

1. SCOPE

This specification sets the minimum acceptable requirements for supply of combined plug / check valve types.

2. APPLICABLE STANDARDS

ISO5752	Face to face dimensions of valves
ISO 7005	Metallic flanges
EN 1074-1	Valves for water supply – Part 1: Fitness for purpose req. and Appropriate verification tests (General Req.)
EN 1074-2	Valves for water supply – Part 2: Fitness for purpose req. and Appropriate verification tests (Isolating valves.)
ISO 5211	Actuator Mounting Flange.
ISO5208 BSEN12266	Industrial valves, Pressure testing of metallic valves
EN 1092	Flanges and their joints – Part 2: Cast Iron flanges, Circular flanges for pipes, valves, fittings and accessories, PN designated
EN 1563	Spheroidal graphite cast iron

2. CONSTRUCTION REQUIREMENTS

This specification covers the design, material, and testing of combined plug/Check Valve suitable for Sewage applications. Combined plug/check valve are designed to protect pumps, turbines, pipelines against reverse flow, water hammer and overflow. Valve shall provide both functions of plug valve and quick closing check valve.

Valve shall consists of butterfly valve equipped with hydraulic actuator, balance weight (or Accumulator), hydraulic power unit, and control panel. The valve shall have an ON/OFF or modulating control function (in certain range) and to shut-off in case of emergency.

The hydraulic circuit is provided to operate the valve in normal condition with additional function to close the valve quickly in emergency such as abnormally high

flow pressure, power failure, etc. Valve shall be fast acting and “failsafe” to prevent a pump from running away or reduce the water hammer in pumping stations.

	Technical Specification Combined Plug /Check Valves	Date :16/01/2023 Page 2 of 4
---	--	---------------------------------

Valves shall be equipped with hydraulic actuator, weight loaded, that shall be suitable for all critical pipeline areas where immediate and quickly control valve closing is required.

Closing of the valve shall be done automatically in case of power failure by the potential energy of lifted weight or weight and accumulator or accumulator.

The hydraulic actuator system shall have the ability to transmit mechanically and hydraulically torques in the opening condition with safety factor greater than 1.2. The design shall be capable of the transmission of actuating torque without additional bending of the valve shaft, additional load on the bearing and clamping

Actuator with its hydraulic system shall be used for opening and keeping the valve on its open position and shall be equipped with hand pump to open the valve in case of emergency cases. Weight and lever shall make separately (modular concept), simple installation can be easily incorporated into individual approach to solving the specific operating conditions.

Closing time shall be performed in 2. Stages

Stage 1(fast closing) : 100 % Open → 30 %: adjustable with throttle valve

Stage 2(slower closing) : 30 % → 0 % Close : adjustable with flow control valve

The actuator shall have limit switches which are required for signaling of the valve disc position and for the controlling of electro-motor pump. The limit switches must be connected respectively to electric circuit diagrams. Very robust and compact design makes it easy and clearly to set the cam in the desired position and reliable operation of the systems in difficult working conditions.

The design shall provide limit switches that recognize the following:

1. “Closed” position
2. “Keep-up” - automatic keeping of valve opening adjusted on percentage 90%
3. “Open” position

The hydraulic actuator shall has a complete electrical control cabinet placed on the actuator or at distance 5 to 10 meters, with switching possibility for the local / remote.

Valve can be controlled in two possibilities:

- a. LOCAL - With switches and push-buttons on hydraulic actuator electro-cabinet
- b. REMOTE - Connecting to the marked terminals in electrical cabinet

Terminal location to connecting (wire by wire) for push-button and signal lamps

c. BLOCK - With switches on hydraulic actuator electro-cabinet

	Technical Specification Combined Plug /Check Valves	Date :16/01/2023 Page 3 of 4
---	--	---------------------------------

Remote Control users can realize in DCS:

- a) Simply with push-button on the remote console
- b) With special user PLC

The Electro-Hydraulic Power Unit shall have the following general characteristic:

- Electro-Hydraulic Power Unit, 400 VAC, 50 Hz, 3 Ph.
- Ambient temperature: -20/+70 °C
- Protection class: IP 65 acc. IEC 60529
- Temperature protection: prevent to overheating of hydraulic oil
- Valve emergency opening: hydraulic hand pump
- Additional sump tank to drain protection of hydraulic oil

3. The plug valve shall be same construction and material as standard as described below:

Valves shall be of the eccentric resilient seated plug/ball valves which are suitable for sewage, slurry, wastewater, waterworks and raw water and applications. Face-to-face dimensions shall in accordance with ISO 5752. Nominal pressure rating as per design requirement (Max PN16 bars)

The valves shall have flanged connections, with the flanges drilled in accordance with the ISO 7005 and EN 1092-2 standards and pressure ratings shall be as per project requirement.

Valve ports shall be of round port type. The body seat shall be furnished with a welded-in overlay stainless steel seat, precisely machined inside the valve body for providing high corrosion and wear resistance, long service life and reliability.

The plug/ball shall be of eccentric design and shall be designed to withstand three time of the rating pressure of the valve. The plug/ball shall be contoured to ensure the lowest possible resistance to flow. Plug/ball shall have an adjustable and removable resilient seal for easy re-adjustment or replacement. The disc rubber seal shall be of one-piece moulded construction and secured in its place by means of a retaining ring that is fixed to the disc by means of stainless-steel fasteners. Valve design shall allow the replacement of disc seal without removing the valve from pipeline. The disc seat shall be upward when the valve is open.

The eccentric design shall allow the seal lifted-off the body seat after short travel (about 5°). There is a large gap area between ball and body which is flushed the flow in intermediate position about the self-cleaning effect

Shafts shall be of Stainless Steel, designed to withstand the maximum torque that will be imposed by the operator. It shall have two Shafts one drive shaft and one stub shaft designed to transmit required torques and withstand stresses imposed under severe operating conditions. Plug/ball valve shall be furnished with self-lubricating bearing sleeve type. Shaft seals shall be a gland type with O-Ring or U-Cup Type

Valves shall be provided with internal and external coating of non-toxic epoxy with a minimum dry film thickness of 250 microns at any point. The coating shall be done after shot blasting in accordance with ISO 8501-01 Gr. SA. 2.5.

Hydrostatic testing (Body test, seat test) shall be performed in each valve in accordance with ISO 5208 Or BS EN 12266-1. Valves shall show no signs of visible leakage during testing.

Marking shall be cast on the body with raised letters or engraved on a separate stainless steel name plate and it Shall indicates the nominal valve size, manufacturer's name, design pressure rating and the year of manufacture.

4. Material Specifications

Body	Ductile Iron EN 400/12 or Ductile Iron EN 500/7 acc. To EN1563
Plug	Ductile Iron EN 400/12 or Ductile Iron EN 500/7 acc. To EN1563
Cover	Ductile Iron EN 400/12 or Ductile Iron EN 500/7 acc. To EN1563
Retaining ring	Ductile Iron EN 400/12 or Ductile Iron EN 500/7 acc. To EN1563
Gland	Ductile Iron EN 400/12 or Ductile Iron EN 500/7 acc. To EN1563
Body Seat	Welded overlay SS316
Plug Seal	NBR Rubber
Driving /stub Shafts	X20Cr13 (AISI 420)
Retaining ring bolts	SS316
Bearing	Self-Lubricating Bearing
Seals	NBR Rubber
Cover bolts	Galvanized steel Gr8.8

