WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION M-01-05

CENTRIFUGAL MULTISTAGE PUMPS FOR VILLAGE FRESH WATER SUPPLY

1.4.2003

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1. DESIGN

This specification is for pump of driving motor power output not exceeding 40 kW. The operating speed of the pump shall not exceed 1,500 r.p.m. or as specified in the Particular Specification.

The pump shall be of the centrifugal, multistage and cellular type. All rotating components of the pump shall be balanced both dynamically and statically. The pump shall be so designed that no thrust is transmitted to the driving motor.

A typical village pump house general arrangement is shown in Sketches A and B. To suit the configuration of the pump house, the pump shall be arranged such that the suction branch shall be at the driving end and the delivery branch shall be at the non-driving end. When viewed from the driving end, the orientation of the suction and delivery branches shall be on the left and vertically upward position respectively. The distance from centre of the suction branch to centre of delivery branch shall not exceed 850 mm as shown in Sketch A.

The pump shall be supplied complete with motor, pressure gauges, flexible coupling, safety guards and common bedplate for the pump and motor. The pump shall be suitable for starting with the delivery valve fully opened (but with reflux valve closed).

2. DUTIES AND CHARACTERISTICS

The pump shall have a stable characteristic and be capable of continuous trouble free operation at any flow rate and pumping head range as specified.

The rated power of the driving motor shall not be less than 120% of the maximum power absorbed by the pumpset over the whole operating range specified.

For calculating the available N.P.S.H. at the pump for any operating condition, the minimum atmospheric pressure shall be taken as 10 m of water and the maximum vapour pressure of water as 0.3 m of water.

3. PUMP TESTS

All pump components subject to pressure shall be hydraulically tested to a pressure of not less than one and a half times the sum of the maximum suction head plus the zero flow head of the pump supplied, for not less than 10 minutes, so as to provide a safety margin against inadvertent surge pressure.

On completion at the Contractor's works, the pump shall be coupled to the motor to be supplied under this contract and tested over the full range of its capabilities to determine pump output, power absorbed and efficiency. The tests shall be carried out to BS EN ISO 9906 Grade 2 in the presence of an independent surveyor, unless otherwise stated in the Particular Specification.

The pump shall be free from unacceptable noise. The limiting noise 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.

4. MATERIALS OF CONSTRUCTION

The materials to be employed shall be suitable for raw and treated water as specified below:-

Component	Material Specification
Pump Casing or Pump Chamber	High Quality Grey Cast Iron to BS EN 1561 EN-GJL-250 or other better material
Impeller	Copper-tin-lead alloy to BS EN 1982 - CC491K or other better material
Casing/Chamber Wear Ring	Copper-tin-lead alloy to BS EN 1982 - CC495K or other better material
Pump Shaft	Stainless Steel to BS 970 : Part 1 Grade 431 S29
Shaft Sleeves	Copper-tin-lead alloy to BS EN 1982 - CC491K or other better material

5. PUMP CASING AND CHAMBERS

Suction and delivery flanges shall be faced and drilled to specified table of BS EN 1092-2 and positioned as indicated in Sketch A or as specified in the Particular Specification.

Means shall be provided to drain the casing and an air release cock of adequate size shall be fitted at least on the first and last casings of the pump.

The coupling for pump and motor connection shall be of flexible type.

6. PUMP IMPELLER

The impeller shall be designed with sufficient strength at the boss to withstand adverse torsional stresses imposed during operation. The impeller shall be machined to close limits and dynamically balanced.

7. PUMP SHAFT AND SHAFT SEAL

The pump shaft shall be protected from wear by renewable sleeves as appropriate. 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 static suction head.

Keyways shall be cut on alternative sides of the shaft to minimize distortion and to retain rigidity of the rotating element.

8. BEARING

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

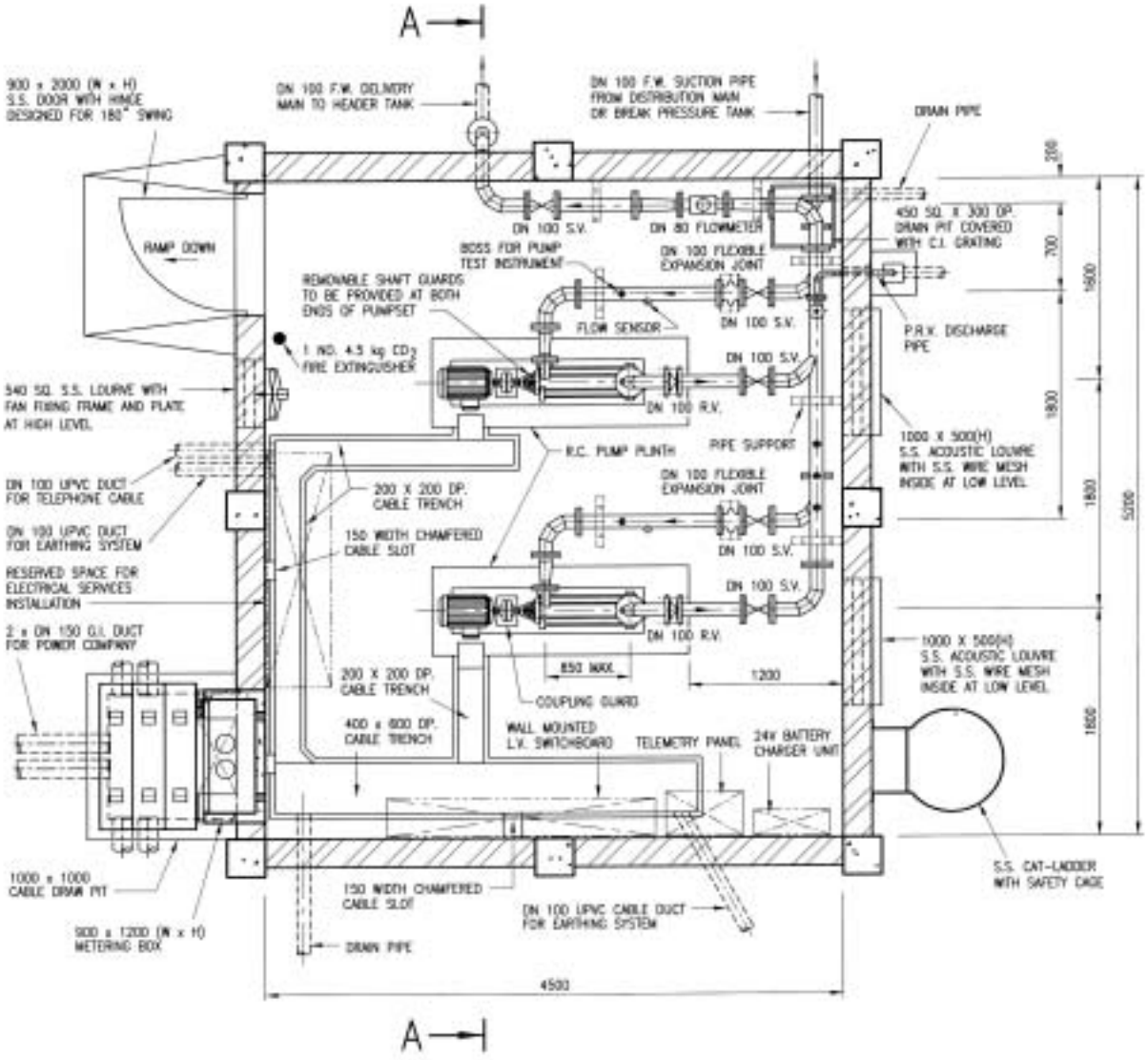
9. PRESSURE GAUGES

One suction and one delivery pressure gauges shall be supplied for each pump. The scale of the suction and delivery pressure gauges shall be from -10 m to +10 m water gauge and from 0 m to +240 m water gauge respectively or as specified in the Particular Specification. The gauges shall be Bourdon tube type and complete with isolating cocks. The diameter of the scale shall not be less than 100 mm. Static head corrections is not required.

10. MOTOR

The motor supplied shall be in accordance with Water Supplies Department Standard Specification E-51-04 for Squirrel Cage Induction Motors up to 40 kW.

Sketch A



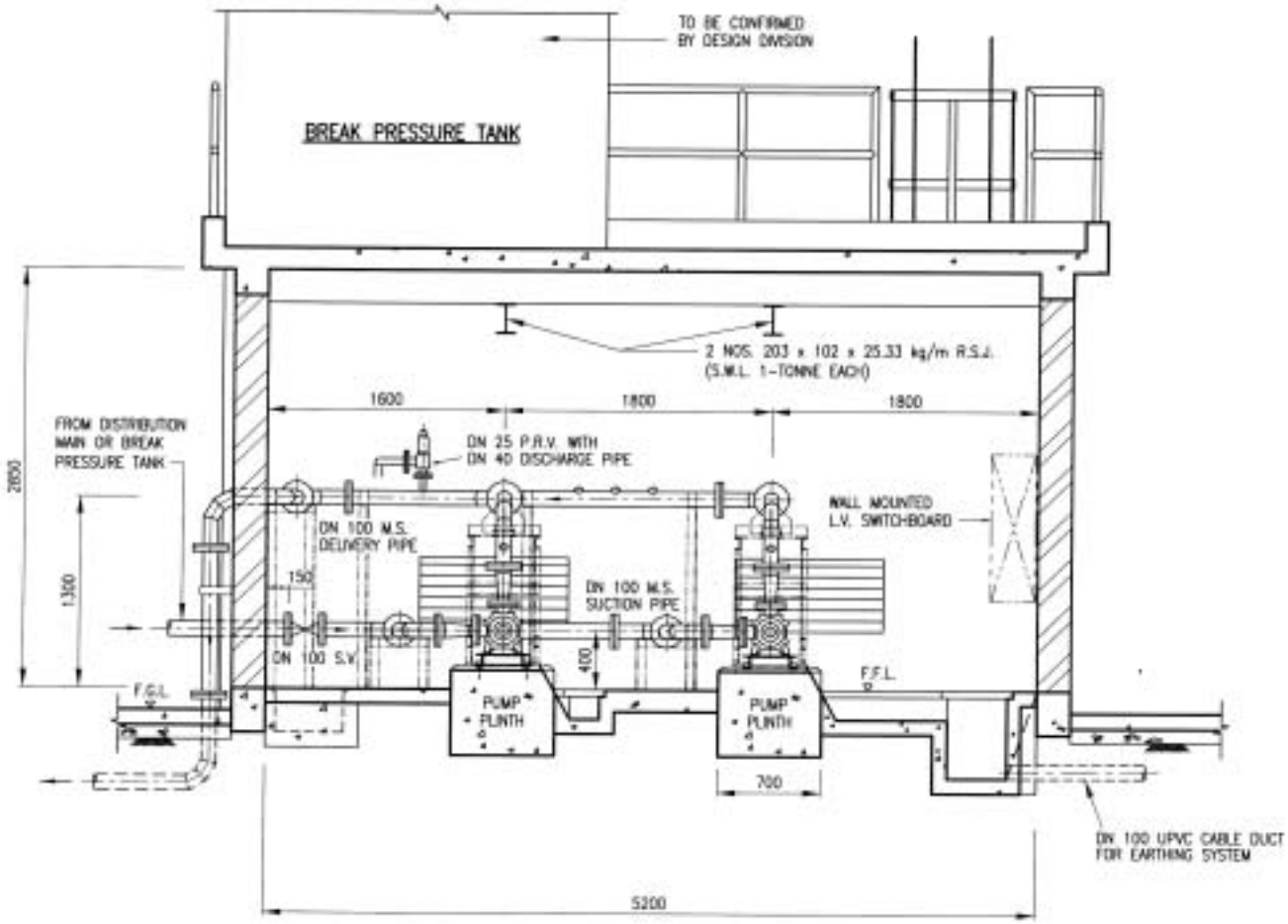
PLAN

NOT TO SCALE

NOTES :
1) ALL DIMENSIONS ARE IN mm

TYPICAL VILLAGE PUMP HOUSE GENERAL ARRANGEMENT

SK70120/055



NOTES :
1) ALL DIMENSIONS ARE IN mm

SECTION A–A

NOT TO SCALE

TYPICAL VILLAGE PUMP HOUSE GENERAL ARRANGEMENT

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- End of Specification -