

FL



UNIDIRECTIONAL END OF LINE RETENTION PENSTOCK

DESCRIPTION

- Penstock for clean liquids or loaded with solids.
- Design of the circular, square or rectangular penstock.
- Possibility of vertical or slanted sealing.
- Various seal materials available.
- Designed to install supported on walls with anchors or bolted to a flange.
- Possibility of extra-flat design.

GENERAL APPLICATIONS

This retention penstock is designed for assembly as end of line. It can be installed mounted on the wall with anchors or bolted to a flange. Its design can be circular, square or rectangular. An elastomer seal is used in order to achieve sealtight integrity.

It is suitable to work with clean liquids or loaded with solids. Used mainly in:

- Wastewater treatment plants
- Irrigation
- Hydroelectric power stations
- Conduits

SIZES

- From DN80 or DN3000
- From 125x125 or 3000x3000

** Larger sizes to order*

Check with **CMO Valves** for the general dimensions of a specific retaining penstock.

WORKING (ΔP)

The maximum working pressure adapts to the needs of the customer in every project. These penstocks are designed to comply with working conditions in the place of installation.

FLANGES / CIVIL ENGINEERING WORK

Possibility of assembly bolted to a flange or wall-mounted:

- **FLANGE:** The joint of the penstock to a flange can be carried out in accordance with different standards: PN10, PN6, PN16, PN25, ANSI 150, Australian Standard, British Standard, JIS Standard...
- **CIVIL ENGINEERING WORK:** These penstocks can be designed to be secured to the wall using chemical or expansion anchors. The boreholes necessary for attachment are made when assembling, using the body of the penstock as a guide.



Fig. 1



Fig. 2

SEALTIGHT INTEGRITY

The sealtight integrity of **FL** retention penstocks complies with that set out in regulation DIN 19569, class 5 leaks.

APPLICATION OF EUROPEAN DIRECTIVES

See document of European Directives applicable to **CMO Valves**.

** For information on categories and zones please contact CMO Valves Technical-Sales Department.*

QUALITY DOSSIER

The sealtightness of the seat area is measured with gauges. Material and testing certificates can be supplied on request.

ADVANTAGES

FL retention penstocks are designed to handle liquids. One of the main elements of the **FL**-s is the body. This penstock is secured directly either to the flange or to the wall, and is fitted with lugs where the flap is attached and swivels. An elastomer seal bolted to the body with a stainless steel flange is used in order to achieve sealtight integrity and prevent liquid leakages.

CMO Valves FL-s are designed in two ways:

- For installation on a flange: the body will be fitted with a flange with boreholes, in accordance with the standard required in the installation. The assembly will be bolted down.
- For installation mounted on a wall: the body will be fitted with a flange with boreholes in accordance with **CMO Valves** design, and used as a template for the boreholes required on site. The assembly will be made using chemical anchors or expansion anchors.

The interior dimensions of the body passage usually coincide with the dimensions of the wall orifice or with the inside of the installation flange, thereby ensuring that there is no obstruction in the passage of the fluid, allowing entirely continuous passage whenever the penstock is completely open and avoiding any build-up of residue.

The main characteristics of **FL** end of line retention penstocks are as follows:

- Little space required for installation.
- Total, continuous passage when the penstock is in open position.
- Very little maintenance; straightforward maintenance.
- Very long working life of the penstock thanks to its straightforward but robust design.
- Possibility of square, rectangular or circular design.

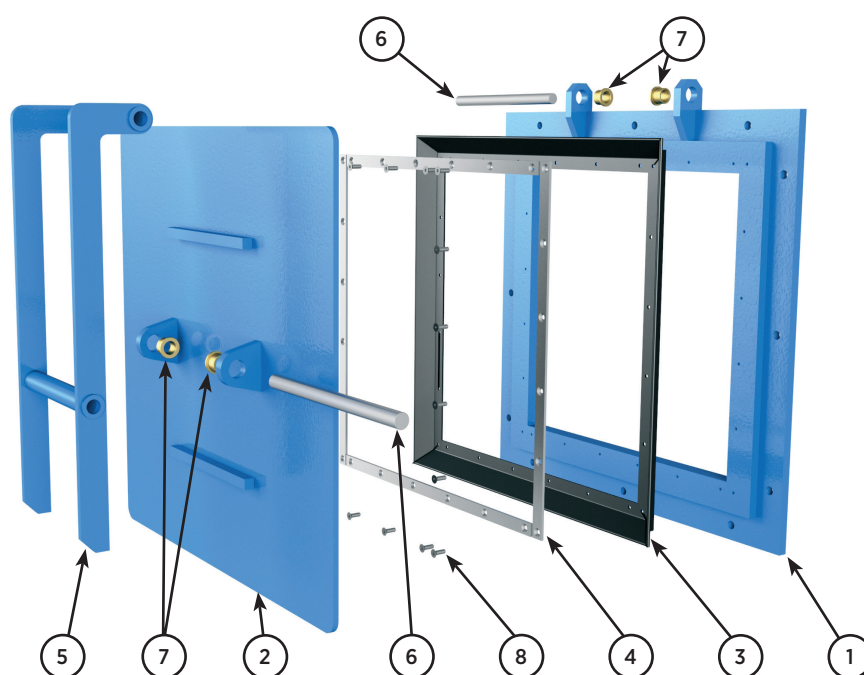


Fig. 3

COMPONENTS LIST

Table. 1

POS	COMPONENT	VERSION S275JR	VERSION AISI304	VERSION AISI316
1	BODY	S275JR	AISI304	AISI316
2	FLAP	S275JR	AISI304	AISI316
3	SEAL	EPDM	EPDM	EPDM
4	FLANGE SEAL	AISI304	AISI304	AISI316
5	ARM	S275JR	AISI304	AISI316
6	SHAFT	AISI304	AISI304	AISI316
7	BUSHING	BRONCE	BRONCE	BRONCE
8	SCREWS AND BOLTS	A2	A2	A4

DESIGN CHARACTERISTICS

1. BODY

The body of such penstocks is usually mechanically welded, manufactured in a single piece and produced with different thicknesses which are reinforced in order to prevent any deformation and increase robustness.

An elastomer seal bolted to the body with a stainless steel flange is used in order to achieve sealtight integrity and prevent liquid leakages.

The bodies can be square (fig. 4), rectangular or circular (fig. 5). Constructed in line with the needs of each specific project.

CMO Valves has two types of design to secure the body in the installation:

- Bolted to a flange already found on site.
- Mounted on a wall and secured with expansion or chemical anchors.

As the body is designed in line with the dimensions of the wall or pipe orifice, there are no protrusions and passage is complete and continuous when the penstock is completely open.

The material used is usually stainless steel AISI304 or AISI316, although carbon steel S275JR can also be used. In accordance with the conditions the penstock will be subject to, there are other special materials available to order, such as AISI316Ti, Duplex, 254SMO, Uranus B6, Aluminium, etc.

As a rule, iron or carbon steel penstocks are painted with an anti-corrosive protection of 80 microns of EPOXY (colour RAL 5015), although other types of anti-corrosive protections are also available.



Fig. 4

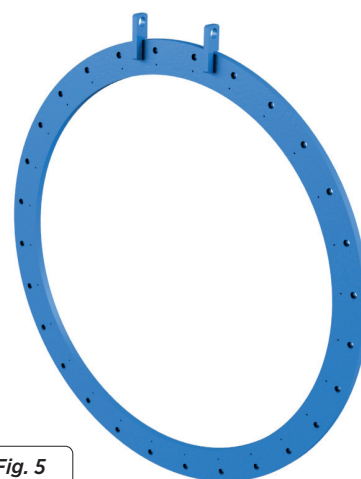


Fig. 5

2. FLAP

The flap manufacture material is usually the same as that used for the body, although it can also be supplied to order with other materials or combinations.

In accordance with the dimensions of the penstock, reinforcements can be welded to the flap (fig. 6) in order to achieve the necessary rigidity.

The flap is secured to the body at the top. This is where the penstock turning point is found, and the flap swivels on this turning point.

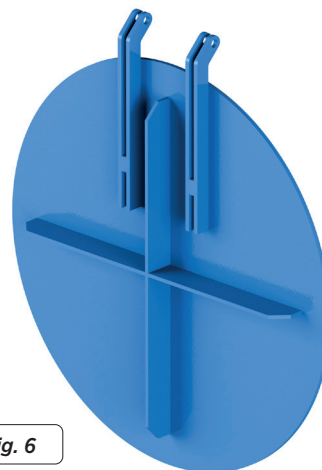


Fig. 6

3. SEAT

The standard seal in this type of penstocks uses elastomer rims located throughout the perimeter of the penstock body; these rubber rims are bolted to the body using stainless steel flanges.

Although the standard sealtight joint is EPDM, there are other types of materials in order to choose the most suitable, in accordance with the working applications for the penstock (work temperature, fluid type, etc).

The characteristics of the most common ones are described here, and they are also summarised below in table 2:

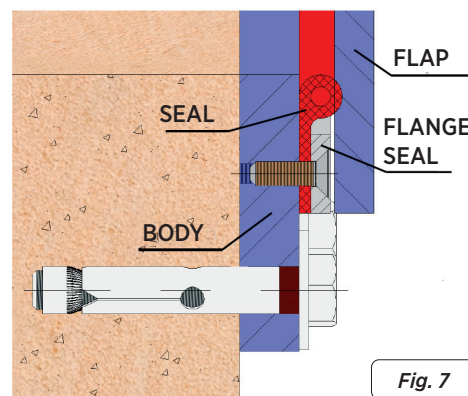


Fig. 7

A summary of the typical materials used for the closures described above and their temperature limitations is shown in the table below.

ASIENTOS/JUNTAS		
MATERIAL	Tª MÁX (°C)	APLICACIONES
EPDM (E)	90 *	Non-mineral oils, water and acids
Nitrile (N)	90 *	Hydrocarbons, oils and greases
FKM (V)	200	Hydrocarbons and solvents
Silicone (S)	200	Food products
PTFE (T)	250	Resistant to corrosion
Natural Rubber	90	Abrasive products
EPDM and Nitrile: it is possible up to Tª Max: 120°C on request		
Note: More details and other materials on request		

Table. 2

***Note:** In some applications other types of rubber are used, such as: hypalon, butyl, etc. Please contact **CMO Valves** if you require one of these materials.

SEALTIGHT JOINT MATERIALS

There are different types of seats depending on the work application:

EPDM

Recommended for temperatures below 90°C*, providing the penstock with 100% sealtight integrity. Application: Water and acids.

NITRILE

Used in fluids containing fats or oils at temperatures no higher than 90°C*. It provides the penstock with 100% sealtight integrity.

FKM

Suitable for corrosive applications and high temperatures of up to 190°C continuously and peaks of 210°C. It provides the penstock with 100% sealtight integrity.

SILICONE

Used mainly in the food industry and for pharmaceutical products with temperatures no higher than 200°C. It provides the penstock with 100% sealtight integrity.

PTFE

Suitable for corrosive applications and pH between 2 and 12. It does not provide the penstock with 100% sealtight integrity. Estimated leakage: 0.5% of the pipe flow.

NATURAL RUBBER

This can be used in multiple applications at temperatures below 90°C, with abrasive products, and it provides the penstock with 100% sealtight integrity. Application: fluids in general.

4. ACTUATORS

These **FL** penstocks do not have an actuator system, but rather are automatic. It is the fluid which opens or closes the penstock.

When the fluid comes from inside the pipe to the outside, it pushes on the flap which swivels on the turning point and opens the penstock. The degree of opening will be proportional to the pressure of the fluid: the greater the pressure, the more the penstock will open (fig. 8).

When the fluid comes from the extractor towards the piping, it pushes the flap against the body, pressing on the elastomer seal in order to achieve sealtight integrity. The greater the fluid pressure, the more the flap presses against the body, thus ensuring sealtight integrity at all times (fig. 9).

The sealtight integrity complies with that set out in regulation DIN 19569, class 5 of leaks.

GATE OPEN

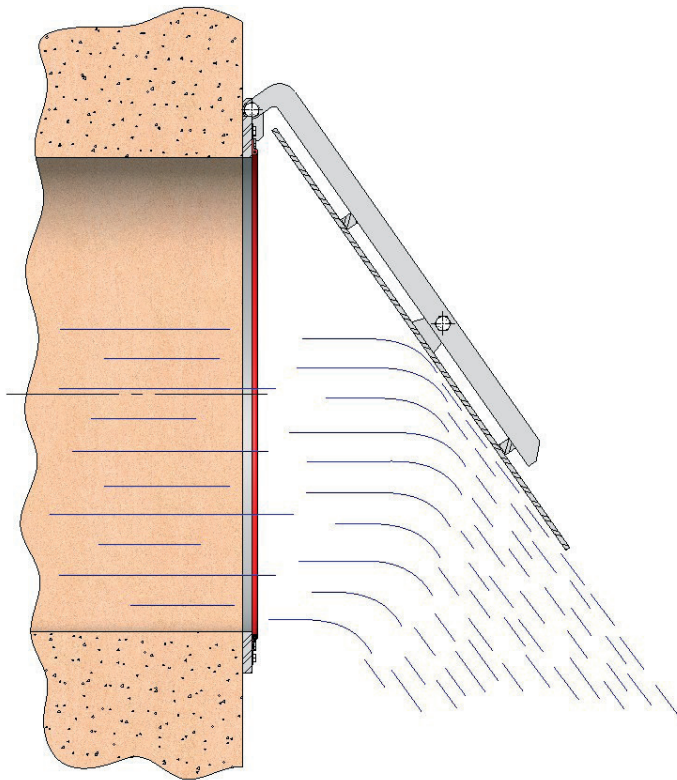


Fig. 8

GATE CLOSED

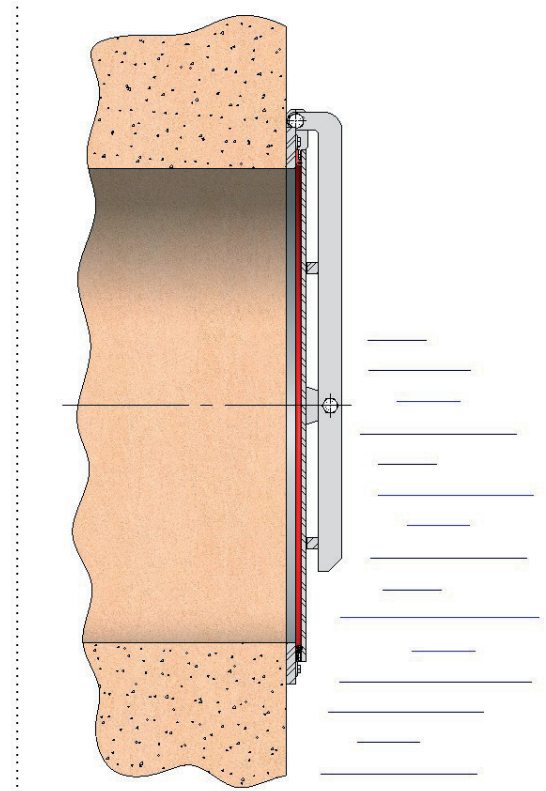


Fig. 9

ACCESSORIES AND OPTIONS

Different accessories are available to adapt the penstock to specific working conditions such as:

MECHANICAL LIMIT SWITCHES, INDUCTIVE DETECTORS AND POSITIONERS:

Limit switches or detectors are installed to indicate a specific penstock position, as well as positioners to indicate continuous position.

MECHANICAL OPENING LIMITERS (MECHANICAL STOPS):

Allow the opening to be mechanically adjusted, limiting the degree of opening required for the penstock.

MECHANICAL LOCKING SYSTEM:

Allows the penstock to be mechanically locked in a set position for long periods.

EPOXY COATING:

All carbon steel components and bodies of **CMO Valves** penstocks are EPOXY coated, giving them great resistance to corrosion and an excellent surface finish.

CMO Valves standard colour is blue RAL-5015.

EXTRA-FLAT MODEL:

There is a **CMO Valves** model of FL penstocks known as extra-flat, which is suitable for installations which do not have a lot of space. The dimensions of the penstock are reduced to a minimum to occupy the least space possible.

ELONGATED BODY:

Allows the penstock to discharge the fluid at a required distance from the flange attachment or penstock wall.

SLANTED SEAL:

In this type of penstocks, the slant of the seal helps to carry out the flap sealing process.

STOPBOARD WITH BALLAST:

ption of stopboard with fixed ballast, for example cement or variable ballast such as sand. Variable ballast can be used to alter the weight in line with the requirements of the installation, filling or emptying the stopboard through the plugs fitted for this purpose.



Fig. 10

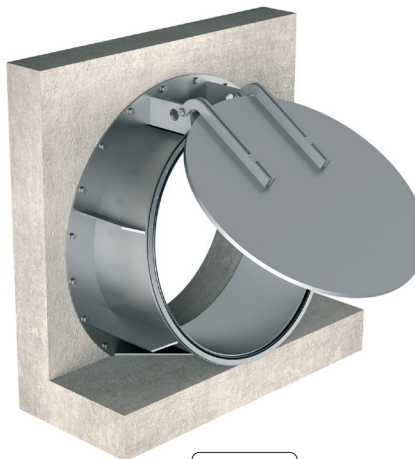


Fig. 11



Fig. 12

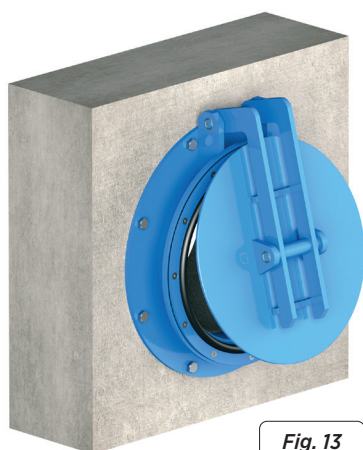


Fig. 13



Fig. 14

DIMENSIONS FOR DIFFERENT OPTIONS

These **CMO Valves** end of line retention penstocks are designed in line with the specific needs of each customer for each project. As detailed throughout this manual, there is a huge range of designs for this penstock, depending on multiple variables such as work pressure, dimensions, materials, type of attachment, etc. If you would like to know the general dimensions of a particular penstock, please contact **CMO Valves** to request this information.

ATTACHMENT OPTIONS

As mentioned above, there are several options to secure the **FL** penstock in the installation, although the following are the most common:

- Bolted to a flange already found in the installation, meaning the standard for this flange must be known in order to manufacture and install without any problems.
- Mounted on a wall and secured with expansion or chemical anchors. With this option it is very important that the wall where the penstock is to be supported is completely flat, otherwise the body may become deformed and produce irreparable damage when tightening the anchorings.

These are the most common attachment options, although, as mentioned on other occasions throughout this manual, the design of these **FL** penstocks is defined in accordance with the customer's requirements in each specific project. In consequence, if you require a different attachment option, contact **CMO Valves** technical sales department for a bespoke project in line with your needs.



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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