WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION M-05-01

SUBMERSIBLE PUMPS

1.4.2003

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1. GENERAL

This Standard Specification shall be read in conjunction with the following WSD Standard Specifications:

M-00-03	Supply of Mechanical Plant
E-51-05	Submersible Motors of Rating between 40 - 140 kW
E-51-06	Submersible Motors of Rating up to 40 kW

2. TYPE AND CONSTRUCTION OF PUMP

The pump shall be of submersible vertical centrifugal type and suitable for handling a mixture of water and sand, sludge and other small solid particles. The pump shall be of open impeller design capable of allowing free passage of solids up to the size as specified in the Particular Specification.

3. DUTIES AND CHARACTERISTICS

The pump shall have a stable characteristic and be capable of continuous operation at within ±50% of the design flowrate.

The minimum submergence for continuous operation and the maximum allowable continuous dry running period of the pump shall be stated in the Tender.

4. PUMP TEST

Manufacturer's type test certificates shall be supplied together with typical pump curves showing pumping heads, efficiencies and power absorbed at various water flowrates. For pumpsets having motor rating larger than 40 kW, pump tests to BS EN ISO 9906 Grade 2 witnessed by independent surveyor shall be required.

5. MATERIAL OF CONSTRUCTION

The following table specifies the materials to be employed for the pumpset and its accessories:

Item	Materials of Construction
Casing	High Quality Gray Cast Iron to BS EN 1561 Designation EN-JL1040 or better
Impeller	Stainless Steel to BS 3100 Grade 316 C16
Pump Shaft	Stainless Steel to BS 970 : Part 1 Grade 431 S29
Pedestal Discharge Elbow	High Quality Gray Cast Iron to BS EN 1561 Designation EN-JL1040 or Better
Guide Rails	Stainless Steel to BS 970 : Part 1 Grade 316
Lifting Chain	
Hold Down Bolts, Nuts & Washers	

6. SHAFT SEAL

The pump shall employ two independent mechanical shaft seals running in an oil chamber. The lower seal shall prevent the pumping fluid from entering the oil chamber and the upper one for stopping the oil from entering the motor compartment. The sealing rings of the mechanical seals shall be of tungsten carbide or other better materials suitable for the rotating speed and system pressure.

Where motor power rating is larger than 40 kW, the pumpset shall be equipped with a moisture detector installed at the oil chamber for the detection of ingress of pumping fluid.

7. BEARING

Ball and roller type bearings shall be well sealed and oil lubricated-for-life. These bearings shall have metric dimensions and conform to BS 3134.

8. WIRE ROPE AND CLAMPS FOR CABLES

Stainless steel wire rope and clamps with resilient felt shall be supplied with the power and control cables. The clamps shall be used for holding the cables onto the wire rope by which the weight of the cables is to be evenly taken up. The stainless steel wire rope shall be held at high level for retrieval of the pump and cables altogether.

9. LIFTING FACILITIES

A dedicated guide rail lifting system suitable for raising and lowering of the pumpset shall be supplied. The guide rail lifting system shall include guide rails, pumpset pedestal discharge elbow, holding down bolts, lifting chain and all mounting brackets.

The lifting attachment of the pumpset shall be designed such that by lowering of the pumpset its discharge flange will click onto the connecting flange of the pedestal discharge elbow. The mating part of the pedestal discharge elbow and the discharge flange of the pump shall truly align and form a perfect match without the requirement of bolting. The weight of the pumpset shall be taken up by the pedestal. No portion of the pumpset shall rest on the floor. Sealing at the discharge connection shall be accomplished by metal to metal contact of machine faces or a suitable gasket. Leakage of pumping medium from the discharge connection during operation of the pump shall not be accepted. When the pump is lifted, it shall be able to detach from the pedestal discharge elbow with ease.

Lifting chain shall have safe working load commensurate with the weight of the pumpset. The lifting chain shall comprise closed lifting rings at regular intervals and its ends. The lifting ring at the lower end shall attach to the lifting eye or handle of the pump by shackle(s) whereas the upper ring shall normally be hung onto the guide rail mounting bracket. Certificate of test and thorough examination of the lifting facilities in compliance with statutory requirements shall be supplied with the equipment.

Sizing calculation of the holding down bolts and installation drawing of the pedestal discharge elbow and guide rail lifting system shall be submitted with the Tender.

10. MAINTENANCE TOOLS AND SPARES

An itemised and priced list of recommended maintenance tools and spares for 1 years service with particular reference to those components which would render the plant inoperative on failure shall be supplied.

- End of Specification -