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## 20 WASHWATER SYSTEMS

### 20.1 GENERAL

#### 20.1.1 Scope

- 1 This part specifies the requirement for the design, manufacture, testing and commissioning of washwater systems.
- 2 Related Sections and Parts are as follows:

Section 1	General
Section 8	Drainage Works
Section 10	Instrumentation, Control and Automation
Section 13	Building Electrical Works
Section 21	Electrical Works

#### 20.1.2 References

- 1 The following standards or revised/updated versions are referred to in this part:
  - ASME BPVC Section VII- BPVC (Boiler and Pressure Vessel Code), Recommended Guidelines for the Care of Power Boilers
  - ASME VIII Div. 1..Boiler and Pressure Vessel Code, Design and Fabrication of Pressure Vessels; (ASME BPVC.VIII.1 BPVC (Boiler and Pressure Vessel Code), Section VIII-Rules for Construction of Pressure Vessels Division 1)
  - BS 970 (ISO 683) Specification for wrought steels for mechanical and allied engineering purposes; (ISO 683-1 Heat-treatable steels, alloy steels and free-cutting steels — Part 1: Non-alloy steels for quenching and tempering; ISO 683-2 Heat-treatable steels, alloy steels and free-cutting steels — Part 2: Alloy steels for quenching and tempering; ISO 683-3 Heat-treatable steels, alloy steels and free-cutting steels — Part 3: Case-hardening steels; ISO 683-4 Heat-treatable steels, alloy steels and free-cutting steels — Part 4: Free-cutting steels; ISO 683-5 Heat treatable steels, alloy steels and free-cutting steels — Part 5: Nitriding steels; EN 10250-4: Open die steel forgings for general engineering purposes - Stainless steels; EN 10095 Heat resisting steels and nickel alloys; BS PD 970 Wrought steels for mechanical and allied engineering purposes. Requirements for carbon, carbon manganese and alloy hot worked or cold finished steels; EN 10089 Hot rolled steels for quenched and tempered springs. Technical delivery conditions; EN 10277 Bright steel products. Technical delivery conditions; EN 10278 Dimensions and tolerances of bright steel products; EN 10088-1 Stainless steels - List of stainless steels; EN 10088-3 Stainless steels - Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes)
  - BS 1123 ..... Fusible plugs for steam boilers and compressed air applications. Specification
  - BS 5169 ..... Specification for fusion welded steel air receivers; (EN 286-1 Simple unfired pressure vessels designed to contain air or nitrogen - Pressure vessels for general purposes)
  - BSI PD 5500..... Specification for unfired pressure vessels
  - ISO 10474 ..... Steel and steel products — Inspection documents

List of 'Approved Suppliers' prepared by the Public Works Authority

### 20.1.3 Submittals

- 1 In addition to the requirements of Part 1 of this Section, the Contractor shall reconfirm the information provided in the Technical Submission Schedules submitted with his Tender.

## 20.2 PRODUCTS

### 20.2.1 General

- 1 The wash water system shall be capable of delivering a supply of final effluent wash water to the plant at the rate recommended by the manufacturers of the proprietary equipment plus a minimum of 6 l/s at 4 bar(g) with any two hydrants open and all process water requirements being met simultaneously.
- 2 The design shall ensure that the hydrant pressure does not exceed 5 bar. Pressure reducing valves may be utilised for this purpose.

### 20.2.2 Washwater Booster Set

- 1 The wash water system shall comprise a minimum of one duty pump and a standby pump, pressure vessel with adjustable differential pressure switches, interconnecting pipework and valves, and a terminal panel. The motor starters and controls shall be part of a FBA. The pumps shall be provided with a duplex-strainer in the suction piping to prevent any debris from entering the system.
- 2 The pressure vessel shall be adequately sized to keep the maximum number of pump starts under the worst conditions to 15 per hour. The pressure vessel shall incorporate a butyl-rubber diaphragm to contain the water and shall be charged with nitrogen or another approved inert gas.
- 3 The vessel shall be of welded construction and in accordance with the relevant British Standards or ASME VIII Div 1, and shall be complete with all necessary fixtures and fittings and shall include the following:-
  - (a) Inspection manhole single or double bridged, according to size, which shall seat on pressure.
  - (b) Flanged inlet and outlet connections.
  - (c) System compound pressure gauge of the diaphragm type.
  - (d) Safety valve, to relieve excess air pressure in tank to atmosphere.
  - (e) 50mm drain connection with valve.
- 4 The vessel shall be high quality epoxy coated inside and out after all manufacture has been completed, and shall be suitable for the maximum working pressure required by the process.
- 5 The upper dome of the vessel shall be fitted with a suitable spring loaded pressure relief valve, which shall be arranged to commence to open at 110% of the maximum system working pressure, and be fully open at 120% of this pressure.
- 6 The pressure vessel, which shall be of vertical or horizontal construction, shall be mounted on a minimum of four mounting feet, to raise the vessel off the base plate a distance of not less than 300mm.
- 7 The vessel shall be fitted with a 150mm diameter pressure gauge, connected such that it reads the air pressure in the vessel and thereby indicating the pressure in the system.
- 8 There shall be provided for the vessel a manually operated air release valve, to enable the system to be depressurised to atmosphere before the system is drained and to enable the vessel to be recharged.
- 9 Pressure switches shall be robustly constructed and suitable for the arduous duties involved, and shall be fully adjustable over their working range, together with adjustable differentials.

### 20.3 TESTING

- 1 Testing of the vessel to the recommended Code of Practice shall be carried out at the manufacturers works, and a test certificate shall be issued. The working and test pressures shall be stamped onto the outside of the vessel such that they are clearly visible.

### 20.4 INSTALLATION AND COMMISSIONING

- 1 Installation and commissioning shall be in accordance with Part 1 of this Section 9.

END OF PART