SELF-TILTING CLEANER

DC

CMO VALVES

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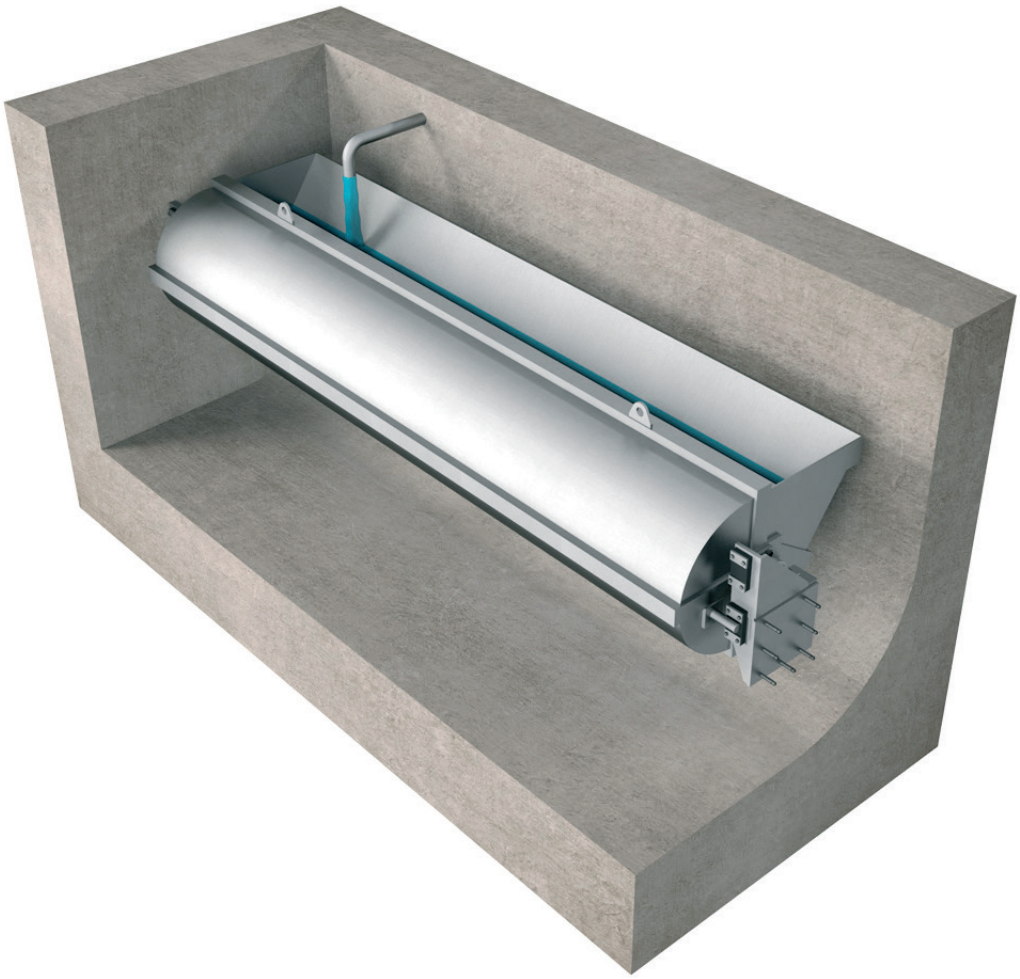
INSTRUCTIONS AND MAINTENANCE MANUAL



INSTRUCTIONS AND MAINTENANCE MANUAL

PURPOSE AND SCOPE

This document describes the installation, use and maintenance instructions for self-tilting cleaners, **CMO Valves** DC series, for storm tanks and holding chambers.

Self-tilting cleaners are designed to release their water content, by tipping, through a self-tilting system, and generating a water wave that carries and cleans the sediment deposited at the bottom of storm tanks and holding chambers, which is their intended use. Any other uses must be consulted and approved in writing by **CMO Valves. CMO Valves** shall not be liable for any damage arising from applications deviating from the intended use or as a result of improper installation, commissioning or operation of the gate.

The manual provides general instructions for self-tilting cleaners complemented by technical information related to their sales order (approval drawings, technical descriptions, specifications, etc.).

As part of its ongoing product and service improvement process, **CMO Valves** reserves the right to alter the data and content of this document at its discretion at any time without notice.

GENERAL APPLICATIONS

Storm tanks are intended to regulate the flow produced during rainy periods and/or to avoid uncontrolled discharges into the receiving medium (river, sea...). During the retention of water in the storm tank, solids settle to the bottom of the tank. These settled components must be removed as soon as possible, before the rain returns and the untreated waste is sent directly to the receiving environment.

It is therefore very important to ensure the storm tank is correctly maintained, by cleaning after each emptying of the tank.

Cleaning these storm tanks manually is very costly, unpleasant and dangerous due to the large amount of sludge that accumulates at the bottom.

With the self-tilting cleaners, this process is automated, avoiding dangers, reducing time and therefore considerably reducing the cost of keeping the storm tank clean.

OPERATION

The cleaning of the storm tank is carried out after emptying it. It is advisable to carry out this cleaning as soon as possible, this will prevent bad odours from being generated and the sediment from drying out and making it more difficult to remove. The self-tilting cleaner is usually empty and in a resting position (fig. 1).

After emptying the tank, the self-tilting cleaner fills up (fig. 2).

When it is almost completely filled, thanks to its design and the precise location of its pivot axis, the centre of gravity causes the cleaner to tilt 3), turning it upside down, thus pouring out the entire volume of water it was holding inside in a minimum period of time, producing a powerful wave that sweeps all the sediments deposited on the tank floor into the channel designed to collect it.

Once the self-tilting cleaner has discharged the entire volume of water it was holding, due to its design and its centre of gravity, without its water load, it returns to the rest position (fig. 1) without the use of auxiliary means.

The operation of this self-tilting cleaner is very simple, it receives a reduced flow of water for a long period of time, and once it has been filled, it releases it all at once.

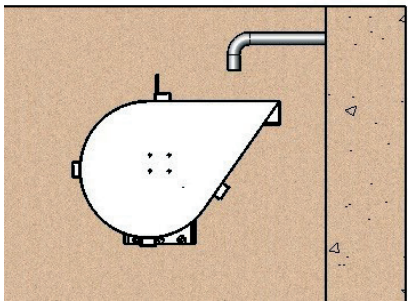


Fig. 1

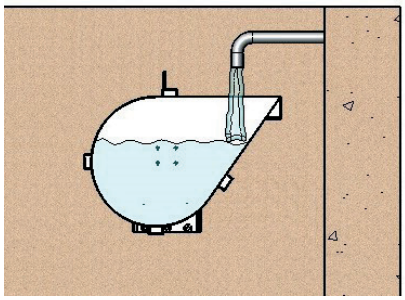


Fig. 2

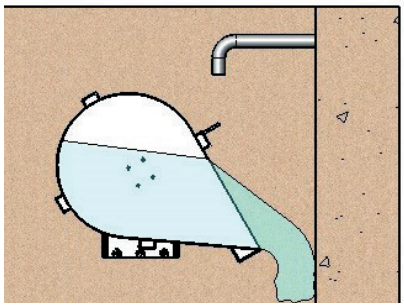


Fig. 3

ADVANTAGES OF THE SELF-TILTING CLEANER

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

- The wave of water generated is very powerful, but at the same time has a very short duration. As a result, the tank is cleaned to a very high level and the amount of water required is minimal.
- It does not require any auxiliary means to operate or to return to its rest position, it uses the mass of the stored water quantity and the force of gravity, which is why it is extremely reliable.
- Construction of the self-tilting cleaner in stainless steel and installation above the spillway level, so it is out of contact with wastewater. Due to these characteristics, the required maintenance is minimal and service life is very long.

The operation of this self-tilting cleaner is very simple, it receives a reduced flow of water for a long period of time, and once filled, it is released all at once, creating a wave or mass of water.

SAFETY ASPECTS

This manual provides essential information on installing, commissioning and maintaining **DC Series**self-tilting cleaners. It is essential to follow all the indicated recommendations, codes of good practice, standards, applicable legislation, and directives related to work safety, risk prevention and technical aspects.

Individuals operating this equipment must possess technical training and be well acquainted with all warnings and cautions outlined in these instructions. Failure to observe the warnings and cautions may result in personal injury and damage to property. Be sure to read and fully understand this manual before installing, operating or maintaining the gate.

Altering or modifying this product without written consent from **CMO Valves** may lead to incorrect operation, critical failures or damage, thereby voiding the warranty.

HANDLING

When handling the equipment, pay special attention to the following points:

- **SAFETY WARNING:** Before handling the self-tilting cleaner, or any of its parts, it is recommended to check that the lifting and handling devices (e.g. cranes) to be used are dimensioned to handle the weight and dimensions of the self-tilting cleaner.

- Soft straps to lift **CMO Valves** self-tilting cleaners are recommended in order to prevent any damage. These straps must be fitted around the top of body, using the lifting lugs for that purpose.

- Do not lift the cleaner by holding the inner ribs of the body, as doing so may deform the body and cause problems during operation.

- 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. If two or more gates are packed together, separation and securing elements must be provided between them to prevent any movements, knocks and friction during transport. When storing two or more gates in the same box, ensure they are correctly supported in order to prevent any deformations. For sea transport, we recommend using vacuum bags inside the wooden boxes to protect the equipment from contact with sea water.

- Special attention should be paid to maintaining the correct levelling of the gates during loading and unloading, as well as during transport and storage, to prevent any mechanical deformations in the equipment. We therefore recommend using mounts or trestles.

STORAGE

Before storing, ensure the gates and related components have not been damaged or deformed during transport or handling. Any incident must be corrected prior to assembly. If in doubt, please contact **CMO Valves.**

To ensure the valve is in optimum conditions of use after long periods of storage, it should be stored in a well-ventilated place at temperatures below 30ºC.

It is not advisable but, if stored outside, the valve 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 undercover.
- It is not recommended to store the equipment outdoors with direct exposure to adverse weather conditions, such as rain, wind, etc. This is particularly true if the equipment is not protected with packaging.
- 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-tilting cleaner mobile parts and this can lead to operating difficulties.
- 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 valve's mobile parts lubricated; for this reason, it is recommended to carry out regular checks and lubrication.

INSTALLATION

Adhere to the following instructions in order to prevent personal and/or material damage (to the facilities, the gate, etc.):

- Before installation, inspect the gate to ensure no damage has occurred during transport or storage
- All personnel in charge of installing or operating 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 valve and put up a warning sign about the work.
- Regarding scaffolding, ladders and other auxiliary elements to be used during assembly, follow the safety recommendations provided by their manufacturers, as well as the safety instructions in this manual.
- Once the equipment has been assembled, make sure that there are no elements, whether interior or exterior, which can interfere with the movement of self-tilting cleaner.
- 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 indicator elements (limit switches, sensors, etc.).

Make sure the inside of the self-tilting cleaner is clean.

There are different ways to assemble these self-tilting cleaners, the most common is by means of supports on the side walls, these supports can be embedded in the concrete or secured by means of expansion or chemical anchors. They can also be mounted by securing the brackets to the back wall or even hanging from the top slab.

ASPECTS TO BE CONSIDERED DURING DESIGN

To design an effective self-tilting cleaner, the following details must be taken into account:

- It is very important that the height (dimension “H” in fig. 4) from the floor to the self-tilting cleaner be as great as possible. The higher the cleaner is installed, the more powerful the wave that is generated.
- The capacity of the self-tilting cleaner is determined according to the length (dimension “L” in fig. 4) of the channel or lane to be cleaned. The longer the length of the channel or lane, the greater the capacity of the cleaner will need to be. This capacity usually ranges between 200 and 2000 litres per meter of hopper.

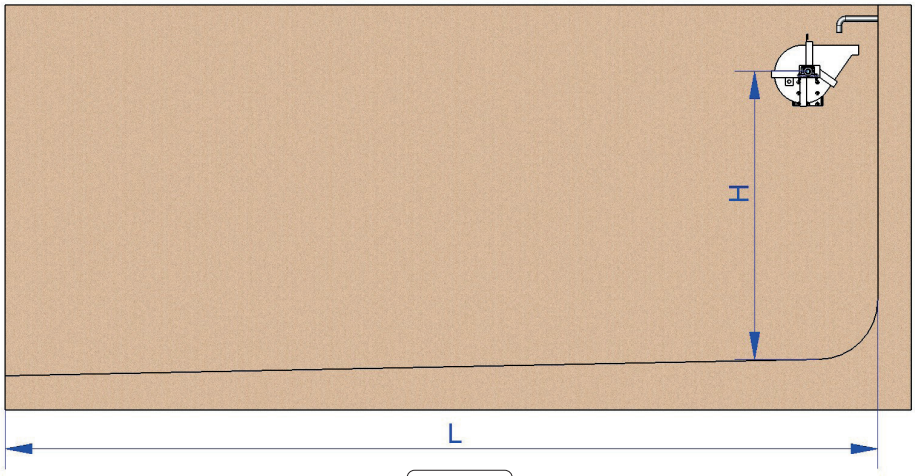


Fig. 4

ASSEMBLY POSITIONS

Self-tilting cleaners are designed to be assembled in a horizontal position. For correct operation it is vital that the bearing supports are perfectly aligned with each other and that the cleaner is installed completely horizontal.

CHARACTERISTICS OF THE BUILDING WORKS

In order to install a self-tilting cleaner and take full advantage of its effectiveness, the storm tank must meet the following requirements:

- The shape of the holding compartment shall be rectangular.
- The tank floor must be polished or at least have a good surface finish, in this way losses due to friction from the cleaning wave are avoided.
- The cradle under the cleaner will have a considerable radius (dimension “R” in fig. 5), in order to reduce losses caused by the impact of water against concrete.
- Cleaning lanes should have a slope of 3% (fig. 5).
- At the end of the lane, collection channels or evacuation pits with a volume 20% greater than that of the self-tilting cleaner are necessary. In this way they will be able to collect all the sediments and the water discharged by the cleaner, preventing the wave from bouncing of the opposite wall and fluctuating along the lane surface.
- In cases where the width of the tank exceeds 10 meters, it will have to be divided into parallel lanes in order to install two or more self-tilting cleaners. In this way the actions of the waves become independent, achieving greater efficiency.
- The self-tilting cleaner must be installed above the height of the spillway, so it is out of the reach of the wastewater and thus minimizes maintenance and its correct operation.

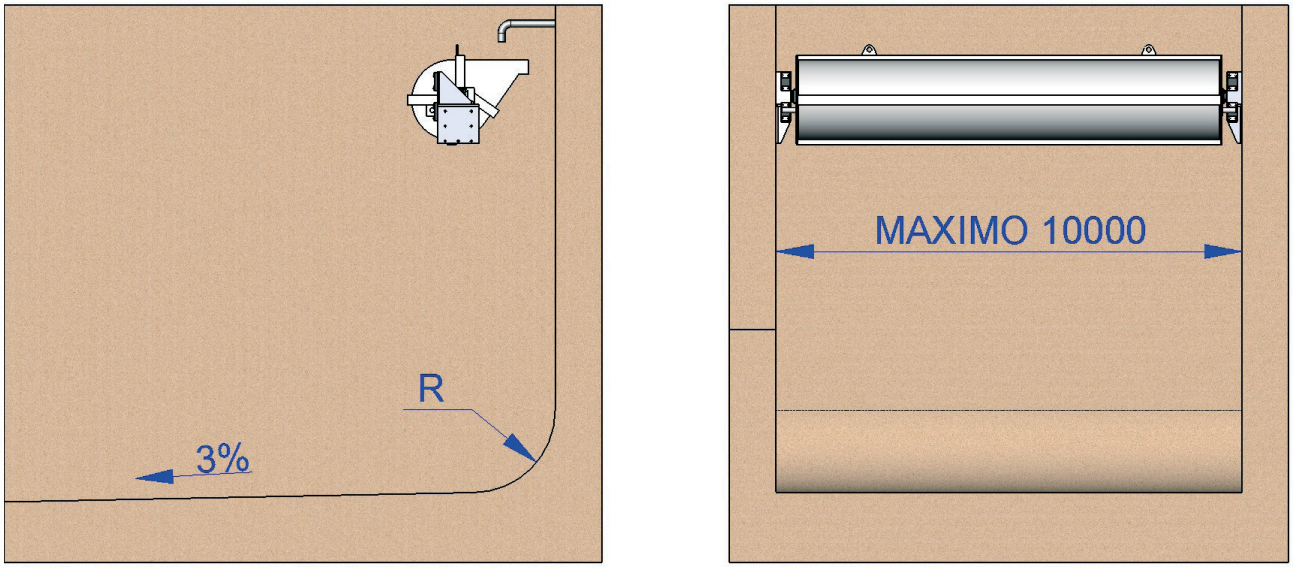


Fig. 5

OPERATION

As mentioned previously in this document, self-tilting cleaners do not require any auxiliary means for their operation, therefore, they do not have any actuation unit, but their operation can be controlled by the flow of water they receive.

The higher the flow rate received by the self-tilting cleaner, the less time is required to fill it, tilt it and generate the cleaning wave.

The cleaner is usually empty when it is in the rest position, when cleaning the lane from the storm tank, proceed to fill the cleaner with water, once it reaches the limit, it tilts, emptying all the water it held at once, at this moment the water supply is cut off, so it returns to its rest position and remains empty.

The movement of the self-tilting cleaner is delimited by mechanical stops. These stops are cushioned by means of elastomer blocks, which make the operation of the cleaner one of the smoothest and most silent.

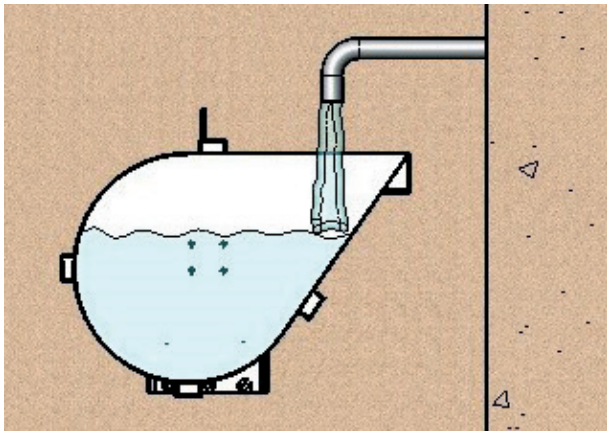


Fig. 6

MAINTENANCE

CMO Valves will not be liable if the gates suffer damage due to improper handling or lack of proper authorisation, or due to incorrect assembly and commissioning. Manipulating or modifying the gate is forbidden unless expressly authorised by **CMO Valves**.

To prevent any personal or material damage during maintenance tasks, follow the safety instructions provided in this manual, as well as the following instructions:

- All personnel responsible for equipment maintenance or operation must be qualified, trained and familiar with the equipment and processes.
- It is mandatory to use appropriate personal protective equipment (PPE) (gloves, safety footwear, goggles, etc.).
- Shut off all lines which affect the gate and put up a warning sign to inform about the work being carried out.
- Check that the self-tilting cleaner is empty.
- Completely isolate the line, channel or lane from the entire process. Empty the channel.
- For maintenance and commissioning, use tools suitable for the application and work area according to current regulations.
- In order to work under ideal safety conditions, 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 placing auxiliary equipment (ladders, scaffolding, etc.) on levers or moving parts which will lead to movement of the leaf.

Taking into account the recommendations indicated, below are the maintenance operations for this type of equipment:

CMO Valves self-tilting cleaners are very simple, so the maintenance required by this equipment is minimal.

The only maintenance required is a visual check of the cleaners and once a year the greasing of the side bearings (fig. 7). Depending on the frequency with which the tank is filled or the dirt accumulated in them, the frequency of greasing the bearings varies.

As mentioned previously, these self-tilting cleaners are installed above the spillway level, so they are not in contact with wastewater. This feature is one of the main reasons that minimize maintenance work and extend the life of the self-tilting cleaner.

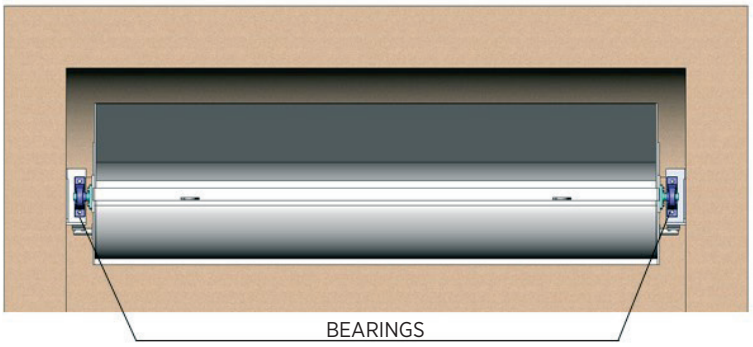


Fig. 7

SPARE PARTS

All components and materials used to manufacture **CMO Valves** self-tilting cleaners have been designed and selected according to the requirements and specifications of each project. Use only original spare parts.

For any request or inquiry, contact **CMO Valves** stating the material or component required and the order or project number. Our website at **www.cmovalves.com** includes catalogues and technical information that can be used to identify the self-tilting cleaner parts and components.

ENVIRONMENTAL ASPECTS: DISPOSAL AND RECYCLABILITY

To minimise the environmental impact during the life cycle of the **DC series** self-tilting cleaners, users are given the following environmental guidelines and should consult the relevant standards and directives before disposal.

- During transport, storage, assembly and commissioning: Materials used in packaging must be processed through the appropriate recycling channels.
- At the end of the product's (or component's) life cycle: Specialised waste management companies can recycle the materials used in the manufacture of the self-tilting cleaner, such as:
    - **Metal:** steel, aluminium, cast iron, copper, bronze, etc.
    - **Plastic:** Sliders, rubbers and seals
    - Due to their nature, **oils and greases** require special treatment before disposal; be sure to use approved waste management companies for this task.

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Latest version of the Installation and Maintenance Manual available at **www.cmovalves.es.**

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CMO VALVES

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CMO VALVES
HEADQUARTERS MAIN OFFICES & FACTORY

Amategi Aldea, 142
20400 Tolosa
Gipuzkoa (Spain)

Tel.: (+34) 943 67 33 99

cmo@cmovalves.com
www.cmovalves.com

CMO VALVES
MADRID

C/ Rumania, 5 - D5 (P.E. Inbisa)
28802 Alcalá de Henares
Madrid (Spain)

Tel.: (+34) 91 877 11 80

cmomadrid@cmovalves.com
www.cmovalves.com

CMO VALVES
FRANCE

5 chemin de la Brocardière
F-69570 DARDILLY
France

Tel.: (+33) 4 72 18 94 44

cmofrance@cmovalves.com
www.cmovalves.com