

Using oil and sediment separators in highway/urban drainage treatment schemes

Separators are widely used across UK developments to prevent pollution from stormwater. They are distinct from gully pots and catch pits because they are designed to retain the material that they capture, even in high flow conditions, and they are much larger. Separators are also tested and proven to work, and certified accordingly; no such testing or certification is available for gully pots. They can be located off-network so maintenance is easier and causes less disruption to traffic. There are several design-types, but the two primary types used in the UK are **oil/water separators** and **hydrodynamic vortex separators**.

Oil/water separators are designed to capture and retain floating oils at the surface of the oil-retention chamber. They rely on a period of quiescence in the vessel to give the oils time to float to the top and the sediment time to sink to the bottom. They capture suspended solids too, and the capacity for this can be augmented to allow for the capture and retention of larger volumes of suspended solids by the addition of extra storage capacity. If they are being specified for the capture and retention of oil spills, they must carry a CA or CE Mark in order to be offered for sale in the UK and they are tested in accordance with BSEN 858:1 to illustrate that they effectively capture oil. They can also be tested to illustrate that they capture sediments, although that test is not mandatory.

When oil/water separators are specifically specified to manage sediment in urban runoff, they are sometimes referred to as horizontal-flow sediment separators. The device is the same, but the treatment flow rate for which it is specified is different, and its primary function is that of sediment capture and retention; the oil capture function is still provided but is less important for some applications. We know that the primary source of stormwater pollution is associated with the sediment in the runoff, so for many locations, the capture and retention of sediment is equally important for river health as the capture of intermittent oil spills and leaks.

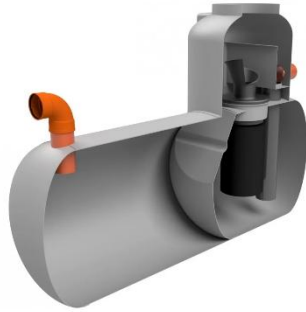
Hydrodynamic Vortex separators are designed to capture suspended solids in stormwater. They rely on their design to force the stormwater into a vortex-flow to maximise the flow-duration of particles so that they are deposited at the bottom of the device and captured. These separators also retain floating oils if their design includes a deep baffle that is connected from side to side. They can be tested to illustrate that they capture sediments, although that test is not mandatory. Although they can capture floating oils, they are not ordinarily tested in accordance with BSEN 858:1 and they cannot fully satisfy the mandated clauses of that Standard so they cannot be attested to comply and cannot carry the relevant CE/CA Mark*. These devices are often used to capture sediment in drainage designs upstream of ponds, basins and wetlands to protect those vegetative devices from gross pollution.

Note: This document covers discharges to surface water. For discharges to foul sewer, speak to the local sewerage undertaker for advice.

It is essential that you specify the correct size of separator for the catchment area that you are draining. This size will depend on the design treatment flow rate that you have selected, and that will relate to a depth of rainfall.

Device	By-pass oil/water separator	Full retention oil/water separator	Horizontal flow sediment separator	Hydrodynamic Vortex separator
Application	Specified to capture low-volume oil spills and frequent small leaks. Can apply to car-parks, lower trafficked roads and other urban surfaces.	Used where there is a significant risk of a large spillages of oil, or collisions/accidents. This will include petrol forecourts, haulage yards, industrial premises and busy road junctions, particularly with high HGV use.	Used where an oil/water separator with enhanced sediment capture and storage capability is specified. The device will capture sediment to prevent pollution and to protect downstream devices such as ponds and basins, but it is also BSEN858:1 compliant and can be used to manage oil spills/leaks.	Used where sediment capture and storage is required to treat urban runoff to prevent pollution and to protect downstream features such as ponds and basins.
Design treatment flow rate	Sized to treat 6.5mm of rainfall, or 18 litres/second/hectare. The Treatment Flow rate is dictated in PPG3 to capture small, frequent oil spills conveyed in low intensity rainfall events.	Sized to treat 65mm rainfall, or 180 litres/second/hectare. The Treatment Flow rate is dictated in PPG3 to capture catastrophic oil spills and frequent spills or leaks in any rainfall event, up to and including high-intensity rainfall.	Sized to treat the 1:1yr 15-minute rainfall event for the catchment, which is approximately 27mm rainfall, or 75 litres/second/hectare in the UK. Site specific rainfall data should be sourced and used. The treatment flow rate is dictated in CIRIA SuDS Manual and British Water How-to-Guide to control pollution in urban runoff in all sub-annual rainfall events.	Sized to treat the 1:1yr 15-minute rainfall event for the catchment, which is approximately 27mm rainfall, or 75 litres/second/hectare in the UK. Site specific rainfall data should be sourced and used. The treatment flow rate is dictated in CIRIA SuDS Manual and British Water How-to-Guide to control pollution in urban runoff in all sub-annual rainfall events.
Design sediment capacity	For all devices, the sediment capacity can be augmented by making the device longer or deeper. The sediment yield from the catchment must be estimated, and the maintenance interval declared by the Client; if the manufacturer has these two pieces of information, they can specify the sediment capacity that they need to provide to properly capture and retain the necessary volume of sediment that is delivered between maintenance operations.			
Sediment capture capability independently tested	No	No	Yes	Yes
Oil capture capability tested in accordance with BS EN 858	Always	Always	Sometimes – check with manufacturer	Sometimes – check with manufacturer but full compliance with BSEN 858:1 cannot be declared.

Example device



*Some of the mandated clauses of the Standard BSEN858:1 are shown below. In order for a product to carry a CE/CA Mark and to be lawfully offered for sale in the UK and an oil/water separator, it must satisfy all the mandated clauses of the Standard.

1 Scope: This standard applies to separator systems for light liquids, where light liquids are separated from waste water by means of gravity and/or coalescence.

6.3.4 Water seals shall be provided at the inlet and outlet of the separator. The depth of the water seal shall be a minimum of 100 mm.

6.5.1 General: The design of the separator system shall ensure that separated light liquid cannot be discharged either accidentally or in an uncontrolled way, e. g. by syphoning. The design shall also ensure that any separated and retained light liquid is not disturbed.

6.5.2 Storage capacity for light liquids: For prefabricated separator systems, the separated light liquid storage capacity shall be at least ten times the nominal size in litres where automatic closure devices are fitted, and at least fifteen times the nominal size in litres where automatic closure devices are not fitted. These capacities shall be based on a light liquid density of 0,85 g/cm³.

6.5.3 Automatic closure devices: Separator systems shall be provided with automatic closure devices.

6.5.4 Automatic warning devices: Separator systems shall be provided with automatic warning devices.

6.5.5 Separators with a bypass device: Where a bypass device is incorporated in a separator system the separator itself shall meet the requirements and tests provided in this standard. The maximum flow rate of the separator related to its nominal size shall not be exceeded.

Reference: BS EN 858-1:2002 Separator systems for light liquids (e.g. oil and petrol) - Principles of product design, performance and testing, marking and quality control

Current version Published: 26 Feb 2002 Available from <https://knowledge.bsigroup.com/>