

WATER SUPPLIES DEPARTMENT
STANDARD SPECIFICATION M-02-03
STAINLESS STEEL PIPEWORK
(FOR PRESSURE RATING OF PN 16 AND PN 25)

1. GENERAL

- (1) This standard specification covers stainless steel pipes, fittings and specials (collectively termed as 'pipework' hereunder) of pressure rating PN 16 and PN 25 of nominal size from 150 mm to 600 mm inclusive.
- (2) The pipework shall be made of stainless steel of grade 316L or superior. The yield strength of the stainless steel at room temperature shall not be less than 215 N/mm².
- (3) All pipes shall conform to the requirements of BS EN 10216-5 (seamless), BS EN 10217-7 (welded) or ASTM-A312.
- (4) All standard fittings shall conform to the requirements of BS EN 10253-3 or shall be manufactured in accordance with ASME B16.9 and ASME B16.28 as appropriate. Bends formed by welding of segments together shall not be allowed unless otherwise approved by the Purchaser/Engineer.
- (5) All special sections and fittings shall be fabricated at factory or workshop in accordance with the requirements for piping of class I of BS EN 13480-4. On-site fabrication shall NOT be allowed unless otherwise approved by the Purchaser/Engineer. All openings shall be suitably reinforced where necessary.
- (6) Welding shall be executed in accordance with BS EN 1011-3 by qualified welders under appropriate welding procedure specifications. Welders shall possess valid welder certificates in accordance with the relevant internationally recognised standard for the appropriate category of welding. Welding consumables shall be compatible with the parent metals and the selected welding process. All welded joints and heat affected zones shall be thoroughly cleaned, pickled and passivated in accordance with Annex A of BS EN 13480-4. Radiographic testing and penetrant testing shall be performed for 100% circumferential butt welded joints and 100% branch and fillet welded joints respectively to ensure the welding quality and the test results shall be assessed by qualified examiners in accordance with the requirements for piping of class I of BS EN 13480-5.
- (7) The flanges shall comply with BS EN 1092-1 PN 16 or PN 25 as appropriate except those joining existing pipework/equipment, which shall be drilled to suit the existing pipework/equipment.
- (8) Drain valves and connection points for instruments shall be provided at suitable positions of the pipework. Bosses welded on the pipework for the connection of instruments and drain valves shall be made of stainless steel to BS 970 grade 316S16.

2. THICKNESS

The pipework shall be designed to withstand the specified pressure rating and without

yielding under the hydraulic test pressure. Notwithstanding that, its thickness shall not be less than that specified for Schedule 40S of ASME B36.19M as shown below:

Nominal Size (mm)	Outside Diameter (mm)	Minimum Wall Thickness (mm)
150	168.3	7.1
200	219.1	8.2
250	273	9.3
300	323.9	9.5
350	355.6	9.5
400	406.4	9.5
450	457	9.5
500	508	9.5
600	610	9.5

3. FLANGE ADAPTORS

- (1) Flange adaptors shall be provided at joints between pipework and valves/equipment and any other positions where removal of pipework is necessary for future maintenance.
- (2) Flange adaptors shall be designed and manufactured suitable for connection to the pipework, valves and equipment. The flanges shall comply with BS EN 1092-1 PN 16 or PN 25 as appropriate except those joining existing pipework/equipment, which shall be drilled to suit the existing pipework/equipment.
- (3) For flange adaptor made of stainless steel, the construction material shall be stainless steel of grade 316L or superior. For flange adaptor made of mild steel, it shall be coated with fusion-bonded epoxy or nylon coating to a dry film thickness of at least 400 microns.
- (4) Stud bolts and nuts of the flange adaptors shall be made of stainless steel. Sealing material shall be made of natural rubber or EPDM.
- (5) Flange adaptors shall be positively restrained from movement by tie bars/bolts where necessary.
- (6) For flange adaptors to be used in raw or potable water application, the coating and gaskets shall comply with BS 6920 or equivalent.

4. SLIP-ON TYPE COUPLINGS

- (1) Slip-on type couplings for use with plain end pipe shall conform to the requirements of BS EN 10224 Annex C Clause C.4.
- (2) For couplings made of stainless steel, the construction material shall be stainless steel of grade 316L or superior. For coupling made of mild steel, it shall be coated with fusion-bonded epoxy or nylon coating to a dry film thickness of at least 400 microns.

- (3) Stud bolts and nuts of the couplings shall be made of stainless steel. Sealing material shall be made of natural rubber or EPDM.
- (4) The pipes joined by couplings shall be positively restrained from movement by tie bars/bolts where necessary.
- (5) For couplings to be used in raw or potable water applications, the coating and gaskets shall comply with BS 6920 or equivalent.

5. BOLTING

- (1) Bolts, studbolts, washers and nuts (collectively termed as bolts hereunder) for pipework shall be made of stainless steel of grade 316 and in metric size and shall conform to BS EN 1515-1 and BS EN 1515-2 where appropriate.
- (2) Bolt lengths shall be sufficient to ensure that nuts are full-threaded when tightened in their final position and that at least two but no more than four threads are protruded.

6. GASKETS

- (1) Gaskets shall be Type WA elastomeric joint seals to BS EN 681-1.
- (2) Gaskets shall be made of natural rubber or EPDM suitable for use with the water medium specified. The gaskets shall be of full face or ring type and not less than 3mm in thickness.
- (3) For gaskets to be used in raw or potable water applications, they shall comply with BS 6920 or equivalent.

7. MARKING AND DOCUMENTATION

- (1) The material and schedule of pipes shall be marked on pipe surfaces for identification.
- (2) All relevant material certificates, welders' qualifications, welding procedure specifications, non-destructive examination reports, examiners' qualifications shall be submitted at appropriate stages to substantiate that the pipework is fabricated in accordance with the requirements of this specification.

8. FINAL TESTING AND INSTALLATION

- (1) The pipework shall be hydraulically tested to 1.5 times the PN rating of the pipework for at least 10 minutes before installation.
- (2) The surfaces of pipework where flange adaptor/coupling fitted and the seating surfaces of flange faces of pipework shall be protected by suitable primer/coating before installation to prevent crevice corrosion between the contacting surfaces. For pipework to be used in raw or potable water application, the primer/coating shall comply with BS 6920 or equivalent.