

HumeGard[®] GPT Inspection and maintenance guide

Issue 1



Purpose of this guide

This guide outlines the maintenance procedures and requirements for HumeGard® GPT 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 HumeGard® GPT 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 HumeGard® 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 HumeGard® 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 HumeGard® 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 HumeGard® 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.

Additionally large litter items may also be removed utilizing the optional stainless steel basket arrangement within the HumeGard®. Alternatively the litter can be removed during education/vacuum clean out, which will be required in order to remove the sediment component of the stormwater pollution.

HumeGard® operation

The HumeGard® GPT utilises the processes of physical screening and floatation/sedimentation to separate the litter and coarse sediment from stormwater runoff. It incorporates an upper bypass chamber with a floating boom (or broad-crested weir for small units) that diverts treatable flows into a lower treatment chamber for settling and capturing coarse pollutants from the flow. There are two types of HumeGard® - the super-critical version, which incorporates a broad-crested weir approach for treatment flow diversion, and a larger, standard version, which incorporates a floating boom arrangement to divert treatable flows.

Super-critical HumeGard® (HG12 & HG15)

The super critical HumeGard® consists of an internal broad crested weir and holding chamber.

A specially designed patented broad crested weir diverts material entrained in the flow into the adjacent holding chamber. This consists of the holding sump and another baffle/weir/channel arrangement designed to retain floating material while guiding flow through to the outlet.

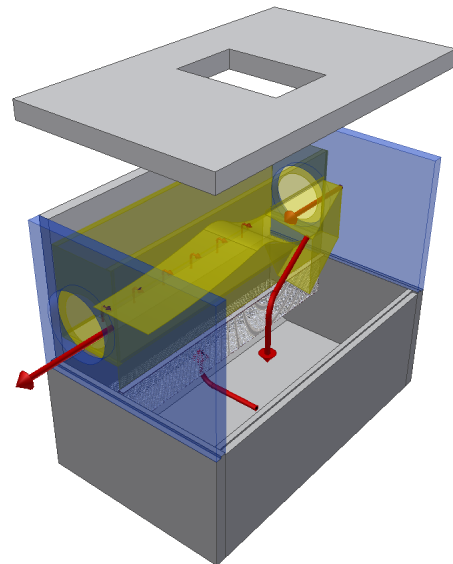
- **Low/Treatment flow operation**

During low to moderate flows, the weir diverts all flows into the sump area where pollutants are captured and retained. The velocity in this sump is controlled and never exceeds a maximum average velocity of 0.2m/s.

- **High/Bypass flow operation**

During high flows, the weir diverts up to the treatable flowrate into the sump and any excess flow is able to flow over the hump and through to the outlet. This ensures that the previously caught pollutants are not disturbed, resuspended and diverted out of the outlet pipe.

Figure 1 – Super-critical HumeGard® GPT



Standard HumeGard® (HG18 – HG45)

The standard HumeGard® consists of an internal separation channel and holding chamber.

A specially shaped boom, which is supported by hangers hinged to the upstream wall, diverts material entrained in the flow from the separator to the adjacent, off line, holding chamber. This consists of the holding sump and another baffle/weir/channel arrangement designed to retain floating material while guiding flow through to the outlet.

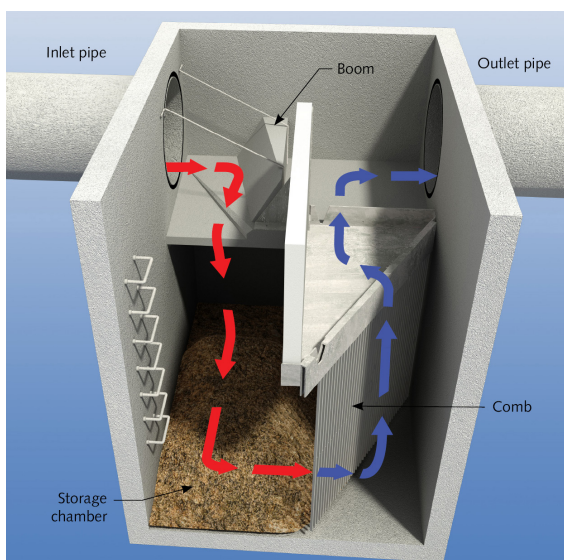
• Low/Treatment flow operation

During low to moderate flows, the boom remains on the floor of the separation channel and imparts an upward and sideways motion to the incoming flow. This action causes deflection into the holding chamber, where heavy and saturated materials settle to the bottom of the sump, while buoyant material is trapped behind the baffle wall arrangement.

• High/Bypass flow operation

During infrequent high flows, the boom lifts, which permits the flow to pass beneath it while continuing to deflect buoyant material to the holding chamber. Once the pipeline flows full, the boom lifts clear, allowing unobstructed flow through the unit, whilst at the same time retaining the floating materials on the upstream side of the device.

Figure 2 – Standard HumeGard® - low flow conditions



Maintenance frequency

It is recommended and good practice for an inspection of the HumeGard® to be carried out on a quarterly basis. The quarterly inspection is to check the operation of the boom, volume of pollutants in the holding sump, etc. But generally, only an annual maintenance period for cleaning is anticipated.

It is important during the quarterly inspections to check that the operation of the boom is satisfactory. The boom should not be impeded by large pieces of litter i.e. logs, etc. or have objects lodged underneath the boom or between it and the baffle plate that may prevent it from rising, or sitting flat on the false floor.

Cleaning maintenance frequency requirements will vary with the amount of stormwater pollution generated in your catchment (amount of litter, sediment, etc.). So it is recommended that as the 3-monthly inspections are performed, the frequency of maintenance be increased or reduced based on local conditions and pollutant capture rates.

The need for maintenance can be determined easily by inspecting the unit from the surface by:

- Checking if litter can be readily seen in the holding chamber once the cover has been removed.
- Using a dipstick or sludge judge (sediment sampling tube) to assess how much sediment or organic material has been captured in the bottom of the holding chamber. A sediment depth over 400mm would indicate cleaning is recommended to minimise the potential for scour.

Sediment sampling tubes are available for purchase from Humes (contact your local sales rep for more details).

Occasionally it may be beneficial to only remove captured litter and not siphon the entire contents of the holding chamber.

Maintenance procedure

Maintenance of HumeGard® units is generally performed using vacuum/eduction trucks.

No entry into the unit is required for maintenance. The vacuum service industry is a well-established sector, that services underground tanks, sewers and catch basins.

HumeGard® units are 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 HumeGard 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 rectangular lid above the holding chamber and conduct a visual inspection to assess the condition of the HumeGard® and note if there are any blockages or lodged debris.
4. Lower the suction hose to the surface of the water in the holding tank and skim across the top to capture floating litter.
5. Lower the suction hose to the base of the holding chamber to remove sediment, organic matter and litter which has sunk.
6. Dislodge materials trapped in the screen using a water jet or brush/broom.
7. Remove the second rectangular access cover over the diversion boom and ensure there is no debris trapped underneath the boom.
8. Clean the interior of the pit using water jet.
9. Replace lids, ensuring they are firmly and securely in place.

It may be convenient on larger units to de-water some of the water in the holding chamber. This will minimise maintenance costs as disposal of essentially clean stormwater can be avoided. Often this can be done onto adjacent ground or into the council sewer system. However, this should only be done with the appropriate authorities' consent.

If a HumeGard® has been fitted with an optional removable basket, the basket can be used to periodically remove litter in between scheduled eduction/vacuum maintenance visits. The baskets must also be removed prior to vacuuming/educting the HumeGard® for the sediment load.



Maintenance cost

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

A typical cost (equipment and personnel) is estimated to be approximately \$1500-\$3500 (based on best information at time of installation) - exclusive of disposal costs.

This estimated cost is based on the clean out of a single unit. Economies of scale will be achieved where there are multiple units for a given location. The time to clean a single unit is approximately 3-4 hours (including transportation and cleaning).

Disposal costs are estimated to be in the order of \$350-\$600 dependent upon volume and type of pollutants removed from the holding sump.



Removal of hazardous material

A wide range of hazardous materials may be intercepted by the HumeGard® gross pollutant trap, although instances of this have been minimal. Hazardous materials may include high levels of heavy metals accumulated within the collected sediments, certain inorganic chemicals, used syringes, glass, and other matter.

As noted, the potential presence of hazardous material is primarily the reason why education is the preferred cleaning method, since this minimises the potential for maintenance personnel and nearby communities to come into contact with such material. Where baskets are required, the majority of the collected material will fall from the basket into the maintenance truck upon opening of the trap door. Any and all contact with the basket should be undertaken with suitable protective clothing, including heavy duty hand protection. If material is caught within the basket, it should be removed using suitable equipment.

Removal of this material by hand is not recommended. It is noted that it is not necessary to have the sumps/ baskets completely clean. The removal of 95% of the material is satisfactory, and the prospect of completely removing every piece of material increases the occupational health and safety risks.

The presence of certain toxicants may need to be considered for the disposal of material and appropriate locations. If elevated levels of toxicants are suspected, then analytical screening of material should be completed to determine an appropriate disposal response according to local and state government regulations.

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 HumeGard 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 & ensure controls work	Monitor to ensure risk remains low	Continue work	
PROCEDURE	POSSIBLE HAZARDS	INITIAL RISK	CONTROLS	PERSON RESPONSIBLE	END RISK	
1. Preliminaries: • Confirm GPT locations and types • Familiarise with GPT technical manual	Nil	-	Refer to relevant manuals	Operator	-	
2. Plan the Job: • Room to access & work on the GPT without impacting other property or vehicles • Consider water flows & if excessive note & move onto next job • Condition & status of GPT • Identify water fill point • Identify waste dump point	• Climbing in/out/around of truck • All GPT 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 & water & 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	3	• 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 GPT	• 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 GPT Cover • Remove lid using the manhole lifting procedure • If lid is mass concrete & 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 • Position bottom end of vacuum hose to remove debris from GPT • Run vacuum prior to remove debris • If there is any requirement to enter the pit for any reason, confined Space Entry Procedure is to be followed • Vacuum all material out of the sump until empty clear 7 clean • Dislodge materials trapped in the screen using water jet or brush/broom • Remove access cover over diversion boom/weir, ensure there are no debris trapped underneath boom/around weir • Clean the interior of the pit using water jet &/or brush/broom • Vacuum all materials out of the pit	• 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 minim slack in hose to prevent whipping • Refer to confined space manuals and SWPs	Operator	5	
7. Finish Cleaning • Replace lid ensuring it is firmly & 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	

HumeGard® unit maintenance record

Customer details			
Company		Phone	
Contact name		Email	
Address		Date	
State		Operator name	
HumeGard® unit details			
Model		Type (circle one)	Small (weir) Standard (boom)
Cleaning method (circle one)	Vacuum Eduction	Lid type	
Plan view (circle one)			
Small HumeGard® (weir)		Standard HumeGard® (boom)	
Pollutant removal results			
Estimated volume of water removed (L)		Litter (%)	
Estimated volume of pollutants (m ³)		Vegetation (%)	
Percentage of pollutant content (%)		Sediments (%)	
Percentage of pollutant capacity (%)		Total volume (%)	
Any evidence of hydrocarbons (grease/oil) contamination?			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 HumeGard® unit (describe briefly):			
If problems were experienced were they then resolved satisfactorily (describe briefly):			

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