

**WATER SUPPLIES DEPARTMENT**

**STANDARD SPECIFICATION EM-02-11**

**PIPING, VALVES & ACCESSORIES**

**FOR CHLORINATION PLANT**

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## **PIPING, VALVES & ACCESSORIES FOR CHLORINATION PLANT**

### **1. PIPING**

#### **1.1 Pressure Pipes and Fittings for Chlorine Gas/Liquid Lines**

The flexible connection to chlorine containers shall be made of silver plated copper tube of outside diameter not less than 6 mm and shall be in the form of a coil of at least two turns of not less than 150 mm diameter.

Schedule 80 seamless carbon steel pipe of the appropriate diameter, but not less than 20 mm N.B. and to ASTM-A106 shall be used.

All fittings shall be forged carbon steel of class 3000 to ASTM-A105 and shall be flanged or otherwise accepted by the Engineer. Flanged unions shall be of the 2-bolted ammonia type. Malleable iron plumbing fittings shall not be accepted.

Pipes carrying gas/liquid chlorine at container pressure must be arranged so as to slope back to the container .

#### **1.2 Pipes and Fittings for Chlorine Gas Vacuum Lines**

UPVC/PTFE pipes and fittings shall be used for chlorine gas vacuum lines. The UPVC pipes shall be of Class E to BS 3506 and fittings shall be to BS EN 1452. The PTFE pipes and fittings shall be to ASTM D4894 and D4895.

#### **1.3 Pipes and Fittings for Chlorinator Water Supply**

Pipes and fittings for chlorinator water supply shall comply with WSD Standard Specification M-02-02, and shall be capable of withstanding the maximum pressure of the supplied water.

#### **1.4 Pipes and Fittings for Chlorinated Solution**

UPVC / PTFE pipes and fittings shall be used for chlorinated solution. The UPVC pipes shall be of Class E to BS 3506 and fittings shall be to BS EN1452. The PTFE pipes and fittings shall be to ASTM D4894 and D4895. All pipes and fittings shall be capable of withstanding the maximum pressure of the chlorinated solution.

### **2. VALVES**

#### **2.1 Chlorine Liquid/Gas Valves**

Valves shall be suitable for chlorine service. Valves for the purpose of isolating chlorine cylinders/drums shall be of bronze body, and valves for the purpose of line shutoff shall be of forged steel body. Both types of valves shall have Monel or

'Hastelloy' C trim at all internal parts including the valve stem. Needle valves, and globe valves with flanged and bolted bonnet type shall be used. Gland packing shall be of PTFE or other approved material. For globe valve of size 20 mm and above, the gland packing shall be tightened by studs and nuts (a single gland nut type shall not be accepted). Ball valves shall not be used except those forming part of standard bulk manufactured equipment and equipped with an automatic device for relieving excess pressure built up within the ball cavity towards the high pressure (upstream) side of the valve.

## 2.2 Water Supply Valves

Manual isolation valves shall be gate valves to BS EN 1074 with ductile iron body, flanged to BS EN 1092, PN16. The valves shall be provided with hand wheels and shall be of the internal screw non-rising spindle type.

## 2.3 Chlorinated Solution Valves

Manual valves for chlorinated solution shall be of the diaphragm or globe type manufactured from UPVC, PTFE or other corrosion and chlorine resistant materials. Isolating valves at the points of application shall also be provided .

## 2.4 Electric Operated Valves

The electric operated valves of solenoid or motorised type shall operate on either a 24V d.c. supply or 220V, 50 Hz supply and shall be designed for satisfactory operation in association with the chlorination equipment supplied. The valve construction shall be to Clause 2.1 to 2.3 as specified above.

# 3. ACCESSORIES

## 3.1 Chlorine Liquid Line Pressure Relief System

Pipes carrying liquid chlorine shall be protected against excessive pressure built-up. A set of liquid line pressure relief system shall be supplied for EACH liquid header i.e. at the location immediately upstream of the electrically operated changeover valve, and at the liquid line upstream of EACH evaporator. Requirements of the system shall comply with WSD Standard Specification EM-02-06.

## 3.2 Chlorine Gas Line Pressure Relief System

A pressure relief system shall be provided at the gas line downstream of EACH Evaporator and at downstream of the vacuum regulator. Requirements of the system shall comply with WSD Standard Specification EM-02-06 and EM-02-02 respectively.

3.3 Chlorine Pressure Gauges

The measuring range of the pressure gauge shall be appropriate for the plant installed. Technical requirements of the pressure gauges shall comply with WSD Standard Specification EM-02-09.

3.4 Chlorinated Solution Dosing Diffuser

The dosing diffuser shall be designed to ensure uniform distribution of chlorinated solution at the point of application.

On dosage to an open channel, a submerged diffuser shall be provided for vertical or horizontal mounting in the channel. All mounting brackets, clamps and holding down bolts shall be of corrosion resistant materials to chlorinated solution.

Where dosage is into a pressurized pipe, a corporation cock shall be provided. The diffuser device shall be withdrawable with a non-return valve and an isolating valve and shall enter the pipe through the corporation cock. All construction materials shall be corrosion resistant to chlorinated solution.

3.5 Gasket

Gasket for chlorine pressure pipes shall be made from PTFE reinforced with fillers suitable for operation under Service Class VI as specified by the Chlorine Institute, USA. Rubber insertion for water and chlorinated solution shall be of 3 mm thick.

4. **PRESSURE TEST**

All chlorine pressure piping system including flexible, valves, fittings and accessories after installation shall be pressure-tested with dry nitrogen at the following pressures for a duration of one hour:

- (A) For liquid chlorine draw-off system.
  - (i) 3.86 MPa without rupture discs and
  - (ii) 2.0 MPa with rupture discs.
- (B) 3.3 MPa for gas chlorine draw-off system.

Other plant and pipework shall be hydraulically tested to 1.5 times the maximum working pressure for a period of one hour.