Humes

Strength. Performance. Passion.

HumeCeptor® system
Inspection and maintenance guide

Issue 2

Purpose of this guide

This guide outlines the maintenance procedures and requirements for HumeCeptor® units.

Where the contents of this guide differ from project specifications and drawings, supervisory personnel should consult with a Humes engineer. In the event of any conflict between the information in this guide and local legislative requirements, the legislative requirements will take precedence.

It is the responsibility of the site owner and its contractors to determine the site's suitable access and location for maintenance plant and equipment.

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Safety advice

The HumeCeptor® unit must be maintained in accordance with all relevant health and safety requirements, including the use of PPE and fall protection where required.

Confined space entry

Maintenance of the HumeCeptor® should not require entry, however, if entry into the unit is required, then the device is deemed a confined space. As such, if entering the unit, all equipment and training must comply to SHE regulations. It is the responsibility of the contractor or person/s entering the unit to proceed safely at all times.

Personal safety equipment

The contractor is responsible for the provision of appropriate personal protection equipment including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment. Make sure all equipment is used by trained and certified personnel, and is checked for proper operation and safety features prior to use.

Handling

The customer, or their contractor, is responsible for the removal of access lids from the HumeCeptor® unit. The customer or contractor should familiarise themselves with the device and site constraints, and particular attention should be given to safety hazards such as overhead power lines and other services in the vicinity when considering the position of plant and equipment.

Maintenance overview

To ensure ongoing long-term environmental protection HumeCeptor® needs to be maintained (generally annually).

The actual on-going maintenance frequency requirements will be determined through quarterly inspections undertaken during the first year. However, only an annual maintenance period is anticipated for most HumeCeptor® units installed within drainage infrastructure.

Inspection can be performed by anyone, and procedures for inspection are provided in this document.

Generally, comprehensive maintenance is performed from the surface via vacuum truck. Companies capable of performing this maintenance can be found in the Yellow Pages or online by searching sewer cleaning or liquid waste removal. If you require a list of contacts for cleaning your HumeCeptor® please call your nearest Humes office.

HumeCeptor® operation

A HumeCeptor® unit can be divided into two distinct zones comprising:

1. A lower treatment chamber
2. An upper by-pass chamber

Stormwater flows into the by-pass chamber via the stormwater drainage-pipe, where low flows are diverted into the treatment chamber by the weir and drop pipe arrangement.

Note, the treatment chamber is always full of water so water will flow up through the outlet decant pipe (based on the head of water behind the inlet weir) to be discharged back into the by-pass chamber downstream of the weir. The downstream section of the by-pass chamber is connected to the outlet drainage pipe.
Oil and other liquids with a specific gravity less than water rise in the treatment chamber and become trapped since the inlet of outlet decant pipe is submerged.

Sediment settles to the bottom of the lower chamber by gravity forces. The circular design of the treatment chamber is critical to prevent turbulent eddy currents, which inhibit the settling process.

During high flow conditions, stormwater in the by-pass chamber will overtop the weir and be conveyed to the outlet drain directly. Water flowing over the weir creates a backwater effect on the outlet decant pipe (ensuring head stabilization between the inlet drop pipe and outlet decant pipe). This ensures that excessive flow will not be forced through the treatment chamber scouring or re-suspending previously settled material.

The by-pass mechanism is an integral part of the HumeCeptor®, since other oil/grit separator designs and proprietary devices have been noted to scour during high flow conditions (Schueler and Shepp, 1993).

Figure 1 – HumeCeptor® system operation during design flow conditions

Figure 2 – HumeCeptor® system operation during high flow conditions

Model Identification

Even if you do not have the plans of your stormwater drainage system, you will still be able to identify the location of an in-line HumeCeptor® unit(s) as all HumeCeptor® units have a 600 mm diameter cast iron lid, clearly embossed with "HumeCeptor®".

You will be also be able to identify an inlet HumeCeptor® unit(s), by looking through the stormwater inlet grate where the fibreglass insert will be visible.

However once you have found the unit, you may still be uncertain what model it is. Comparing the measured depth from the water level (bottom of insert) to the base of the tank with the dimensions listed in Table 1 below will help to determine the size/model of the unit.

If there is still uncertainty regarding the size of the HumeCeptor® using depth measurements, contact your nearest Humes office for further advice.

There are a few variations on the standard models described above. However, basic maintenance procedures will be the same. The following figures display the different types of HumeCeptor® units available. For further details, please refer to the HumeCeptor® Technical manual.

Table 1 – Depths from pipe invert to base

Model	Pipe invert to base (m)
STC2	1.50
STC3	1.40
STC5	1.80
STC7	2.70
STC9	2.40
STC14	3.40
STC18	3.10
STC23	3.70
STC27	3.50

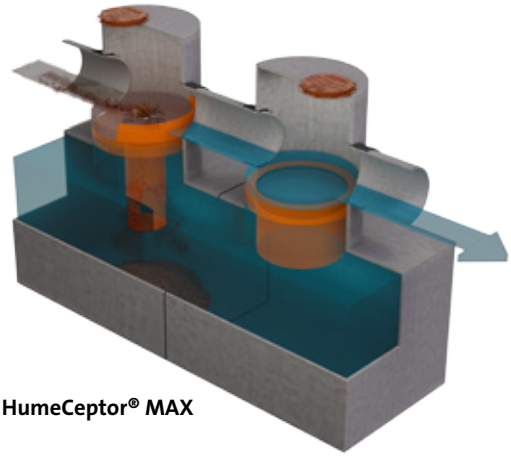
Figure 3 – HumeCeptor® system variations

STC 2 (inlet)

MultiCeptor™

AquaCeptor™

DuoCeptor™



HumeCeptor® MAX

Inspection Procedure

HumeCeptor® units are generally sized such that they only require maintenance (cleaning out) on an annual basis. This being said, it is difficult to know what the actual pollutant loading rate from the particular catchment that the HumeCeptor® services might be (how much pollution enters the device in a given time frame). Therefore, the manufacturer recommends that the HumeCeptor® should be monitored on a 3 monthly basis, which will assist in determining the actual need for maintenance.

The following procedure can be used to inspect the HumeCeptor® and determine the levels of sediment and hydrocarbons (oils) in the device.

1. Locate the HumeCeptor® - all units have a 600mm diameter cast iron lid embossed with"HumeCeptor®"
2. Use the Gatic lifter to remove the lid
3. Conduct a visual inspection of the inlet and outlet pipes to ensure there are no blockages
4. Conduct a visual inspection of the fibreglass insert and check for damage; also check for obstructions in the orifice
5. Identify the location of the oil clean out port and the outlet riser
6. Use the Sludge Judge to determine the levels of sediment and hydrocarbons in the device

The HumeCeptor® is designed to capture and retain sediments and hydrocarbons, therefore, two samples will need to be drawn from the device by using the Sludge Judge. The Sludge Judge is used in the following manner:

Sediment Sampling

1. Lower the Sludge Judge into the outlet riser of the HumeCeptor® all the way to the base of the unit; the float valve will open allowing materials to flow in. It should be lowered in slowly and not plunged to the bottom.
2. When at the bottom of the unit the clear pipe of the Sludge Judge will be filled to the top of weir level with water (and sediment at the bottom). Tug slightly on the rope to set the check valve trapping the mixture inside.
3. When the Sludge Judge has been raised clear of the HumeCeptor®, the amount of sediment in the base of the device can be read using the markers on the clear pipe section.
4. To empty the Sludge Judge, touch the check valve pin against a hard surface; this opens the check valve allowing the contents to drain out.

Oil Sampling

A similar procedure for using the Sludge Judge applies for checking the oil level in the HumeCeptor®, except in this instance the device is used through the oil clean out port rather than the outlet riser.

1. Lower the Sludge Judge into the oil clean out port of the HumeCeptor® to a depth of 1 to 1.5 meters below the fibreglass insert.
2. When at the required depth tug slightly on the rope to set the check valve trapping the mixture inside.
3. When the Sludge Judge has been raised clear of the HumeCeptor®, the amount of oil in the device can be read using the markers on the clear pipe section.
4. To empty the Sludge Judge, touch the check valve pin against a hard surface; this opens the check valve allowing the contents to drain out.

The depths of the sediment and hydrocarbons should be recorded. The HumeCeptor® will require a clean out when either the sediment or oil levels in the device reach the depths outlined in Table 2 below.

It should be noted that for an STC2 model HumeCeptor®, a screw cap will need to be removed to access the Oil Clean Out Port. Ensure that the cap is replaced when work is completed.

Table 2 – Sediment depths indicating maintenance

Model	Max Oil Depth (mm)	Max Sediment Depth (mm)
STC2	350	200
STC3	450	350
STC5	450	600
STC7	450	850
STC9	850	600
STC14	1150	700
STC18	1050	600
STC23	1050	700
STC27	1150	750

Maintenance Procedure

Maintenance of HumeCeptor® is performed using vacuum/eductor trucks this ensures that no requirement for entry into the unit is necessary for maintenance. The vacuum truck industry is a well-established sector of the waste management industry cleaning underground tanks, sewers and catch basins.

A HumeCeptor® unit is cleaned by adhering to the following steps:

1. Complete a Job Hazard Analysis (JHA) and a Work Method Statement (WMS) before undertaking the maintenance procedure.
2. Prepare the site around the HumeCeptor® for cleaning. This involves establishing the job site (traffic control if required), assembling cleaning equipment, positioning the vacuum truck and ensuring correct equipment is available to use (including PPE).
3. Remove the lid above the holding chamber and conduct a visual inspection to assess the condition of the HumeCeptor® and note if there are any blockages or lodged debris
4. Check for oil using a dipstick, tube or sampling device via the oil sample port.
5. Remove and store any free oil separately using a small portable pump via the oil sample port:
   a. Be sure to skim from the top of the water to ensure oil contaminants are removed
   b. Approximately 300 mm of water should also be removed from the top of the water column
   c. The oil/fuel waste can be disposed of separately, as this will incur a higher disposal cost
6. Remove the sludge/sediment from the bottom of the HumeCeptor® using the vacuum truck:
   a. The truck's suction hose should be lowered into the sump of the device via the outlet riser
   b. While extracting the waste, move the hose around in the opening to ensure that the hose is sucking from various locations in the sump to remove all the captured material
   c. The extracted waste can usually be disposed of as general waste at a waste transfer station
7. Clean the interior of the pit using water jet
8. Replace lid, ensuring it is firmly and securely in place

It may be convenient on larger units to de-water some of the relatively clean water from the central zone in the treatment chamber. This will minimise maintenance costs as disposal of essentially clean stormwater can be avoided. Often this can be done in either the sewer or upstream of the pipe (position sandbags to create temporary storage). However, this should only be done with the appropriate authorities consent.

Maintenance Cost

The costs to clean out a HumeCeptor® will vary based on the size of the unit, pollutant volume/type and transportation distances.

Economies of scale will be achieved where there are multiple units for a given location. The time to clean the HumeCeptor® is approximately 30 minutes to an hour, excluding transportation and disposal.

Disposal costs will vary greatly depending on local authority requirements, the type of contaminants washing off your site and the availability of waste disposal facilities.

It should be noted that these costs would be incurred during the maintenance of any type or brand stormwater quality structure and not just the HumeCeptor®.

Maintenance Frequency

It is generally recommended that inspection of the unit to be undertaken every three months for the first year of operation. This schedule may then be relaxed after a year, when confidence is gained regarding the actual pollutant load and run-off generated by the up-stream catchment. A more frequent program may be required where there is greater risk of oil spills.

You may elect to undertake inspection yourself or choose to contract a waste management company to obtain a complete inspection and maintenance package. Contact the nearest Humes office for recommendations/ information regarding companies, which have the capabilities to provide an inspection and maintenance service in your area.

The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the interceptor can be determined by inserting a dipstick in the oil sample port. Similarly, the depth of sediment can be measured from the surface without entry into the HumeCeptor® via a clear tube (Sediment sampler) - sediment sampler tubes are available from Humes. The sampler is inserted in the 610 mm opening in the "disc" in-line models and through the 100 mm oil sample port in the "inlet" models.

As a general rule an annual maintenance schedule is recommended. However maintenance requirement frequency will vary with the volumes of stormwater pollution generated by your site (number of spills, amount of sediment, etc.). So while annual maintenance is recommended, the frequency of maintenance may be varied (increased or reduced) based on local conditions; if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilised maintenance may only be required every two or three years.

Although HumeCeptor® will continue to operate effectively until sediment completely fills the treatment chamber. It is still deemed good practice that maintenance should be performed "annually" or "once the sediment depth exceeds the guideline values" provided in Table 2, whichever condition is achieved first.

HumeCeptor® units are often installed in areas where the potential for hydrocarbon spillage is great. However HumeCeptor® should be cleaned immediately after any major spill occurs, by a licensed liquid waste contractor. You should also notify the appropriate regulatory agencies as required in the event of a spill.

Removal of Hazardous Material

The requirements for the disposal of material removed from the HumeCeptor® are similar to that of any other stormwater treatment device. Local guidelines should be consulted prior to disposal.

The sediment, once de-watered, may be suitable for disposal in a sanitary landfill. It is recommended to check with the relevant authorities in your local area as some local authorities may require testing of the sediment prior to disposal.

All petroleum waste-products, collected in the HumeCeptor® (oil/chemical/fuel spills), should be removed and disposed of by a licensed waste management contractor.

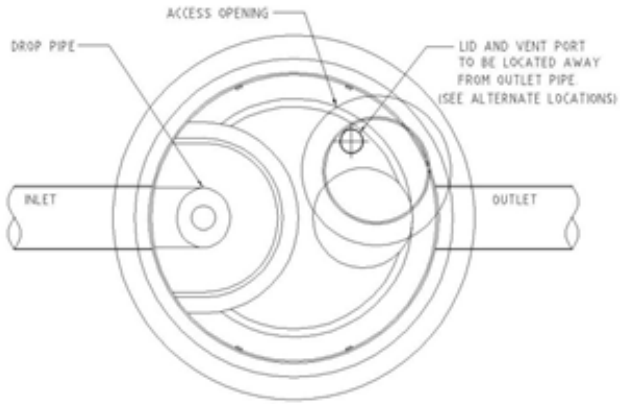
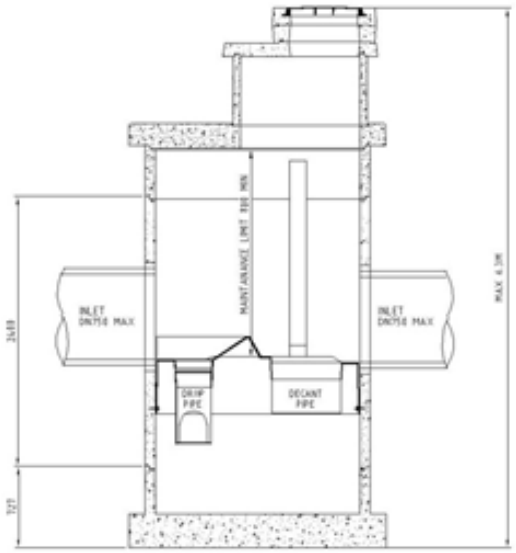
Example Job Safety Analysis (JSA)/Work Method Statement (WMS)

The following JSA/WMS is a guide only. It is the responsibility of the cleaning contractor or asset owner to develop their own JSA/WMS in line with their own WHS requirements and constraints. It also assumes that there will be no entry into the unit during maintenance.

Project/ Address:				**Date:**	
Job: Clean out of HumeCeptor® unit				**Operator:**	
Risk Level:	1 - Extreme	2 - High	3 - Medium	4 – Low	5 - Negligible
Consequence:	Likely to cause very serious harm	Clear potential for serious harm	Similar to risk of driving a car	Little likelihood of any harm	Virtually Harmless
Response:	STOP THE JOB	STOP and Reassess to find better way	Control and ensure controls work	Monitor to ensure risk remains low	Continue work

PROCEDURE	POSSIBLE HAZARDS	INITIAL RISK	CONTROLS	PERSON RESPONSIBLE	END RISK
1. Preliminaries: • Confirm unit locations and types • Familiarise with the technical manual	Nil	-	Refer to relevant manuals	Operator	-
2. Plan the Job: • Room to access and work on the unit without impacting other property or vehicles • Consider water flows and if excessive note and move onto next job • Condition and status of unit • Identify water fill point • Identify waste dump point	• Climbing in/out/around of truck • All units have a high risk of containing syringes	3 4	• Refer to safety plan on moving around vehicles • Wear PPE and never reach into or lift accumulated matter with hands. If a needle stick injury occurs, wash the affected area with soap and water and report the incident to the branch and seek medical attention ASAP.	Operator	4 5
3.Establish Job Site: • Over 60 km/hr will require traffic management • Within 6.4m of overhead power lines will require spotter	• Traffic • Pedestrians • Overhead power lines	2	• Devise a relevant Traffic Management WMS • Ensure barriers and signs redirect pedestrians • Ensure spotter is present	Operator	5
4. Assemble Cleaning Equipment • Position vacuum hose to remove debris from the unit	• Infection • Sharp edges • Manual handling • Falling equipment • High pressure water	3	• Personal hygiene (wash hands prior to smoking/eating) • Wear gloves & remove sharp edges/burrs on equipment • Follow a manual handling WMS • Store equipment securely on vehicle • Inspect vacuum hose fittings firmly secured • Inspect hose daily 7 ensure it has been tested (6 monthly) • Never cap jetting hose • Inspect jetting hose for damage • Never adjust pump pressures or regulators • Maximum reducer on 1" hose is ¾" • No reducers on ½" hose • Fittings to be firmly secured using a spanner	Operator	5
5. Open the Cover • Remove lid using the manhole lifting procedure • If lid is mass concrete and exceeds safe lifting limits, use mechanical lifting device	• Manual Handling • Open Manholes	3	• Refer to a SWP for manual handling • Refer to a SWP for manhole lifting	Operator	5
6. Start Cleaning • Check for oil using a dipstick, tube or sampling device • Remove and store any free oil separately using a small portable pump • If there is any requirement to enter the pit for any reason, confined Space Entry Procedure is to be followed • Decant the relatively clean water from the central zone to either sewer or upstream (approvals from authorities required to discharge to sewer) (OPTIONAL) • Vacuum all material out of the sump until empty clear • Clean the interior of the pit using water jet	• Manual handling • Eye injury from flying debris • Noise • People inside exclusion zone • Confined Space Entry (If required)	3	• Follow a SMP for manual handling • Wear eye protection • Wear hearing protection • Stop operation until area clear. Only essential personnel within exclusion zone • Ensuring minimum slack in hose to prevent whipping • Refer to confined space manuals and SWPs	Operator	5
7. Finish Cleaning • Replace lid ensuring it is fimly & securely in place • Ensure all waste is vacuumed and site is clean prior to packing up • Complete the CWS recording all details and any problems	• Manual handling	3	• Follow a SMP for manual handling	Operator	5

HumeCeptor® unit maintenance record

Customer details			
Company		Phone	
Contact name		Email	
Address		Date	
State		Operator name	
HumeCeptor® unit details			
Model		Type (circle one)	Standard | Inlet | Multi | Aqua Duo | MAX
Cleaning method (circle one)	Vacuum | Eduction		
Layout details			
Plan		Elevation	
			

Pollutant removal results			
Estimated volume of water removed (L)		Hydrocarbons(%)	
Estimated volume of pollutants/oil (m^3)		Vegetation (%)	
Percentage of pollutant content (%)		Sediments (%)	
Percentage of pollutant capacity (%)		**Total volume (%)**	**100**

Any evidence of gross pollutants (i.e. items larger than drink cans)?	YES	NO
Any evidence of sewage contamination?	YES	NO
Any evidence of any other unexpected contamination?	YES	NO

Describe unexpected contamination (if any):

Any problems cleaning the HumeCeptor® unit (describe briefly):

If problems were experienced were they thenresolved satisfactorily (describe briefly):

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