ESA 3 - USE AND DESIGN OF OIL SEPARATORS IN SURFACE WATER DRAINAGE SYSTEMS

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Please remember that you have the responsibility to stay up to date with compliance matters and we recommend that you regularly check and review that what you do is in compliance with current legislation. Following good environmental practice will significantly reduce the chances of you causing an environmental incident, which you could be prosecuted for; and/or incur the costs of clean up etc.

Companies who are found to be responsible for a pollution incident may be subject to prosecution if they have not followed best environmental practice; and to the costs of clean up and civil undertakings (e.g. restocking fish).

Following this advice will help you manage your environmental responsibilities, prevent pollution and comply with the law. BSIF provide a series of Environmental Safeguarding Advice documents which we believe you will find useful. These can be downloaded at www.bsif.co.uk/resources

The advice given is based on available information and legislation and its' interpretation by BSIF. BSIF will not accept any direct or indirect liability deriving from following advice or guidance. For access/guidance on the steps you must take as a business to comply with the law by not causing pollution visit www.gov.uk or if your business in based in Scotland or Northern Ireland visit www.netregs.org.uk

The content of this Environmental Safeguarding Advice is recognised by the Environment Agency .

1. INTRODUCTION

This advice will help you decide if you need an oil separator at your site and, if so, what size and type of separator is appropriate. Throughout we use the term 'separator' rather than the term 'interceptor'; these terms have the same meaning and in this advice the word oil means; liquid hydrocarbons that float on water such as diesel, petrol or engine oil. Separators can also be used to contain synthetic oils and vegetable oil that are immiscible with water too. However it should be noted that they don't work on soluble oils, or the soluble fraction added to some fuels.

A. HOW DO OIL SEPARATORS WORK?

Oil separators can be fitted to surface water drainage systems to protect the environment from pollution by oils. They separate the oil from the water and then retain the oil safely until it is removed. Designed to contain oil leaks oil separators need to be correctly designed, installed and maintained to be effective.

B.EXAMPLES OF WHERE SEPARATORS ARE USED

Surface water may be contaminated by oil in a variety of locations. These locations need to have measures in place to prevent oil from polluting the environment.

These sites include, but aren't limited to:

Car parks typically larger than 800m² in area or for 50 or more car parking spaces

Smaller car parks that discharge to a sensitive environment

Areas where goods vehicles are parked and/or manoeuvred

Vehicle maintenance areas

Busier road sections/junctions and interchanges where incidents are more likely to occur

Industrial sites where oil is stored or used

Refuelling facilities

Oil storage tank farms

Trapped gully pots can provide adequate protection for car parks that are too small to justify the installation of a separator, but they must be properly maintained.

You might not need an oil separator if you use 'sustainable drainage systems' (SUDS). The SUDS approach should be used on all sites to minimise the impact of the development on the environment. As the legal requirements for SUDS differ from country to country you should seek clarification relating to the country you are based in. Techniques that control pollution close to the source, such as permeable surfaces or infiltration trenches, can offer a suitable means of treatment for run-off from low risk areas such as roofs, car parks, and non-operational areas. In higher risk areas you might need other SUDS facilities such as constructed ponds, wetlands or swales. Where there is a high risk of oil contamination, it may be better to use an oil separator as part of the SUDS scheme.

If you do need an oil separator, you will need to consider where it will discharge. It is important to speak to your local regulator as early as possible if you plan to discharge to surface water drains, to a watercourse or to the ground, as you might require regulatory consent. In Northern Ireland any discharge from an oil separator will require consent. These consents are not issued automatically and, if allowed a discharge, there might be strict controls on the level of polluting substances in it such as oils. If you install a separator discharging to surface water you will need a Class 1 separator (see Section 3a).

If your separator will discharge to a foul sewer, you must contact your local sewer provider before doing so. For discharges to foul sewer you will need a Class 1 or Class 2 separator (see Section 3a). If your separator will discharge to a surface water sewer that is owned by the sewer provider, you must also contact them before you connect to that sewer.

Drainage from areas such as scrapyards, storage and handling areas for chemicals (solvents, acids etc.), and washing bays are likely to be contaminated with substances other than oil, and should normally drain to the foul sewer with the approval of the sewer provider.

The local sewer provider might require the discharge to have a separator and you must consult them. Discharge from such areas is not suitable for drainage to surface water drains, a watercourse or to the ground.

Drainage containing detergents should not pass to a separator that discharges to surface water because the detergents prevent the separator from working properly.

2. CHOOSING THE RIGHT SEPARATOR

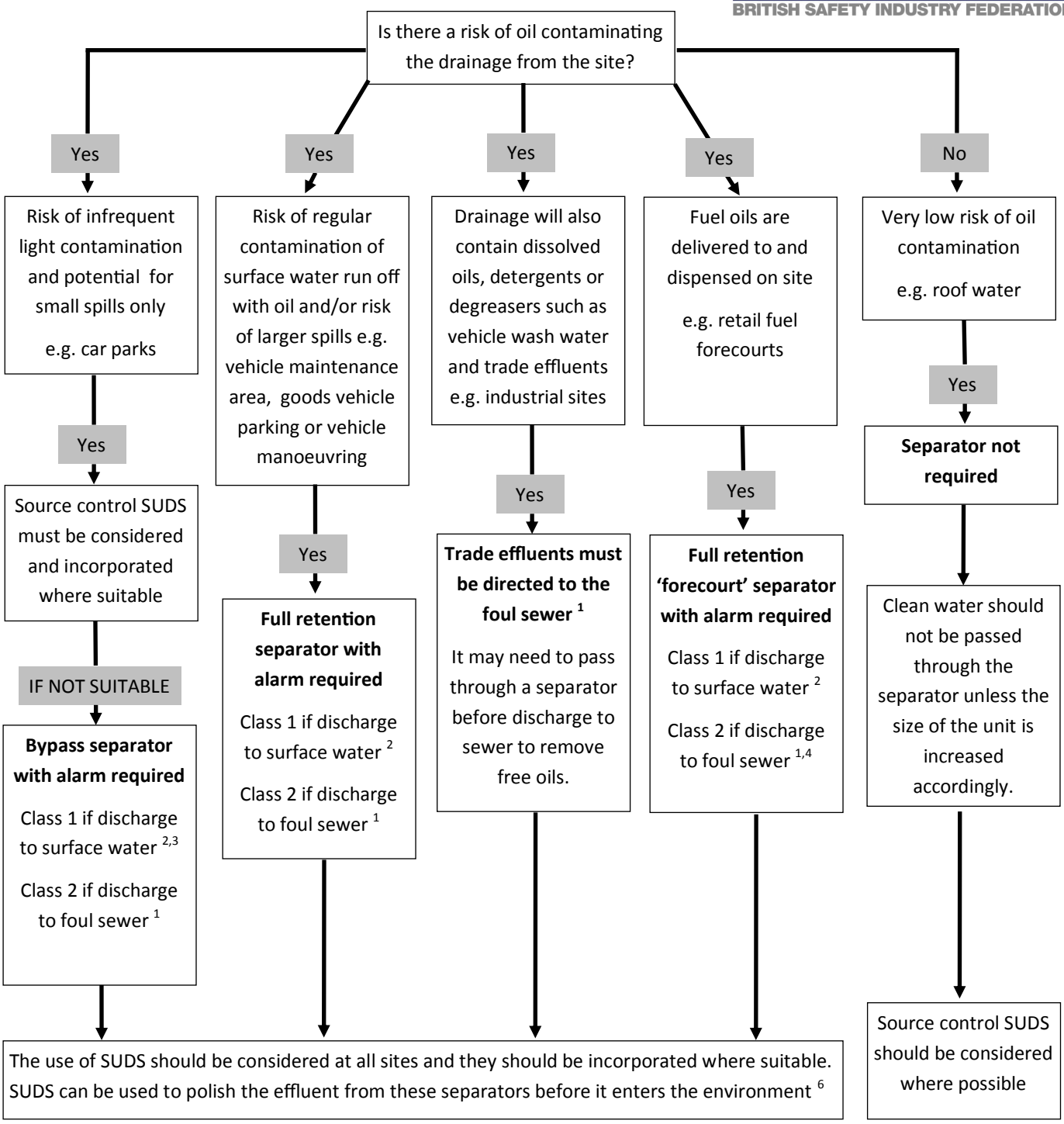
Use the flow chart to help you select the appropriate system for your site. More than one separator might be required on larger sites or a site with many activities. You will need to consider the local circumstances and risk factors including:

- The discharge point of your proposed separator
- The environmental sensitivity of your location
- Activities on your site

The advice is that SUDS should be incorporated into the surface water drainage whenever possible.

NOTES TO ACCOMPANY THE FLOWCHART

1. You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.
2. You must seek prior permission from the regulator before you decide which separator to install.
3. In this case, if it is considered that there is a low risk of pollution a source control SUDS scheme may be appropriate.
4. In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.
5. Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.
6. In certain circumstances, a separator may be one of the devices used in the SUDS scheme.



3. SEPARATOR STANDARDS AND TYPES

The UK has adopted a two-part European Standard (BS EN 858-1:2002 and BS EN 858-2:2003) for the design, use, selection, installation, operation and maintenance of prefabricated oil separators. The Construction Products Regulations require that new prefabricated separators (made off site and then installed) must satisfy certain essential requirements. Demonstration of fulfilment of these requirements can be provided by compliance with the mandated clauses of BS EN 858-1.

A. SEPARATOR CLASSES

BS EN 858 refers to two 'classes' of separator, based on performance under standard test conditions.

Class 1 separators are designed to achieve a discharge concentration of less than 5 mg/litre of oil under standard test conditions. These separators are required for discharges to surface water drains and the water environment. Many Class 1 separators contain coalescing devices, which draw the oil droplets together and facilitate the separation.

- Class 2 separators are designed to achieve a discharge concentration of less than 100 mg/litre of oil under standard test conditions. They are suitable for dealing with discharges where a lower quality requirement applies such as discharges to the foul sewer (but check first with your sewer provider).

Both classes can be produced as 'full retention', 'bypass' or 'forecourt' separators (see below).

The oil concentration limits of 5 mg/litre and 100 mg/litre only apply under standard test conditions. You should not expect separators to always perform within these limits under field conditions. In addition, these levels of oil might be too high in some environmentally sensitive areas to allow the discharge to pass into the water environment without additional treatment.

B. FULL RETENTION SEPARATORS

Full retention separators treat the full flow that can be delivered by the drainage system. The 'full flow' is normally equivalent to the flow generated by a rainfall intensity of 65 mm/hour

Full retention separators are used where there is a risk of regular contamination with oil and a foreseeable risk of significant spillages e.g. vehicle maintenance areas and retail fuel forecourts.

You need to consider the flow rates of potential spillages delivered to the separator from the drainage system and the oil storage volume of the separator needs to be sufficient to retain the entire spillage. See Section 9 for more information about preparing for emergencies.

On large sites, some short-term storage upstream of the separator might be an acceptable means of limiting the flow rate and the size of separator needed. Any surface water stored cannot be pumped through the separator unless the separator is specifically designed to receive pumped inflows and a low-shear, non-emulsifying pump is used.

C. BYPASS SEPARATORS

Bypass separators fully treat all flows, for the area served, generated by rainfall rates of up to 6.5 mm/hour. This covers most rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, e.g. where only small spillages can occur and the risk of spillage is small such as on short stay car parks.

In cases where a large spillage might occur, it is not acceptable to use a by-pass separator. The only exception to this is a major trunk road where the size and type of spillage is impossible to foresee and the surface area drained makes it impractical to provide a full retention separator. For major trunk roads a SUDS approach incorporating a number of SUDS techniques is likely to be more appropriate.

On sites where high levels of silt are likely to enter the separator, the build up of silt must not be allowed to compromise the operation of either the separator or the by-pass device. On such sites (e.g. major trunk roads and quarries) an adequately sized silt separation chamber should be installed upstream of the separator and appropriate management systems put in place to monitor the situation and remove the silt when necessary. The use of SUDS techniques can minimise the amount of silt in the surface water run-off.

D. FORECOURT SEPARATORS

This advice uses the term 'forecourt' to refer to all forms of liquid-fuel dispensing outlets, both retail and non-retail, including those where only diesel is dispensed. A forecourt separator must be a 'full retention' separator, large enough to serve the catchment area of the site and have a sufficient oil storage volume to retain any foreseeable spillages.

It is important to install a forecourt separator of an appropriate size. On a forecourt where tanker deliveries are received, a separator with an oil storage capacity of 7,600 litres will meet the requirements of BS EN 858-2, clause 4.3.6. If a smaller unit is proposed, the size should be determined by undertaking a risk assessment incorporating catchment size, potential spillages during delivery, and other risks such as safety issues. If the compartment size of the tanker that delivers to your site is greater than 7,600 litres your separator should be sized accordingly

4. SEPARATOR SIZE

A. NOMINAL SIZE

Separators are tested in accordance with the standard test procedure in the European Standard. Each separator is allocated a nominal size (NS) on the basis of the test results. Full retention and bypass separators are referred to as NS and NSB, respectively.
The nominal size of a full retention separator that is required for a catchment area (A) is obtained using the following formula:

NS = 0.018 x A (in m2)

For a bypass separator, the formula is:

NSB = 0.0018 x A (in m2)

In addition, capacity for silt storage (C) must be provided for all separators – either as an integral part of the separator or as a separate upstream unit – according to the following:

C (in litres) = NS x 100 or C (in litres) = NSB x 100

Silt capacity for a bypass separator must be provided either upstream of the separator or in the bypass weir chamber, and not in the main oil separating chamber.
Separators must be designed such that when the silt chamber or silt area of the separator is full of silt, this will not affect the operation of the separator, the skim pipe or the by-pass device.

B. OIL STORAGE CAPACITY

The oil storage capacity is defined as the volume of separated oil that can be stored in the separator without any of the stored oil entering the inlet or outlet of the separator. The oil storage volume (V) is given by the following:

V (in litres) = NS x 10 or V (in litres) = NSB x 15

On sites where significant oil spillages are foreseeable, make sure the oil storage capacity is sufficient to retain any such spillage and a separator larger than that identified in Section 4a may be required.

C. MINIMUM SIZE

The minimum working capacity (which excludes any provision for silt deposition) of a separator should be 1,000 litres; though for forecourts, it is likely that risk assessment will indicate the need for a larger separator. For bypass separators, the minimum capacity is defined as the working capacity of the oil separating chamber only.

5. CLOSURE DEVICES AND ALARMS

A. CLOSURE DEVICES

If too much oil is allowed to accumulate inside a separator, it will not work effectively and oil will escape. To avoid this, full retention separators must be provided with an automatic closure device that will prevent flow passing through the separator when the quantity of oil in the separator exceeds the oil storage volume (V).

Also, during emptying or maintenance the separator should be isolated to prevent the escape of waste oil. Open all isolation valves when the operation is complete.

Do not fit automatic closure devices to bypass separators unless they have been designed specifically to operate on such separators. If the automatic closure device is activated the operator should be alerted by a high level alarm so that immediate maintenance can be carried out.

B. AUTOMATICWARNING DEVICES/ALARM SYSTEMS

Separators must be provided with a robust device to provide visual and audible warning (if necessary to a remotely located supervisory point) when the level of oil reaches 90 per cent of the oil storage volume (V) under static liquid level conditions. This automatic warning device indicates that the separator is in need of immediate emptying for it to continue to work effectively. Also, as the build up of silt will prevent the separator from working effectively, we recommend that you install a silt level alarm or another suitable device in your separator to alert you to the build-up of excessive levels of silt. In many cases, oil and silt alarms can be fitted to an existing separator. Silt alarms are most useful on those sites where high volumes of silt are likely to enter the separator, such as quarries, builder's yards and major trunk roads.

Further equipment can be fitted to the separator, alongside a closure device and warning device, to alert the site operator to the routine maintenance requirements of the separator. This equipment might, for example, indicate when the next inspection is due and such 'separator management systems' will ensure that the separator continues to receive the appropriate level of attention.

Any electrical device used within a separator or used to monitor sensors placed within a separator must be intrinsically safe and certified to a suitable explosion protection standard. The location of the monitoring device, such as the alarm or 'separator management system' control panel, must be located within a safe area and conform to the requirements of BS EN 60079-10. For this reason it is important to always use qualified technicians who are familiar with the installation, calibration and servicing of intrinsically safe equipment. Regular maintenance and testing of equipment is essential.

6. INSTALLATION AND LABELLING

A. MANUFACTURING AND QUALITY STANDARDS

Any clean water should enter the drainage system downstream of the separator. If any clean water is drained through your separator, you will need to consider this extra water volume when selecting the separator type and size.

If the discharge for the separator is subject to the controls of a permit to discharge, a sampling chamber will be required downstream of the separator, to allow representative samples to be taken.

Provide separators with sufficient access points to allow for the inspection and cleaning of all internal chambers. Keep access to the separator clear and do not use this area for storage.
If the separator is installed to retain flammable liquids, provide appropriate ventilation.

B. LABELLING

Provide separators with a visible and durable label that can be read after installation and which contains the following information:

- manufacturer's reference number and year of manufacture
- oil storage capacity
- volume of separator
- bypass/full retention
- silt storage capacity
- unique identifier for the design of separator (name or number)
- oil level warning device details
- depth of oil storage
- class of separator
- closure device details
- nominal size

Mark the position of all separators clearly on all drainage plans and identify the separator on the ground by marking the manhole cover 'Separator'.

7. MAINTENANCE AND USE

To prevent pollution and minimise your costs, you need to manage your separator effectively. To make this easy, all parts of the separator that have to be regularly maintained must be accessible at all times.

Every six months, or in accordance with manufacturer's instructions, experienced personnel should:

- Physically inspect the integrity of the separator and all mechanical parts
- Assess the depth of accumulated oil and silt
- Service all electrical equipment such as alarms and separator management systems
- Check the condition of any coalescing device and replace it if necessary

Some heavily used or high-risk sites might require more frequent inspections.

Keep a detailed log of when the separator is inspected, maintained, emptied and serviced. Also record specific events relating to the separator system such as cleaning, repairs, accidents and incidents.

All sites should empty their separator as soon as a significant quantity of oil and/or silt has built up. The retained waste, including the silt, must be removed and the separator must be refilled with clean water before being put back in to service to prevent damage and to prevent oil passing through it. In addition to normal emptying of the separator, it will also need to be emptied right away if oil or silt levels exceed 90 per cent of the storage volume of the separator and the alarm is activated (see Section 5b). When the oil or silt reaches this level or after a spillage, employ a registered waste removal company to empty the separator (see Section 8 for information about waste management).

For all waste removal operations you must make sure that the waste removal company has experience in emptying separators and that they do not allow any of the contents to escape from the outlet during emptying.

Every five years it is recommended that separators be emptied and given a general inspection to test the integrity and performance of the system. The separator must be refilled with clean water following such an inspection.

Information on separator maintenance is in Part 2 of the European Standard.

8. WASTE MANAGEMENT

All waste must be handled, stored and disposed of correctly to avoid pollution. Waste oil is designated as hazardous/special waste and as a waste producer and holder, you are responsible for complying with the Hazardous Waste (England and Wales) (Amendment) Regulations 2016, the Special Waste Amendment (Scotland) Regulations 2004, or the Hazardous Waste (Amendment) Regulations (Northern Ireland) 2015.

You may need to register as a producer of hazardous/special waste, and you should refer to www.gov.uk for guidance. You must follow the Duty of Care Code of Practice which requires you to make sure that the waste oil:

- Does not escape from your control
- Is transferred only to a registered waste carrier to be sent for recycling or disposal at a suitably licensed facility
- Is accompanied by an appropriate transfer note with a full written description of the waste

9. EMERGENCIES

Draw up a Pollution Incident Response Plan (PIRP) that includes all oil separators. ESA21 INCIDENT RESPONSE PLANNING is worth consulting in relation to this.

Do not use a separator as the primary method of containing a large oil spill from above ground oil storage; this should be protected by a secondary containment system.

We recommend that all oil deliveries to the site be supervised.

Notify the local regulator immediately in the event of an emergency.