



## Waste Classification

Guidance on the classification and assessment of waste  
(1st edition 2015)

Technical Guidance WM3

ESTRATTO RELATIVO ALLE DETERMINAZIONI SUGLI IDROCARBURI



## 4. Waste oils and other wastes containing or contaminated with oil

This example applies to waste oils and any waste containing or contaminated with oil. It does not apply to edible oils (e.g. 20 01 25), or to pure biodiesel (i.e. biodiesel that is known not to be blended or contaminated with conventional fuel). Biodiesel means vegetable oil or animal fat based diesel fuel consisting of long chain alkyl esters.

### Introduction

The term 'Oil' covers many substances or mixtures including the broad use of mineral based fuels and lubricants, food or animal feeds and a range of other types. This example is focused upon mineral and hydrocarbon oils derived from petroleum resources. It is divided into two separate sections:

- Waste mineral oils (predominately oils, liquid fuels and lubricants, including synthetic oils and waste oil separator contents).
- Wastes, other than waste oils, that contain or are contaminated with oil (i.e. where the oil phase is not the predominant substance).

You must use this procedure for two groups set out above. You must not use the procedure set out for other wastes.

Oils are complex mixtures of hydrocarbons. However many of these complex mixtures are classified as a hazardous substance in their own right. Assessment of waste oil must therefore be based on the concentration of the oil substances as a whole. Individual hydrocarbon components are not considered separately.

### 4(a) Waste mineral oils

All waste oils such as fuel oil, diesel, biodiesel, or lubricating oils, etc are legally classified as a hazardous waste, under absolute hazardous entries in the List of wastes. The only two exceptions to this rule are edible oil and in certain circumstances some biodiesel (see scope)

This rule applies to all types of oil regardless of composition, hazardous properties and source. **This means that even a waste oil possessing no hazardous properties must legally be classified as a hazardous waste.**

Waste oil entries can be found in the following chapters of the List of Wastes:

- Chapter 13 Oil Wastes and Wastes of Liquid Fuels (includes all entries)
- Sub-chapters 05 01 wastes from petroleum refining (entries referring to oil only)
- Sub-chapter 12 01 wastes from shaping and physical and mechanical surface treatment of metals and plastics (entries referring to oil only)
- The following specific wastes: 080319\* disperse oil, 190207\* oil and concentrates from separation, 190810\* grease and oil mixture from oil/water separation other than those mentioned in 190809, and 200126\* oil and fat other than those mentioned in 200125

### Assessment of the hazardous properties of waste oil

The hazardous properties (if any) of the oil must be described on the consignment note to accompany its movement.

Often the most accessible and complete source of information on the chemical properties of a specific oil is a Safety Data Sheet. However you should check that these are European and REACH compliant, and are therefore based on the legal classification of the relevant petroleum group in a harmonised entry in the Classification and Labelling Inventory. Marker compounds are not considered in these circumstances.

If you do not have, and cannot obtain, a Safety Data Sheet then you should use the classification for that petroleum group. Note: Harmonised entries for oils in the Classification and Labelling Inventory

are typically incomplete, in that Flammable, Toxic for Reproduction and Ecotoxic properties have not been considered. You will need to consider these in classifying the waste. Marker compounds applicable to the group may be considered in these circumstances. See section 3.3 of this example.

Waste oils are generally considered to display the following hazardous properties:

- HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
- HP 7 Carcinogenic
- HP 14 Ecotoxic

Certain oils may also possess other hazardous properties, for example unleaded petrol (a mixture of gasoline and various additives) is typically HP 3, HP 4, HP 5, HP 7, HP 10, HP 11 and HP 14.

It is important when deciding on the waste's hazardous properties that you consider the chemical changes that could have occurred within the oil once it has been used and become waste.

## 4(b): other wastes containing or contaminated with oil

This example explains how to identify if wastes contaminated with oil display hazardous properties due to the presence of oil. Waste oils themselves are covered in 4(a).

This section considers only the oils contaminating a waste. Where the waste contains other hazardous substances, for example metal compounds or coal tar, these must also be considered. For hazardous properties that add concentrations of different hazardous substances together (for example HP 4, HP 5, and HP 14) the additive procedures from Appendix C must be applied in conjunction with the information below.

The assessment of waste is made according to the procedure set out in chapter 2 of this document. This section provides advice on the assessment of hazardous properties, and would for example determine whether a waste classified under a hazardous/non-hazardous mirror entry in the List of Wastes was hazardous or not due to the presence of oil contamination.

Figure 3.4 is provided to guide you through the criteria, and must be used in conjunction with the supporting text.

### Is the identity of the contaminating oil known or can it be identified?

The simplest scenario is where the identity of the contaminating oil is known, **or** can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment. Some examples are provided in Table 3.4

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Appendix B explains how to identify the classification of hazardous substances. All properties of the oil must be considered. Ecotoxic, Flammable, Mutagenic and Toxic for Reproduction may not be listed in the oil entries.

Diesel Range Organics (DRO) may be present in many oils. Their presence cannot be assumed to mean that diesel is the contaminating oil. However if the analysing laboratory reports that the hydrocarbon profile of the oil as a whole is consistent with diesel, or weathered diesel, then the oil should be considered to be diesel.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Table 3.4 | Example classifications of products from some petroleum groups

Petroleum Group							
Petrol (Gasoline)		Diesel		Heavy/Residual Oils	Fuel	Crude Oils	
Flam. Liq. 1	H224	Flam. Liq. 3	H226	Muta. 1B	H340	Flam. Liq. 2	H225
Skin Irrit.2	H315	Skin Irrit. 2	H315	Carc. 1B	H350	Carc. 1B	H350
Muta. 1B	H340	Acute Tox. 4	H332	Acute Tox. 4	H332	Eye Irrit. 2	H319
Carc. 1B	H350	Carc. 2	H351	Repr. 2	H361d	Asp.Tox. 1	H304
Repr. 2	H361d	Asp.Tox. 1	H304	STOT RE 2	H373	STOT RE2	H373
STOT SE3	H336	STOT RE 2	H373	Aquatic Chronic 2	H411	STOT SE3	H336
Asp. Tox.1	H304	Aquatic Chronic 2	H411			Aquatic Chronic 2	H411
Aquatic Chronic 2	H411						

### If the identity of the oil is unknown and cannot be determined

This is likely to be the case with many wastes, and in particular with contaminated soil and stones. It is important however that all reasonable efforts are made to identify the oil.

For contaminated land specific consideration must be given to the following before proceeding;

- The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as, waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
- The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

Contaminating oil, other than diesel, should be assumed to display the following hazard statements associated with the hazardous properties indicated (unless the actual classification can be determined):

- (HP 3 Flammable)
- H304 & H373 (HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity),
- H340 (HP 11 Mutagenic)
- H350 (HP 7 Carcinogenic)
- H361d (HP 10 Toxic for Reproduction)
- H411 (or R51-53)(HP 14 Ecotoxic)

The assessment of the waste is based on the presence of oil. It considers each of these properties in turn using the Total Petroleum Hydrocarbons (TPH) (C<sub>6</sub> to C<sub>40</sub>) concentration. The bullets below compare the concentration of TPH to the concentration limit concentrations set out in Appendix C for each hazardous property:

- If the concentration of TPH is ≥ 10% the waste will be HP 5\* Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
- If the concentration of TPH is ≥ 3% the waste will be HP 10 toxic for reproduction.
- If the concentration of TPH is ≥ 2.5% the waste will be HP 14\* Ecotoxic.
- If the concentration of TPH is ≥ 0.1% the waste will be HP 7 Carcinogenic **and** HP 11 Mutagenic unless the concentration of benzo-a-pyrene is <0.01% of the concentration of the TPH (this is explained in the following section)

Note \*: HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity and HP 14 Ecotoxic are additive properties. Where other hazardous substances, with hazard statement codes associated with those properties, are present the additive procedures in Appendices C5 and C14 must be followed.

Flammability (HP 3) need only be considered where the oil is at sufficient concentration to make this relevant.

### **Use of Marker Compounds for HP 7 Carcinogenic and HP 11 Mutagenic**

The assessment of HP 7 Carcinogenic and HP 11 Mutagenic follows Appendix C7 and C11 of this document. Markers are used solely to determine if the oil is classified with hazard statement codes H350/H351 (HP 7) and H340/H341 (HP 11) for use in that assessment.

The use of marker compounds is optional. If marker compounds have not been used the oil must be assumed to be carcinogenic and mutagenic. For unknown oil this means that a waste containing  $\geq$  0.1% TPH is hazardous waste.

These markers not applicable to other hazardous properties, for example HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity and HP 14 Ecotoxic.

The use of specific hydrocarbons, for example Polyaromatic Hydrocarbons (PAH or PAC), as markers for carcinogenicity in oil is well established.

This guidance considers the use of markers for HP 7 and HP 11 in two circumstances;

- Wastes contaminated with known oil
- Wastes contaminated with unknown oil and wastes from treatment of oil contaminated waste.

### **Wastes contaminated with known oil (other than from the treatment of oil containing waste)**

Where the identity of the contaminating oil is known, and the oil is classified as carcinogenic or mutagenic on the manufacturer's Safety Data Sheet, marker compounds must not be used for that property. The relevant marker would have been considered in the preparation of the safety data sheet. If the oil is not carcinogenic or mutagenic, and its composition has changed significantly during use, then either the oil should be classified as carcinogenic/mutagenic or the relevant marker should be reassessed.

Where the identity of the contaminating oil is not known, but the petroleum group has been established, then the appropriate marker for that petroleum group may be used unless the oil is diesel or petrol. Marker compounds must not be used for petrol or diesel:

- Diesel is carcinogenic, H351. No marker compounds apply.
- Petrol is carcinogenic H350 unless the identity is known and the safety data sheet for that particular product indicates otherwise.

For oils in other petroleum groups the CLP identifies the following three markers for use in determining the carcinogenic or mutagenic nature of the oil contaminating the waste. Only the marker(s) assigned to that group by the CLP can be used. The oil is not carcinogenic or mutagenic, where indicated by the CLP note(s) assigned to that group, if the:

- **benzene** concentration is less than 0.1% of the of the TPH concentration w/w (mg/kg);
- **1,3-butadiene** concentration is than less 0.1% than of the TPH concentration w/w (mg/kg); and
- substance contains less than **3 %DMSO extract** (relative to TPH concentration) as measured by IP 346 'Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions — Dimethyl sulphoxide extraction refractive index method', Institute of Petroleum, London. (Note: this method is only applicable to hydrocarbon oils and is not suitable where other additives/contaminants may be present)

Where the CLP does not assign a marker to the petroleum group, then markers must not be used for that petroleum group, H350, H351, H340 and H341 are allocated as indicated by that entry.

Markers related to the refining history are not applicable to waste. These would require the identity of the oil to be known, and should already have been determined by the manufacturer and supplier on the Safety Data Sheet.

## Waste contaminated with unknown oil and waste from the treatment of oil contaminated waste.

Markers can only be used for unknown oil where all reasonable efforts have been taken to identify the specific oil or petroleum group. This might include for example site investigation, site history and laboratory analysis. Producers or holders may, as an alternative to such efforts, classify the oil as H350 (HP 7) and H340 (HP 11).

However, where a waste contaminated with known or unknown oil has been subsequently treated by a process that changes the contaminating oil, any oil contaminated residues from that treatment should be assessed as waste contaminated with an unknown oil.

Mixing or blending processes that dilute the concentration of the oil, without treating the oil itself, cannot change a carcinogenic/mutagenic oil to a non-carcinogenic/mutagenic oil

If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:

- the waste contains **benzo[a]pyrene (BaP)** at a concentration of less than 0.01% (1/10,000<sup>th</sup>) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have **not** arisen from petrol or diesel

Where any one of these three criteria is not met the oil should be classified as H350 (carcinogenic) and H340 (mutagenic). Some worked examples are provided below to illustrate this.

TPH concentration (in waste)		Benzo[a]pyrene concentration limit concentration (in waste) (equivalent to 0.01% of TPH concentration)		
0.1%	1000 mg/kg	0.00001%	0.1 mg/kg	100 µg/kg
1%	10,000 mg/kg	0.0001%	1 mg/kg	1000 µg/kg
10%	100,000 mg/kg	0.001%	10 mg/kg	10,000 µg/kg

Figure A3.4 | The assessment of wastes, other than waste oils, containing or contaminated with oil

