HIDROSTANK

SELF-TIPPING CLEANERS

CLEANING
STORM WATER
HOLDING TANKS

Catalogue

HIDROSTANK, S.L.
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Automatic cleaning
Flush wave
Minimum maintenance

When water is retained inside the storm tank, this leads to the sedimentation of solids at the bottom.

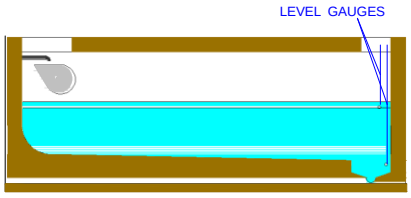
By means of the HIDROSTANK, Self-tipping Cleaners, you can avoid manual cleaning of the tank, a task that can be unpleasant and dangerous, thus minimising problems, saving time and maximising on safety.

Our Self-tipping Cleaners are the ideal solution for cleaning water-holding chambers; no maintenance is required and they have a long service life.

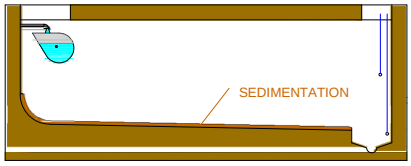
OPERATION

Cleaning the water-holding chamber and channels in storm tanks is carried out once these have been emptied, to prevent the accumulated sedimentation causing bad odour and making cleaning even more complicated.

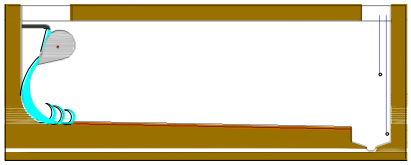
This sequence is illustrated in the following steps:



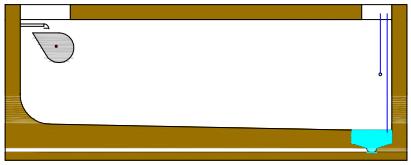
1. The water stored in the tank causes sedimentation at the bottom; by means of a level gauge you can detect the filling of the tank. The cleaner-bucket is in standby position.



2. Once the holding tank has been emptied, sedimentation accumulates on the bottom. Emptying is detected by means of another level gauge whose signal is picked up by the automaton which opens the electro-valve, and this in turn permits the filling of the self-tipping cleaner.



3. Once the self-tipping cleaner-bucket is filled, the point of gravity of the water-cleaning unit is displaced, causing it to overturn, instantly freeing the volume of water contained. The wave created sweeps the sediment deposited at the bottom of the tank, dragging it to a receptor channel.



4. Once the contents of the cleaner-bucket have been emptied, it returns, of its own design, to the standby position, activating a limit switch which closes the electro-valve.

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The wave generated by the self-tipping cleaner drags the sedimentation to the water collection channel, as seen in the following sequence:

DRAWING

Normally the filling of the cleaner-bucket is carried out using mains water, although it is also possible to set up a tank that collects waste water, ground water or even water from a nearby river, and pump the water to fill the cleaner. See figures 1 and 2.

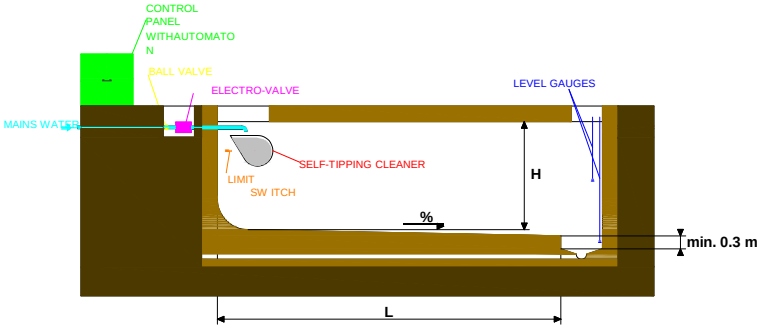

Figure 1: Mains water filling circuit.

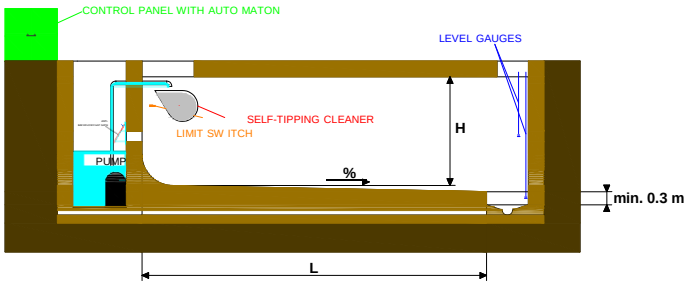

Figure 2: Waste water filling circuit.

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DESIGN

There is a direct relation between the capacity of the cleaner-bucket (litres/metre), the length to be cleaned (L), the fall height (H) and the gradient of the bottom (%). See figures 1 and 2.

These are the three parameters that determine the capacity in litres per metre of the cleaner, designed with capacities between 200 and 2000 litres/metre. The dimensioning of each holding tank calls for a study in order to obtain efficient and economic cleaning.

Manufactured in lengths of up to 10 lineal metres, they can be positioned in parallel in tanks with widths greater than 10 metres. See Figure 3,

Made of Stainless steel AISI 304 or AISI 316, corrosion is avoided even in the most aggressive environments.

INSTALLATION

1. Civil works: The installation of a self-tipping cleaner is related to the following important points in the civil works in order to ensure correct operation:

- The cradle under the cleaner will have a radius equal to the diameter of the cleaner. This cradle reduces the loss caused by the impact of water against the concrete.
- The capacity of the clean water collection channel must be at least 1.2 times the volume of water in the cleaner. This channel must have a gradient of 3% towards its outlet and a minimum depth of 0.30 m. See Figures 1 and 2.
- Polishing of the tank floor to reduce friction losses in the cleaning water.
- Window on the slab situated above the cleaner-bucket of the same length so as to facilitate introducing and removing the cleaner from the tank.
- Manhole covers: A manhole cover will be placed over each level gauge to enable its extraction from outside the tank and facilitate maintenance work.
- When the width of the tank is greater than 10 metres two or more cleaners are installed in parallel. In these cases it is important to divide the tank into parallel lanes which separate the action of the flush waves, thus obtaining greater efficiency of cleaning. The low walls that separate the lanes, along the first 2 m. should reach up to the slab (for attaching the supports of the cleaners) and after that should have a height of 0.20 m., a pointed finish (to avoid sedimentation) and a length of 1 metre less than the length to be cleaned (to facilitate passing from one lane to another). See Figure 3,

Figure 3: Low-wall lane separation.

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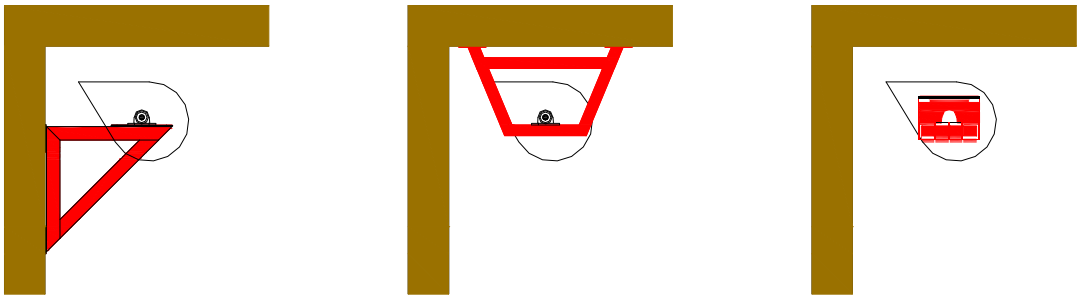
2. Supports: The supports of the cleaners can be attached to the back well, to the upper slab or to the lateral walls, depending on the design of the tank. See Figure 4 below



Anchor attached to back well

Anchor attached to upper slab

Anchor attached to side wall

Figure 4: Types of supports

To avoid maintenance, the cleaner-bucket must be positioned over the maximum level of water expected, that is, if possible, above the maximum relief level.

3. Accessories: The accessories related to installing a self-tipping cleaner are: (See Figure 1)

- Filling circuit: A filling circuit consists of:
  - Pipelines: these may be of polyethylene, stainless steel or material specified by the client.
  - An electro-valve: You are recommended to install it in a sump pit exterior to the tank or in the control cabin to facilitate maintenance work.
  - A ball valve.
  - It is also convenient to fit a union adapter with another ball valve to facilitate hosepipe connections.
- Control circuit, which includes:
  - Measurement of water level in the tank by means of any of the following apparatus, installed in the cleaning-water collection channel:
    - Two level buoys.
    - Three conductive probes. A piezometric probe.
    - An ultrasound level sensor.
    - …
  - Inductive proximity detector fastened to a small plaque at one end of the cleaner.
  - Programmable automaton.
  - Equipment remote control may also form part of it.

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MAINTENANCE

In general, the self-tipping cleaners do not need any maintenance. With regard to their related elements, the following aspects should be observed:

The point that most needs to be taken into consideration when it comes to maintenance is the supervision of the correct lubrication of bearings, which may seize up due to the dirt existing inside the tank. Depending on the frequency with which the tank is filled, it is necessary to monitor the bearings about every 1 to 3 years. If the bearings should be totally submerged, check their condition as soon as possible once the tank has been emptied, as the water can damage bearing joints, and "wash" away any grease.

With regard to the sensors that are related to the cleaners, when they are activated automatically, it is necessary to check their correct functioning every now and again.

- **Level gauges.** Generally, it is sufficient to clean the probes using a hosepipe to free remains of dirt attached to them.
- **Inductive detectors.** It is necessary to check their correct adjustment if a problem is detected (check they have not moved from their initial point of regulation).
- **Electrovalves.** During the first outflows it is necessary to check that the electrovalves close correctly, cleaning them if necessary from possible remains of sand and stone that may have stayed inside the water pipes as a result of the works. Should they not close correctly it is necessary to loosen the bobbin and remove the upper cover (loosen the 4 corresponding screws). Look carefully on the cover for any small stone or remains of sand trapped in the holes on the inner side and clean well the joint and metallic piece. Assemble once again as before. Be careful to close the ball valve related to the electrovalve before dismounting.

It is very important to try to keep all these elements (bearings, level gauges, inductive detectors and electro-valves) easily accessible to facilitate any maintenance work required. Access covers will be fitted on top of the different sensors. In the case of bearings and inductive detectors, it is advisable to install a cover through which the whole cleaner may be removed. It is also advisable to install the electrovalves outside the tank, either in the sump pit or in the control cabin.

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