

Purchase Specification for

Butterfly valves for pipeline service

The valves are to be used in a marine environment, including exposure to sea water.

Table of Contents

- 1.0 General
- 2.0 Scope of Supply Duty and Requirements
- 3.0 Design and Requirements
- 4.0 Testing
- 5.0 Painting
- 6.0 Assembly of Components
- 7.0 Tagging
- 8.0 Guarantee
- 9.0 Documentation

1.0 General

1.1 This specification covers the manufacture assembly, inspection, testing and supply of butterfly valves for Europe Asia Pipeline Co. Ltd. (EAPC).

The valves are for installation at Ashkelon Terminal in a marine environment and Site condition is specified in paragraph 3.1.

2.0 SCOPE OF SUPPLY

The scope of supply shall include the following:

- 2.1 Butterfly lug valves: 5 units of 24" ", suitable for flat face flanges assembly (protruding elastomer seal)
- 2.2 The valves shall be zero leakage, bubble tight, design as fire proof, with a mechanical actuator. The mechanical gear should have a circular handle on an axis perpendicular on the valve axis. The gear shall allow for 180 degrees turn of the handle position (shall allow left or right side handle positioning)
- 2.3 Trim suitable for crude oil at ambient temperature, wide range of crude oil (including sour) with remains of sand and small metal scrap from the pipeline and / or storage tanks
- 2.4 Mechanical actuator allowing the lock of valve in open and close position by means of a beveled gear assembly. The dimension of the handle axis should be mentioned in the offer.
- 2.5 All valves shall be maintenance free, all bearings shall be factory greased and encapsulated in a water tight assembly
- 2.6 All valves shall have an external position indicator, usually on the stem with a clear designation of closed and open position.
- 2.7 The valves shall allow replacement of elastomer seat, stem, and disk, stem seals and / or stem bearings.
- 2.8 The valves shall comply with the requirements of API 609 and certificated.
- 2.9 The valves shall be tested in accordance with API 598

The quotation shall include the list of recommended spare parts and any special tools for stem, disk, seat, stem seals replacement with break down prices.

3.0 DESIGN REQUIREMENTS

3.1 General

The items shall be designed as butterfly lug valve with a mechanical actuator and lock options fully open and fully closed.

Valve design should provide a tight mechanical seal and shall be unaffected by pressure variations.

Valve design shall provide the option to repair the valve when dismantled from the line.

3.2 Process Conditions

Fluid: wide range of crude oil with remains of sand and small metal scraps from the pipeline and storage tanks, including sour crude oil, at ambient temperature.

Pressure design: preferred: 19 bar (ASA150);

Viscosity : 5-300 cst.

Temperature : +2°C to 60°C

Relative Humidity : up to 90%

Special Conditions : Sandstorms and dust, marine environment, exposure to sea water

3.3 **Standards of Compliance**

3.3.1 API 598 for testing

3.3.2 API 609 for building

3.3.3 ASME B 16.34 meaning:

Body & shell materials comply with ASME and ASTM material standards for chemistry and strength.

Body & shell materials are heat-treated to insure proper grain structure, corrosion resistance and hardness.

Wall thicknesses of body and other pressure-containing components meet ASME B16.34 specified minimum values for each pressure class

Stems will be internally loaded and blowout proof.

All bolting will be ASTM grade with maximum applied stress controlled by B16.34.

Each valve is shell tested at 1,5x rated pressure for a specific test time duration.

Each valve is tested for seat leakage in both directions for a specific test time duration

Each valve is permanently tagged with materials of construction, operating limits and name of manufacturer

3.3.4 Fire type-testing certification of the design shall be provided. Fire-type testing shall be carried out in accordance with API 6FA.

3.3.5 Fire safe design in accordance with API 6FA (Specification for Fire Test for Valves)

3.3.6 Non-Destructive Examination (NDE):

3.3.6.1 Radiographic testing of castings on 100% of critical areas

3.3.6.2 Radiographic testing of weldments on 100% of weld

3.4 **Materials of Construction**

- 3.4.1 All Materials of construction shall be with full compliance to API 609.
- 3.4.2 Carbon and low-alloy steel bolting material with a hardness exceeding HRC 34 (HBW 321) shall not be used in order to avoid hydrogen embrittlement.
- 3.4.3 Valve shall have a trim with minimum hardness difference of 50 HB between mating parts of disk and seats.
- 3.4.4 Soft seal materials shall have good resistance to crude oil.
- 3.4.5 Preferred materials of construction:
 - 3.4.5.1 Seat – Nitrile rubber BUNA - N,
Fluor elastomer (VITON, FKM)

3.5 **Actuator**

Actuators are mechanical, in a totally self-contained and sealed unit, replaceable assembly with an operating circular handle. The material of the actuator body shall be either resistant to corrosion in a marine environment or coated to resist corrosion in a marine environment.

Since the valve is to be assembled at mono buoy and used at sea, the actuator has to be sturdy, as small as possible to avoid mechanical damage.

4.0 **TESTING**

Test certificates shall be transmitted to purchaser in 3 copies.

Vendor shall disclose the details and the extent of shop assembly and testing procedures he intends to follow.

The testing shall be in accordance with API 598 standards. Seat test should be Bi-directional as specified in API 598.

5.0 Coating

5.1 Valve and actuator shall be coated in accordance with manufacturer standard for marine environment, exposure to UV, exposure to sea water, resistant to mild mechanical shocks and scratches, and to meet site conditions as specified in Chapter 3.

Vendor has to specify proposed coating in his quotation.

6.0 ASSEMBLY OF COMPONENTS

All units shall be supplied completely assembled – ready for installation.

7.0 TAGGING

7.1 Each item shall be tagged with number specified by purchaser and fitted with a 316. S.S. nameplate containing at least the following data:

7.1.1 Name of manufacturer

7.1.2 Size & rating

7.1.3 Manufacturer serial number

7.1.4 Purchaser tag number

8.0 GUARANTEE

Vendor will guarantee that the equipment furnished is free from faults in design, workmanship and materials.

Should any defect in design, materials, workmanship or operating characteristics develop during the first year of operation (but not over twenty four (24) months from the date of shipment), the Vendor will make all necessary or desirable alternations, repairs and replacements of said defective equipment, free of charge and shall also pay transportation involved of the above mentioned to and from the plant.

If the defect or functional failure cannot be corrected, the Vendor agrees to replace promptly, free of charge, the faulty equipment.

9.0 **Documentation**

The following documents are to be transmitted in 3 copies in English:

General arrangement drawings of valve and actuator with overall dimensions

Cross section showing construction details

Material Specification

Itemized price list of recommended spare parts

Installation, Operating and Maintenance Instruction. Full set of drawing including materials and part numbers for ulterior order will be delivered