

WASH BAY

OIL & GRIT INTERCEPTORS FOR WASH BAYS

SEPARATING LIGHT OILS FROM WASTEWATER IN COVERED AND UNCOVERED WASH BAYS



The exterior vehicle wash bay is a quintessential conflict of interest. On the one hand, the vehicle wash bay process unleashes detergents, fuel, grease, oil, and coolants that need to be intercepted before entering the wastewater networks.

On the other hand, the sealed expanse of the wash bay is a high-volume collector of stormwater that needs to be kept away from the wastewater network.





DESIGN REQUIREMENTS

Local Authorities have differing requirements for the management of wastewater from wash bays. These requirements are determined by the strengths and weaknesses of the wastewater and stormwater infrastructure, and the associated risk to the local environment. Mactrap can supply different designs based upon the Local Authority objectives, for example:

1. Covered Wash Bay

All effluent flows to an oil & grit interceptor and the outflow flows to wastewater. There is no impact from stormwater on the wastewater network.

2. Uncovered Wash Bay

a) Combined flow to wastewater

The Council considers risk from stormwater in the wastewater network to be low. All effluent flows to an oil & grit interceptor and the outflow flows to wastewater.

b) Combined flow to stormwater

The Council considers risk of light oils in the stormwater to be low. All effluent flows to an oil & grit interceptor and the outflow flows to stormwater.

c) Diverted flow between stormwater and wastewater

The Council does not allow stormwater in the wastewater network, and the stormwater network must also be protected from light oils. The flow is diverted between the stormwater and wastewater networks and each flow has its own oil separation.

CALCULATIONS

The following sample calculation is for a wash bay with combined flow to wastewater. A combined flow oil & grit interceptor will be sized to the higher of the load from rainfall catchment or from wash bay effluent. In this example the load on the separator is approximately the same for stormwater and wash bay effluent.

Calculation for separator load from vehicle wash down

- a. Vehicle wash time 30 mins
- b. Higher end commercial water blaster 1000l/hr
- c. $0.5\text{m}^3/30\text{mins}$
- d. $3 \times 30\text{min}$ inflow volume for separator size = approx. 1500l

Calculation for separator load from maximum rainfall catchment

- a. The wash pad is $12\text{m} \times 6\text{m}$ for a total area of 72m^2
- b. 10mm/30min (exceedance event every 2 years)
- c. 75% of ARI = 7.5mm/390min average max rainfall event
- d. $0.54\text{m}^3/30\text{mins}$
- e. $3 \times 30\text{min}$ inflow volume for separator size = approx. 1500l.

Note 1: Most local authorities have mandated a 1500L oil & grit interceptor as standard for uncovered wash bays up to 75m^2 .

Note 2: Where wash bays exceed 75m^2 then supporting calculations must be provided for trade waste consent and will usually require stormwater diversion systems to protect the wastewater network.



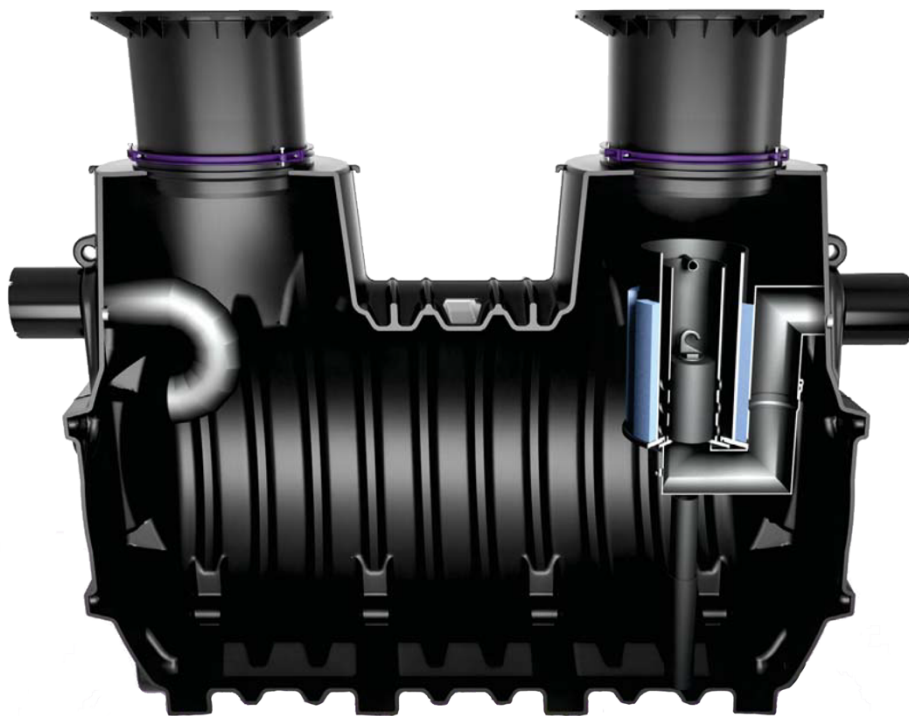


OIL & GRIT INTERCEPTORS

Functional Description

Mactrap oil & grit interceptors separate light fluids and sludge out of the wastewater by means of gravity. Light fluids¹ float up in the separation chamber and collect at the surface. Sludges, which are heavier than water, sink to the bottom and form a sludge layer.

Coalescence interceptors, like oil & grit interceptors, work on the principle of gravity. To increase the separation performance, the interceptor also contains a coalescence filter, usually associated with an automatic shut off valve. This cylindrical insert has two functions. Firstly, it affects the flow in the separator and secondly, it filters all the wastewater through the coalescence material.



When wastewater containing oil flows through this filter fabric, very fine oil droplets that can no longer be separated out by gravity collect on the coalescence material and combine to form large oil droplets. When these reach a sufficient size to create buoyancy, they detach themselves from the filter material and rise to the surface. Mactrap oil & grit interceptors can all be equipped with an automatic shut off valve². When the maximum oil storage volume is exceeded, this device closes the outlet and prevents the escape of light fluids into the drainage system.

This safety device consists of a guide tube full of water, which houses a float. The float is carefully designed for the specific gravity of the weight, so that it floats in water, and sinks in light fluid (up to a density of 0.95 g/cm³). When the maximum oil storage quantity is reached, oil flows through the lateral openings into the float guide tube. The float then sinks, reliably shutting off the outlet of the interceptor.

¹ Light fluids refer to fluids of mineral origin with a density of $\leq 0.95 \text{ g/cm}^3$, which are insoluble or only slightly soluble in water.

² The automatic shut off valve is an "emergency closure valve". When actuated in an emergency, the interceptor must be taken out of service and maintained.





AUTOMATIC STORMWATER DIVERSION

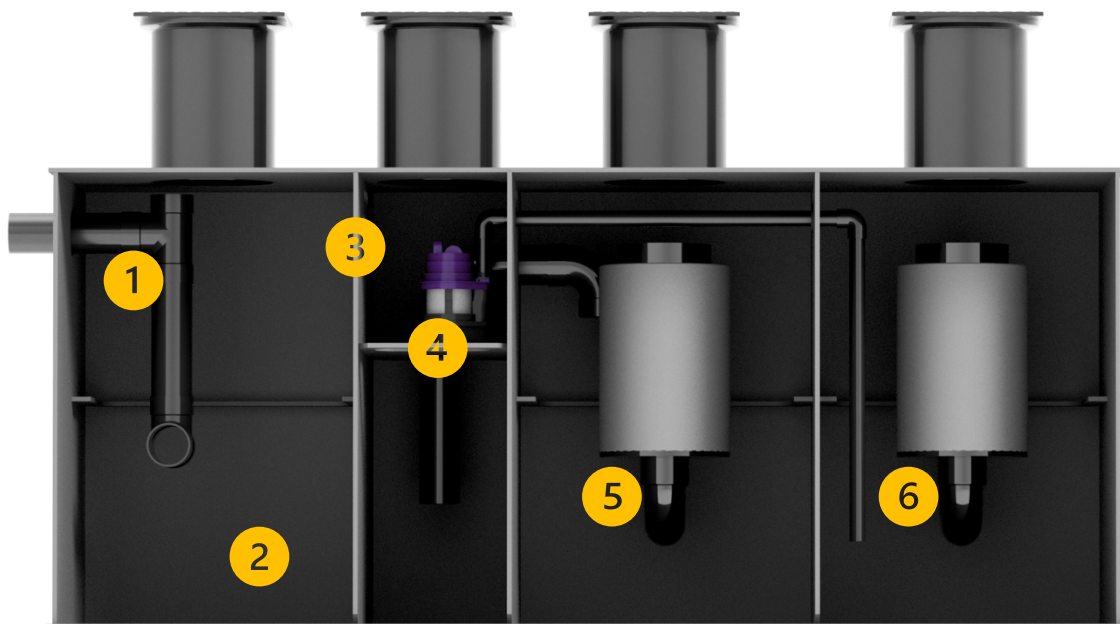
Stormwater Sentry

Mactrap manufactures the Stormwater Sentry diversion system for washdown areas exposed to rainwater. The system consists of a logically controlled wastewater pump which automatically diverts wash water and 'first flush' rainwater to wastewater, whilst allowing unpolluted rainwater to flow to stormwater.

Functional Description

Stormwater Sentry is a network diversion system integrated into an Oil & Grit Interceptor. It provides a multi-layered approach to protecting the wastewater network, the stormwater network and the environment from light fluid¹ contaminants that arise from uncovered wash bays.

Stormwater Sentry contains a sensor-controlled pump that automatically diverts contaminated washdown water (as well as 'first flush' rainwater) to wastewater drainage, whilst allowing unpolluted rainwater to enter stormwater drainage.



1. Water enters Stormwater Sentry from the wash pad into the sediment chamber.
2. Grit and other heavier than water sediment settles to the bottom of the sediment chamber.
3. Any light oil contaminants rise to the surface and are carried with the inflow to the pump chamber.
4. If the power washer is active the transfer pump activates and diverts the inflow to the wastewater chamber.
5. When the power washer is inactive rain inflow will be transferred to the stormwater chamber from a mid-level pick up point trapping oil contaminants in the pump chamber. If any emulsified light oils flow through to the stormwater chamber they will be intercepted and stored.
6. If the power washer is inactive but the pump has not operated for (nominally) 20 hours, then the first of the inflow (first flush) is transferred to the wastewater chamber.

Note: Coalescent filters and auto shut off valves can be added to the stormwater and wastewater chambers.





LIFT PUMPS AND PUMPING STATIONS

Occasionally the separated water from an interceptor needs to be lifted to the wastewater network. Mactrap supplies Kessel Aqualift pumps and chambers.

The Aqualift is available as a Mono or Duo system with pumps in different capacity classes. A wide selection of upper sections and covers ensure that the pumping station can be installed flexibly at different installation locations.

The pumps can be operated in potentially explosive areas, this means at locations where explosive gasses may occur due to wastewater and/or light fuel/oil liquids.



COVERS AND RISERS

- Installation options of pedestrian strength (Class A) and vehicular strength (Class D) covers.
- Standard riser height has inherent flexibility and extensions are available for deeper installations.
- Fully sealed for odour protection.
- The concrete or other medium surrounding the covers must be engineered.

Type	Class	Typical Use	Nominal Wheel Loading (kg)	Serviceability Design Load (kN)	Ultimate Limit State Design (kN)
	A	Areas accessible by pedestrians	330kg	6.7kN	10kN
	D	Major roads including freeway and motorway shoulders. Warehouse and loading docks.	8,000kg	160kN	240kN

WARRANTY

The Mactrap oil & grit interceptor is warranted for impermeability, fitness for use and structural stability for thirty (30) years when installed underground and ten (10) years when installed above ground. The manufactured unit is warranted for quality of manufacture for five (5) years provided the interceptor is installed and operated in accordance with the specifications provided with each unit. Mactrap warranty does not include maintenance and servicing of the interceptor.

