



CONSTRUCCIONES  
METÁLICAS  
DE OBTURACIÓN, S.L.

**CMO**



GESTION DE  
LA CALIDAD  
CERTIFICADA

QUALITY  
MANAGEMENT  
CERTIFIED

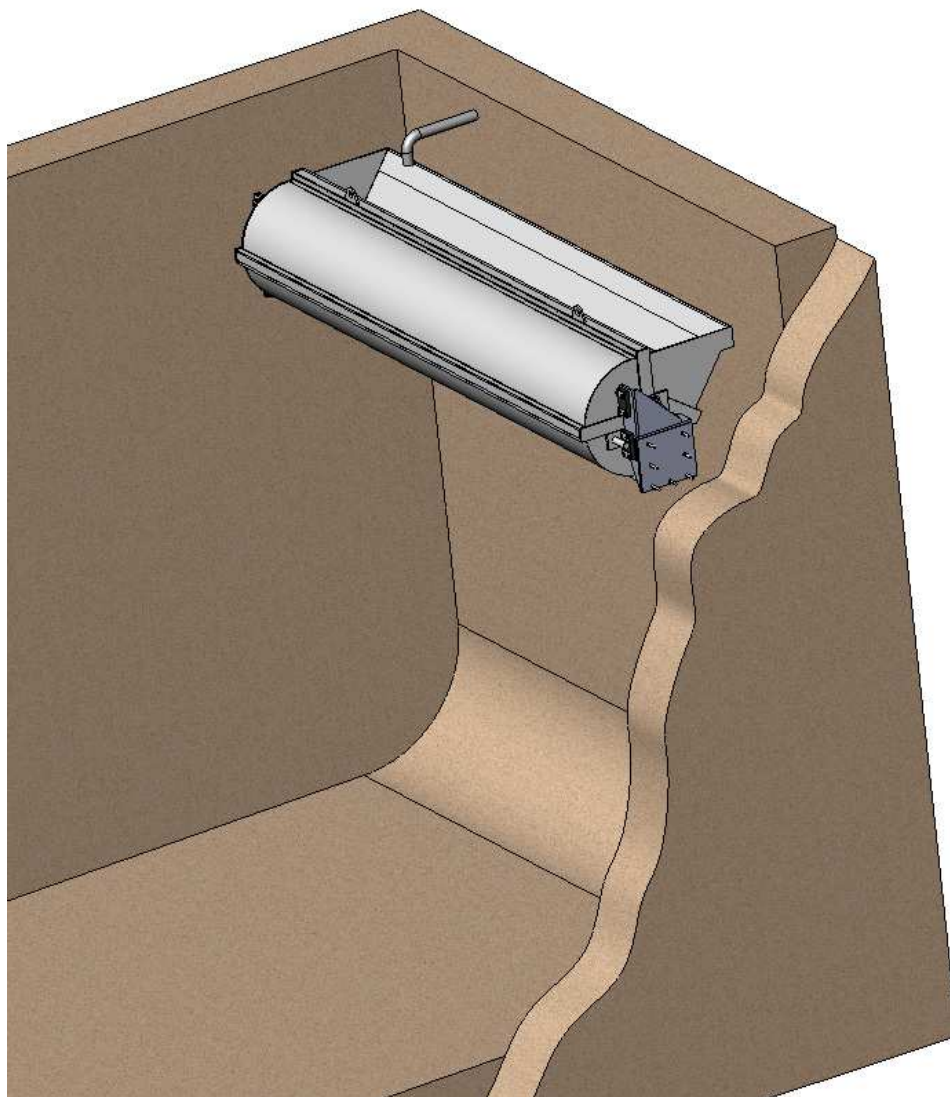
**SELF-TIPPING CLEANER**

**DC SERIES**

29/05/2012

# CHARACTERISTICS AND MAINTENANCE MANUAL

## SERIES: DC



C.M.O.

Amategui Aldea 142, 20400 Txarama-Tolosa (SPAIN)

Tel: 902 40 80 50 / Fax 902 40 80 51 / [cmo@cmo.es](mailto:cmo@cmo.es) <http://www.cmo.es>

MAN-DC.ES00

page 1



## SELF-TIPPING CLEANER

## DC SERIES

### GENERAL APPLICATIONS

Storm tanks are designed to regulate the flow produced in periods of rain and/or avoid uncontrolled discharges to the receiving environment (sea, river, etc). During the retention of water in the storm tank, solid sediments build up at the bottom. These decanted components must be removed as soon as possible, before the rain returns and sends untreated waste directly to the receiving environment. For this reason it is very important that the storm tank is cleaned every time it is emptied, thus ensuring it remains clean.

Cleaning these storm tanks manually is very expensive, and is also unpleasant and dangerous due to the large amount of sludge which builds up on the bottom.

This process is automated with the self-tipping cleaners, avoiding hazards by reducing time and thus considerably cutting the cost of keeping the storm tank clean.

### OPERATION

Cleaning of storm tanks is carried out after emptying them. We recommend carrying out this cleaning as soon as possible in order to avoid unpleasant odours and to prevent the sedimentation from drying out and becoming hard to remove.

The self-tipping cleaner is often empty and in idle position (fig. 1).

After emptying the tank, proceed to fill the self-tipping cleaner (fig. 2).

Thanks to its design and the precise location of its turning shaft, the centre of gravity makes the cleaner tip when it is almost completely full (fig. 3); this means the entire volume of water retained inside is discharged in minimum time, producing a powerful wave which sweeps all sediments built up on the base of the tank through to the channel fitted to collect them.

Once the self-tipping cleaner has discharged the entire volume of water it retained, it returns to idle position thanks to its design and its centre of gravity (fig. 1) without using any auxiliary means.

The operation of this self-tipping cleaner is very straightforward: it receives a reduced flow of water for a long period of time, which is released at once when full.

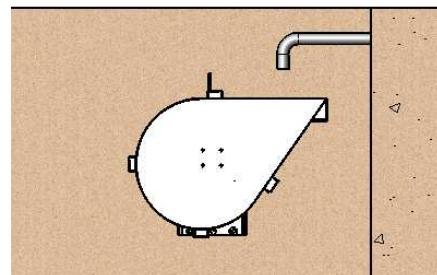


fig. 1

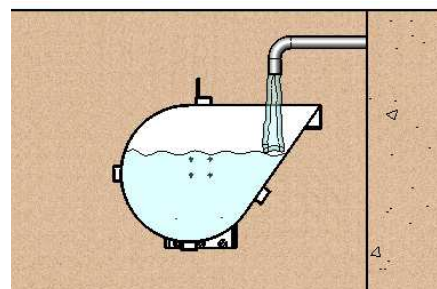


fig. 2

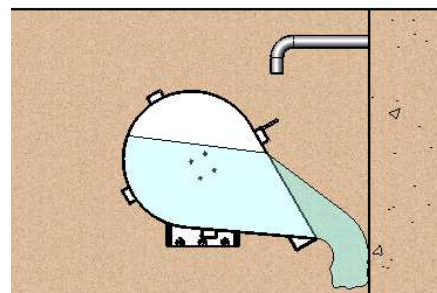


fig. 3



## SELF-TIPPING CLEANER

## DC SERIES

### ADVANTAGES OF THE SELF-TIPPING CLEANER

This type of self-tipping cleaners has considerable advantages over other cleaning systems:

- The wave of water generated is very powerful but also very short in duration. This means highly effective cleaning of the tank using very little water.
- No auxiliary means are required in order to operate or return to idle position, making use of the volume of water stored and the force of gravity to provide maximum reliability.
- Self-tipping cleaner made from stainless steel and installed above relief level, thus ensuring it does not come into contact with wastewater. Given these characteristics, maintenance is minimum and they have a very long working life.

## HANDLING

Pay special attention to the following points when handling the equipment:



- **SAFETY WARNING:** Before handling the self-tipping cleaner, we recommend checking that the crane to be used is capable of bearing its weight.
- To prevent damage, it is recommended to use soft straps to lift CMO self-tipping cleaners. These straps must be secured in the top of the body, using the lugs fitted for this purpose.
- Do not lift the cleaner by the interior ribs of the body, as this may produce damage to the body and lead to operation problems.
- Packing in wooden boxes: If the equipment is packed in wooden boxes, these must be provided with clearly marked holding areas where the slings will be placed when securing them. In the event of two or more self-tipping cleaners being packed together, separation and securing elements must be provided between them to prevent possible movements, knocks and friction during transport. When storing two or more cleaners in the same box, ensure they are correctly supported in order to prevent deformations. In the case of dispatches by sea we recommend the use of vacuum bags inside the boxes to protect the equipment from contact with sea water.
- Pay special attention to maintaining the correct levelling of the self-tipping cleaners during loading and unloading as well as during transport to prevent deformations in the equipment. For this purpose we recommend the use of mounts or trestles.

## INSTALLATION

In order to avoid personal injury and other types of damage (to the facilities, the equipment, etc.) we recommend following these instructions:



- The staff responsible for the installation or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles, etc).
- Shut off all lines that affect the storm tank and put up a warning sign to inform about the work being performed.
- Use non-electrical hand tools during installation and maintenance, in accordance with **EN13463-1(15)**.



## SELF-TIPPING CLEANER

## DC SERIES

- As regards scaffolding, ladders and other auxiliary elements to be used during assembly, follow the safety recommendations indicated in this dossier.
- Once the equipment has been assembled, make sure that there are no elements, whether interior or exterior, which can interfere with the movement of the self-tipping cleaner.
- The operation of the equipment must be coordinated with the site's control and safety staff and no modifications are permitted in the equipment's external indication elements (limit switches, positioners, etc.).
- When operating the equipment, follow the safety recommendations indicated in this dossier.

Before installation, inspect the self-tipping cleaner to ensure no damage has occurred during transport or storage.

Ensure the inside of the self-tipping cleaner is clean.

These self-tipping cleaners can be mounted in different ways, although the most common way is using mounts on the side walls. These mounts can be embedded in the concrete or secured using expansion or chemical anchors. They can also be mounted by securing brackets to the back wall or even hanging from the upper slab.

## ASPECTS TO BE CONSIDERED DURING DESIGN

The following details must be taken into account when designing an efficient self-tipping cleaner:

- It is very important that height (level "H" in fig. 4) from the base to the self-tipping cleaner is as large as possible. The higher up the cleaner is installed, the more powerful the wave generated.
- The capacity of the self-tipping cleaner is determined in line with the length (level "L" in fig. 4) of the channel to be cleaned. The longer the length of the channel, the greater the capacity required for the cleaner. This capacity usually varies between 200 and 2000 litres per metre of hopper.

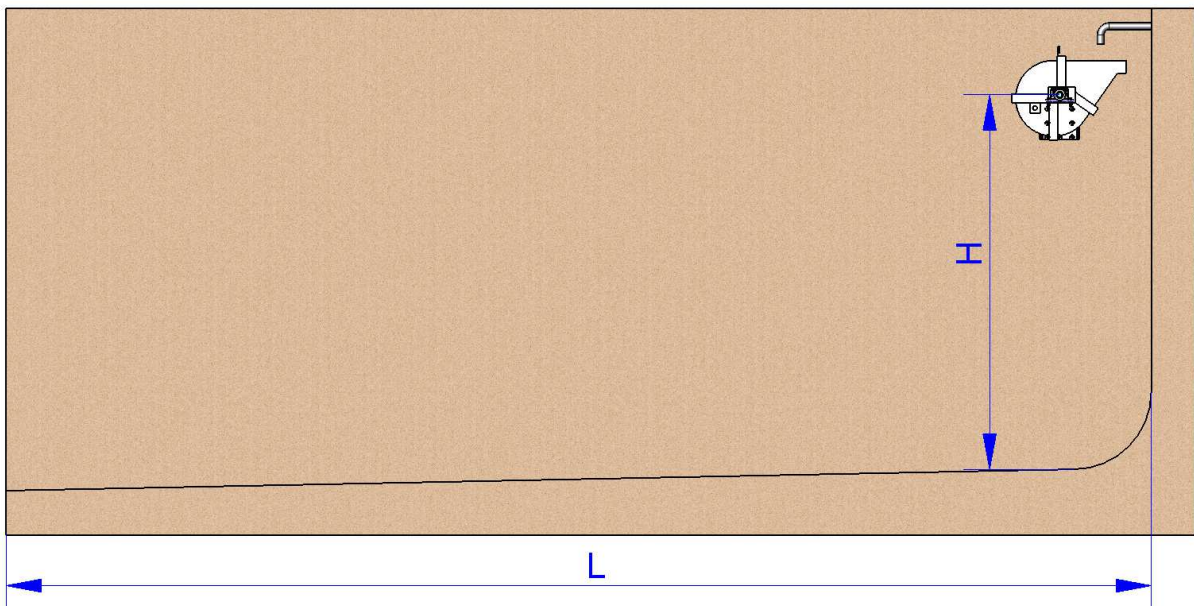


fig. 4



## SELF-TIPPING CLEANER

**DC SERIES**

### ASSEMBLY POSITIONS

The self-tipping cleaners are designed for assembly in horizontal position. For correct operation, it is vitally important that the bearings supports are perfectly aligned and the cleaner is installed completely horizontal.

### CHARACTERISTICS OF THE CIVIL ENGINEERING WORK

In order to install a self-tipping cleaner and make full use of its efficiency, the storm tank must comply with the following requirements:

- The retention compartment must be rectangular in shape.
- The bottom of the tank must be polished, or at least have a good surface finish, in order to avoid cleaning wave friction losses.
- The cradle underneath the cleaner will have a considerable ratio (level "R" in fig. 5), in order to reduce any losses produced through shock as the water comes into contact with the concrete.
- The cleaning channels must have a slope of 3% (fig. 5).
- Collection channels or drainage ditches with a volume 20% higher than the self-tipping cleaner are required at the end of the channel. This means all the sediments and the water discharged by the cleaner can be collected, preventing the wave from rebounding against the opposite wall and fluctuating along the bottom of the channel.
- Whenever the width of the tank exceeds 10 meters, it will be necessary to compartmentalise in parallel channels in order to install two or more self-tipping cleaners. The actions of the waves are therefore independent, achieving greater efficiency.
- The self-tipping cleaner should be installed above the level of the spillway, thus keeping it out of the range of the wastewater, as this will minimise maintenance and improve operation.

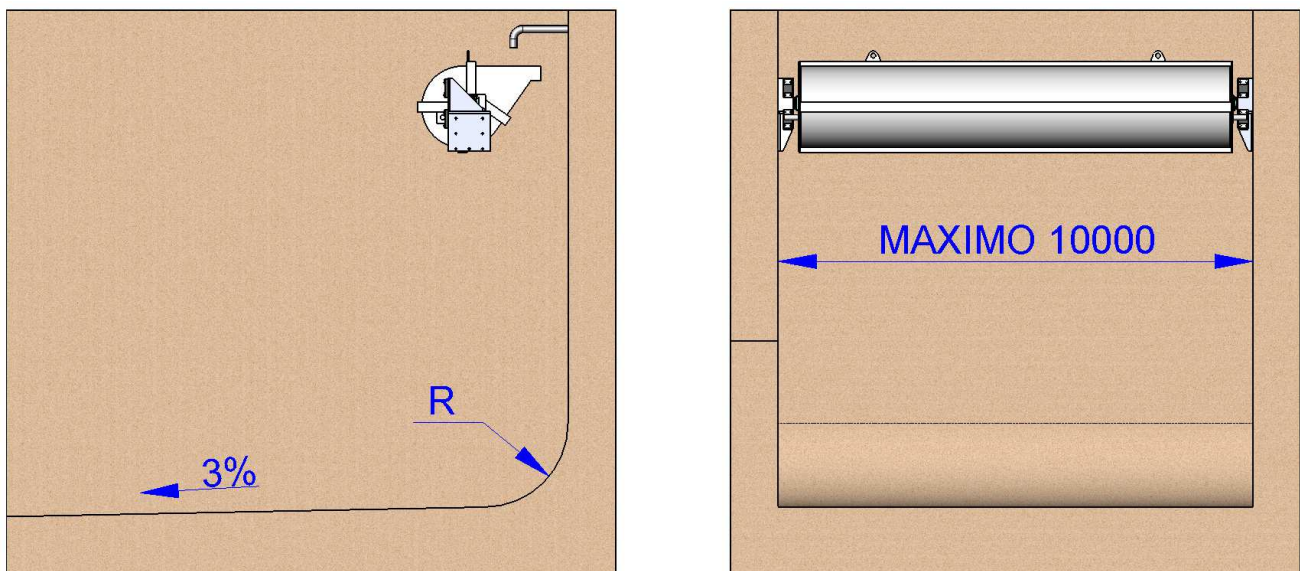


fig. 5



## SELF-TIPPING CLEANER

## DC SERIES

### ACTUATOR

As mentioned previously in this dossier, the self-tipping cleaners do not require any auxiliary means to operate, i.e. they do not require any actuator and can be controlled using the flow of water they receive.

The greater the flow received by the self-tipping cleaner, the less the time required to fill, tip and generate the cleaning wave.

The cleaner is often empty when in idle position; in order to clean the storm tank channel, fill the cleaner with water and this will, once full, tip and empty all the retained water at once. At this moment the water supply is interrupted, allowing it to return to idle position and remain empty.

The movement of the self-tipping cleaner is delimited by mechanical stoppers. These stoppers have absorption through elastomer plugs, making the operation of the cleaner both smoother and quieter.

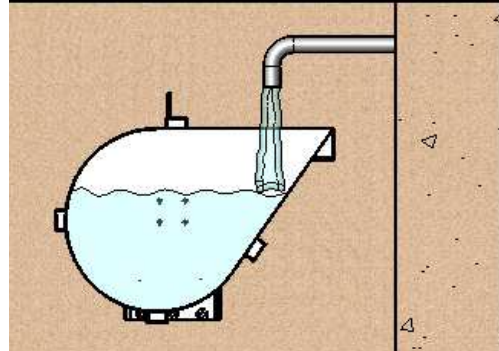


fig. 6

### MAINTENANCE

CMO will not be liable if the self-tipping cleaners suffer any damage due to improper handling or without proper authorisation. The cleaners must not be modified except under express authorisation from CMO.

#### IMPORTANT SAFETY ASPECTS

The following instructions should be followed in order to avoid personal injury or material damage when carrying out maintenance tasks:

- The staff responsible for the maintenance or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles, etc.).
- Shut off all lines that affect the self-tipping cleaner and put up a warning sign to inform about the work being performed.
- Use non-electrical hand tools during maintenance, in accordance with **EN13463-1(15)**.
- In order to work in ideal safety conditions, both the electrical and magnetic elements must be idle. The electrical control cabinets must also be out of service. The maintenance staff must be up to date with the safety regulations and work can only start under orders from the site's safety staff.
- The safety areas must be clearly marked, avoiding the use of auxiliary equipment (ladders, scaffolding, etc.) in moving parts, in order to produce the movement of the self-tipping cleaner.



Taking into account the recommendations indicated, the maintenance operations carried out in this type of equipment are shown below.



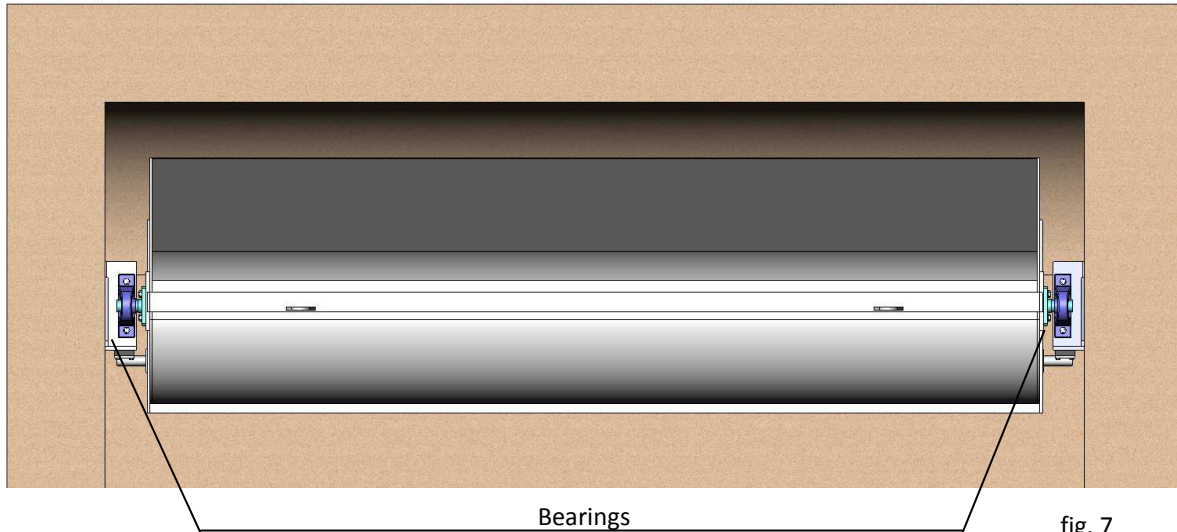
## SELF-TIPPING CLEANER

## DC SERIES

CMO's self-tipping cleaners are very straightforward and require minimum maintenance.

The only maintenance required is a visual check of the cleaners and lubrication of the side bearings once a year (fig. 7). The regularity interval for lubricating the bearings will depend on how often the tank is filled or the dirt built up in them.

As mentioned above, these self-tipping cleaners are installed above relief level, thus ensuring they do not come into contact with the wastewater. This characteristic is one of the main reasons which minimise the maintenance work and prolong the working life of the self-tipping cleaner.



## STORAGE

To ensure the self-tipping cleaner is in optimum conditions of use after long periods of storage, we recommend storing it in a well-ventilated place at temperatures below 30°C.

It is not advisable, but if it is stored outside, the self-tipping cleaner must be covered to protect it from heat and direct sunlight, with good ventilation to prevent humidity. The following aspects must be considered for storage purposes:

- The storage place must be dry and under cover.
- It is not recommended to store the equipment outdoors with direct exposure to adverse weather conditions, such as rain, wind, etc. Even when the equipment is packaged.
- This recommendation is even more important in areas with high humidity and saline environments. Wind can carry dust and particles which can come into contact with the self-tipping cleaner's moving parts and this can lead to operating problems.
- The equipment must be stored on a flat surface to avoid loss of shape.
- If the equipment is stored without suitable packaging it is important to keep the self-tipping cleaner's mobile parts lubricated, for this reason it is recommended to carry out regular checks and lubrication.