There are many different types of materials to manufacture packing, though MIPEL uses only types criteriously selected, and that perfectly atend the customers needs as well as the existing standards for bronze valves.

a). PTFE packing (Polytetrafluorethylene)

Well known as Teflon packing (PTFE), manufactured from this material has an excellent behaviour due to the extraordinary self-lubricating properties and its shapeability, inside packing chamber, causing no unwanted outflow, indispensable for cleaning and ease application.

For a long time Teflon packing (PTFE) are employed in bronze valves by MIPEL, for all kinds of pressure, except in cases where the working temperatures are above 200 ºC, which is the limit permited for Teflon.

b). Grafithed Asbestos Packing

Packings are manufactured from woven asbestos thread, impregnated with grafithe.

They are very compact dense, suitable for sealing on valve stem, resisting to temperatures up to 320 ºC.

1.3.2.6.3. Fluid Leakage through Packing

When opening and closing operations are frequent, packing wears and allow leakage from the line to the atmosphere. A single retight on the gland packing can solve the problem.

However, when packing is worn out, the replacement can be done even with the valve under pressure, since the manufacturer suggests it in their catalog.

To make it possible, just totally open the valve forcing the stem against the cover and blocking the fluid flow to the packing chamber, allowing a safe and efficient replacement.

1.3.2.6.4. Gasket

Many types of gaskets are used in sealing for flanges coupling and other types of connections in valves and pipeline.

For bronze valves specifically, the hidraulic cardboard gasket are frequently used, because it is suitable for possible pressure variations and working temperature.

Hydraulic cardboard for gaskets is a product basically made of asbestos fibers impregnated with elastomer and have uniformity, elasticity, flexibility and good resistance to deterioration as main features.

1.3.3. LIFT CHECK VALVES

Belonging to the group of self-operated valves and also known as non-backflow valves, has the property of allowing the flow in one direction only as a main feature, retaining it automatically when a backflow occurs.

An arrow engraved on the external part of body indicates flow direction. Several specific types of lift check valves are manufactured by MIPEL to atend the most different working conditions, as follows:

1.3.3.1. Horizontal Lift Check Valve

The body of this kind of valve has similar features to the body of globe valves, so with the same fluid flow behaviour, which as the fluid enters into the valve, raises the obturator, usually driven in its lower part by flow orifice and in its upper part by the orifice placed on the bonnet, and leaves through the opposite end (see figure 39, 40 and 41).

The retention effect (backflow blockade) takes place when the fluid pressure to the valve upstream is lower than the pressure to the dowstream of itself, with the obturator automatically closing when backflow takes place. (see figure 41).

Horizontal lift check valves are suitable for fluids service lines, such as: air, gases, liquids in general and steam, and are usually employed along with globe valves, always in horizontal pipelines.

Horizontal lift check valves obturators have the same features of the globe valves obturators in the seat contact area, and also the same usage, in relation to the several types of fluids (see figure 42 and 43).

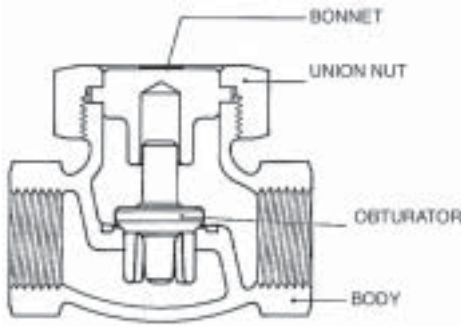

Figure 39: Horizontal Lift Check Valve Sectional drawing

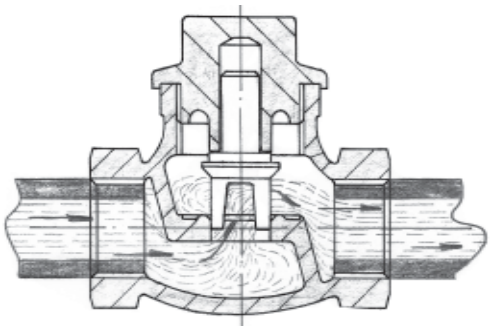

Figure 40: Horizontal Lift Check Valve Fluid flow details

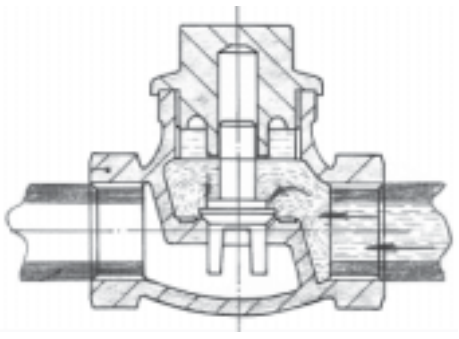

Figure 41: Horizontal Lift Check Valve retention effect detail (backflow blockade)

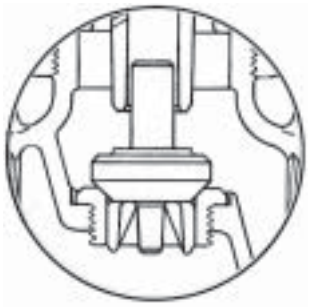

Figure 42: Stainless steel conical disc for horizontal lift check valves Employed with aggressive fluids and fairly dirt

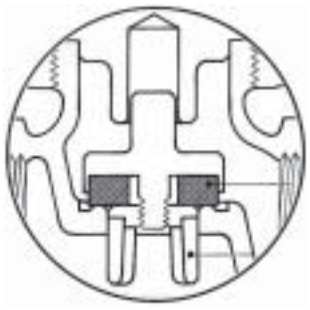

Figure 43: Renewable PTFE disc for horizontal lift check valves Employed with aggressive fluids and flow high speed

1.3.3.2. Bronze Swing Check Valves

This valve is composed of a disc shape obturator attached to an articulated arm, upper fixed by a transversal axis, against the interior of body valve (see figure 44). It works automatically.

The fluid on the way in cross over the seat area, raising the articulated obturator, leaving through the opposite end, and the retention effect (backflow blockage) takes place when the fluid has an upstream pressure lower than the dowstream pressure of itself, with backflow inclination. (see figure 45 and 46).

Due to the free flow, this kind of valve, provides a minimum load loss and can be installed in horizontal or vertical pipelines.

We suggest the use of Swing Check Valves, always along with gate, cock or ball, blockade type of valve and it is not suggested to use in pulsating or high speed flow, which can cause disturbing noise, vibration and lifetime reduction.

The obturators of Swing Check Valves come always in a disk shape, it can be totally metalic or inserted with rings made of elastomer (buna N or neoprene).

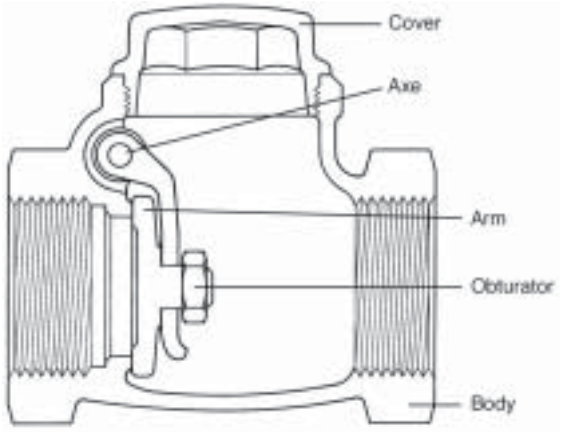

Figure 44: Swing Check Valve Sectional drawing

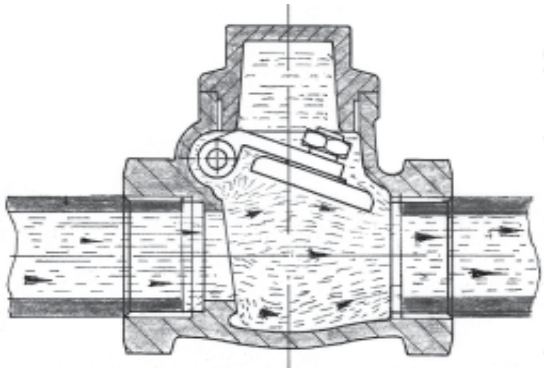

Figure 45: Swing Check Valve Fluid flow detail

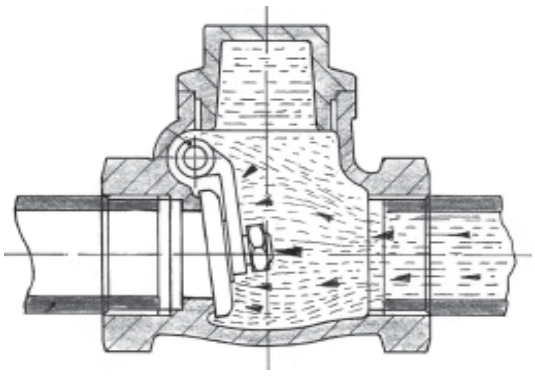

Figure 46: Swing Check Valve Retention effect (backflow blockage) detail

1.3.3.3. Vertical Lift Check Valve

This type of valve is suitable for ascending flow, therefore designed to always operate in a vertical position.

The body has a cylindrical shape with coaxial input and output ends, having an internal obturator, that in the seat contact area, has a conical trunk shape with a guide axis (see figure 47 and 48). The operation is automatic.

The flow (always ascending) raises the obturator, opening the valve, that closes automatically when there is a tendency to backflow.

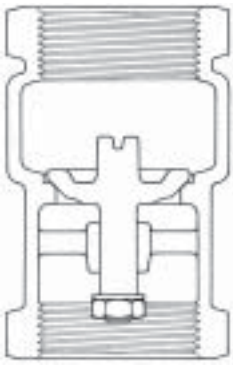

Figure 47: Vertical lift check valve - sectional drawing

Figure 48: Vertical Lift Check Valve - Basic Model

Two basic types of obturators are used in these valves: totally metalic obturator, suggested to use in water, low pressure steam, petroleum by-product lines, always free from dirt and inserted circular cross-section elastomer ring obturator for fluid use, even with some dirt (see figures 49 and 50).

Figure 49: Metallic obturator employed in vertical lift check valve and in foot lift check valve

Figure 50: Obturator with inserted elastomer ring employed in vertical lift check valve and in foot lift check valve

1.3.3.4. Foot Lift Check Valve

Also known as foot valve, with a similar operation of vertical lift check valve, having in the input end (lower side) a protection grid (strainer) to prevent coarse solid material from going in (see figure 51).

This valve is used in the botton of a well or reservoir, vertically coupled to the suction tube of a discharge delivery, when in operation, keeps the obturator raised, allowing the flow of aspired fluid.

When the fluid suction ceases, the obturator returns to the normal closed position, preventing the backflow, keeping the pipeline and the pump always full, allowing a new cycle of discharge delivery operation, with no need to primer.

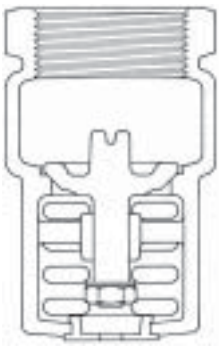

Figure 51: Foot Lift Check Valve Basic Model

1.3.4. COCK VALVE

Historically it is one of the oldest known valve.

Its mechanism consists on obturator (conical cock) that rotativelly operates inside the body, requiring only 1/4 of a lap to open and close.

Both, cock and body have orifices of flow adjusted in a way to match one with the other, to allow the fluid flow.

Cock valves from MIPEL are recommended to be used as blockade valve, being unsuitable for controlling and/ or throttling operation and frequent opening and closing operations, because the grease layer applied between the body and the cock, to reduce friction between parts and seat, can run and cause leakage.

The two most bronze manufactured types of cock valve by MIPEL are:

1.3.4.1. PASSING COCK VALVE

Its a very simple type of valve, suggested for liquid use, though, it is not suitable for steam use and other high temperature variation conditions, which can cause jamming, due to the thermical expansion of the material.

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Its constructive shape consists of conical cock (obturator) that self-adjusts to the body, crossing it over, in a way to allow, in its lower end, a washer and a nut, used for required adjust and control to get good performance of the valve turn system. (see figure 52).