WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION M-01-06

CHLORINATOR WATER SUPPLY BOOSTER PUMPS

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1. DESIGN

The pump shall be centrifugal type of robust construction with all rotating parts carefully balanced to prevent undue vibration. Both horizontal and vertical mounted pumpsets are acceptable unless otherwise specified in the Particular Specification.

The pump shall be free from unacceptable noise. The limiting sound pressure level of the pumpset with the motor coupled up at the pump closed valve head shall not exceed 94 dB(A) measured to BS EN ISO 1680 at any point 1 m from the pumpset.

The pump motor shall be totally enclosed having the degree of protection of IP55 to IEC 60034-5 and shall comply with Water Supplies Department (WSD) Standard Specification E-51-03 for motor rating of 40 kW and above and E-51-04 for motor rating below 40 kW.

All rotating parts shall be provided with suitable guards.

2. DUTIES AND CHARACTERISTICS

The pump shall have a stable characteristic and shall be capable for continuous operation at any flow rate over the whole operating range. The operating range together with the duty flow rate and head of the pump shall be either specified in the Particular Specification or to meet the requirement of the chlorinator ejector(s) supplied under the contract.

The pump supplied shall satisfy the following requirements in determination of the pump operating range and duty point in meeting with the requirements for chlorinator ejector(s):

(a) Pump duty flow – the pump duty flow shall be able to meet the flow requirement of the chlorinator ejectors for creation of the required vacuum capable of drawing the specified amount of chlorine into the motive water. In assessing the pump duty flow, a 20% flow margin shall be added to cater for pump deterioration.

(b) Pump duty head – the pump duty head shall be able to overcome all head losses associated with the pipes, valves, fittings and ejector(s) for the flow requirement as specified in (a) above plus the requirement for injection of the chlorinated solution into the pump delivery pipe or dosing point(s) as specified in the Particular Specification. In assessing the pump duty head, an additional allowance equivalent to 20% of the total losses of the ejector, valves, pipes and fittings shall be added.

(c) Pump operating range – the pump operating range for flow rate and head shall be able to meet all the possible operating conditions of the chlorinator ejectors and the required injection pressure range as specified in the Particular Specification.

The efficiency of the pump at the duty point specified shall not deviate from the maximum design efficiency of the pump by more than 10%.

The rating for the motor if required to be provided for the pump shall be not less than 120% of the maximum power absorbed by the pumpset over the whole operating range specified.

3. HORIZONTAL PUMPSETS

The pump supplied shall be complete with coupling and foundation bolts. The contractor shall provide a common bedplate for the mounting of the horizontal pumpset if the pump is supplied with motor. The bedplate shall be of a robust and rigid design to ensure that there is no vibration of the plant, and designed as to allow suitable cable access to the motor cable box.

4. VERTICAL PUMPSETS

The pumpset with the motor directly on top shall be vertically mounted on a bedplate. Foundation bolts are to be supplied for the bedplate.

5. PUMP TESTS

All pump components subject to pressure shall be hydraulically tested to 1.5 times the maximum pressure attainable in the system and shall be sustained for a period of not less than 10 minutes.

On completion at the Contractor's works the pump shall be coupled to the motor and tested to BS EN ISO 9906 Grade 2 over the full range of its capabilities to determine pump output, power absorbed and efficiency. However, a typical works tests certificate in lieu of the above tests on the actual pump supplied is also acceptable provided that the tenderer must guarantee that the performance shall be same as that shown on the test certificate.

6. MATERIALS OF CONSTRUCTION

The pump shall be manufactured from the following materials or other superior suitable materials:-.

Component	Raw Water and Treated Water
Casing	High Quality Grey Cast Iron to BS EN1561, designation EN-GJL-250
Impeller	Leaded Gunmetal BS EN 1982, designation C491K
Pump Shaft	Stainless Steel to BS EN 10088, designation 1.4057
Shaft Sleeves	Leaded Gunmetal BS EN 1982, designation C491K

7. PUMP CASING

Pump casing shall preferably be fitted with renewable wear rings (neck rings). Bosses, radially drilled and tapped to receive pressure gauge connection shall be provided on both the suction and the delivery sides adjacent to the pump connection flanges. Means shall be provided to drain the casing and an air release cock of adequate size shall be fitted at the highest point on the first and last stages of the pump.

8. PUMP IMPELLER

The impeller should be designed with sufficient strength to withstand all possible stresses imposed by the drive. The impeller shall be machined to close limits and shall be dynamically balanced.

9. GLANDS

The pump shall be fitted with mechanical seals suitable for use with a pressure of at least the closed valve head of the pump plus the maximum suction head.

For vertical pumpset, a water thrower shall be provided to protect the lower bearing.

10. BEARINGS

Ball and roller type bearings shall be sealed, grease lubricated and protected from the ingress of dust and water. These bearings shall conform to relevant BS, ISO or other equivalent standards and shall be readily obtainable. Special bearings and Imperial size bearings are not acceptable.

11. GAUGES

Bourdon tube type suction and delivery pressure gauges of suitable range and fitted with a 'snubber' for pulsation damping shall be provided. The gauges shall be graduated in both kPa and metres head of water.

The gauge complete with isolating cock shall be mounted at the pump suction and delivery branches. Static head correction is not required and the scale diameter shall not be less than 150 mm.

An additional tee connection, with an isolating cock is to be provided between the gauge and pump branch.

- End of Specification -