WRAP (Waste & Resources Action Programme)	WRAP's vision is a world without waste, where resources are used sustainably. We work with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way.

Appendix B Description of waste lubricating oils that are acceptable inputs for the production of PFO

Acceptable inputs for the production of PFO	
Waste type (EWC code) ⁴	Description
12	Wastes from shaping and physical and mechanical surface treatment of metal and plastics
12 01	Wastes from shaping and physical and mechanical surface treatment of metals and plastics
12 01 07*	Mineral based machining oils free of halogens (except emulsions and solutions)
12 01 10*	Synthetic machining oils
12 01 19*	Readily biodegradable machining oil
13	Oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19)
13 01	Waste hydraulic oils
13 01 10*	Mineral based non-chlorinated hydraulic oils
13 01 11*	Synthetic hydraulic oils

⁴Each waste type is assigned a six digit EWC code made up of three, two digit sub-codes. Acceptable inputs are only those specific waste types listed, as identified by a full six digit EWC code. The first two digit sub-code (EWC chapter) describes the type of process and the second two digit sub-code (EWC sub-chapter) describes the industry or sector from which a waste type arises. Two and four digit sub-codes are shown for information purposes only.

* indicates that the waste type is considered to be hazardous waste.

Waste type (EWC code)⁴	Description
13 01 12*	Readily biodegradable hydraulic oils
13 01 13*	Other hydraulic oils
13 02	Waste engine, gear and lubricating oils
13 02 05*	Mineral-based non-chlorinated engine, gear and lubricating oils
13 02 06*	Synthetic engine, gear and lubricating oils
13 02 07*	Readily biodegradable engine, gear and lubricating oils
13 02 08*	Other engine, gear and lubricating oils
13 03	Waste insulating and heat transmission oils
13 03 07*	Mineral-based non-chlorinated insulating and heat transmission oils
13 03 08*	Synthetic insulating and heat transmission oils
13 03 09*	Readily biodegradable insulating and heat transmission oils
13 03 10*	Other insulating and heat transmission oils
13 04	Bilge oils
13 04 01*	Bilge oils from inland navigation
13 04 02*	Bilge oils from jetty sewers
13 04 03*	Bilge oils from other navigation
13 05	Oil/water separator contents
13 05 02*	Sludges from oil/water separators
13 05 03*	Interceptor sludges
13 05 06*	Oil from oil/water separators
13 05 08*	Mixtures of wastes from grit chambers and oil/water separators
13 07	Wastes of liquid fuels
13 07 01*	Fuel oil and diesel
13 07 03*	Other fuels (including mixtures)
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
19 02	Wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 07*	Oil and concentrates from separation
20	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
20 01	Separately collected fractions (except 15 01)
20 01 26*	Oil and fat other than those mentioned in 20 01 25

Appendix C Standards and specifications to which this Quality Protocol applies

Waste lubricating oil may be processed into a replacement fuel for either distillate oil or residual fuel oil.

Producers of processed fuel oil (PFO) must have the facility to analyse the PFO for all test parameters specified, in UKAS accredited laboratories (either in-house or by contract laboratories).

Samples must be analysed by producers of each batch; if additions are made to a batch tank then it becomes a new batch and should be re-analysed. Loads should not be despatched until the supplier's analysis is known.

Where alternative sampling and testing regimes are submitted by producers that can be demonstrated to meet the standards of the Quality Protocol, these will be considered by the Environment Agency on a site by site basis.

C1 Standard for a distillate oil equivalent

The starting-point for a non-waste distillate oil equivalent fuel is to meet the parameters set in the most up to date version of the British Standard (BS2869:2006) for class D fuels, with the exception of viscosity. In addition to these parameters, the distillate oil equivalent must also be analysed for total halogens expressed as chlorine, and metals and their compounds. The test methods which should be used and the acceptable limits are as detailed in Table 1 below.

Table 1 Specification for a distillate oil equivalent

Property	Units	Limit max.	Test method
Total halogens , as chlorine	mg/kg	5	IP 503
PCBs	mg/kg	5	IP 462
Metals	mg/kg		
Mercury		5	IP PM DZ*
Lead		5	IP PM ED*
Nickel		5	
Chromium		5	
Copper		5	
Zinc		5	
Arsenic		5	
Cadmium		5	
Thallium		5	
Antimony		5	
Cobalt		5	
Manganese		5	
Vanadium		5	

* Proposed test methods, the precision of which will be determined before publication

All of the above values are maximum values.

C2 Standard for a residual oil equivalent

The starting-point for a non-waste residual oil equivalent is to meet the parameters set in the most up to date version of the British Standard (BS2869:2006) for Class E or F or G fuels, with the exception of viscosity. In addition to these parameters the PFO must also be tested for total halogens expressed as chlorine, and metals and their compounds, using standard test methods. The limit for sulphated ash content contained in Table 2 below should be referred to rather than that contained in the British Standard. All of the additional parameters which must be analysed, the test methods and acceptable limits, are detailed in Table 2 below.

Table 2 Specification for a residual oil equivalent

Property	Units	Limit max.	Test method
Sulphated ash content	% (m/m)	0.20	IP 550
Total halogens , as chlorine	mg/kg	150	IP 503
PCBs	mg/kg	5	IP462
Metals	mg/kg		
Mercury		5	IP PM DZ*
Lead		25	IP PM EB*
Nickel		5	
Chromium		5	
Copper		40	
Zinc		300	
Arsenic		5	
Cadmium		5	
Thallium		5	
Antimony		5	
Cobalt		5	
Manganese		5	
Vanadium		5	

* Proposed test methods, the precision of which will be determined before publication

All of the above values are maximum values.

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