WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION EM-01-06

PROGRESSIVE CAVITY PUMPS

1. PROGRESSIVE CAVITY PUMP

1.1 Pump Type

(a) Progressive cavity pump shall be the type of pump with 1-lobe or 2-lobe geometry of rotor revolves eccentrically inside a fixed 2-lobe or 3-lobe geometry of stator. The eccentric motion of the rotor shall maintain constant seal across the stator as it travels continuously through the pump to give a uniform positive displacement of the cavities. The pump shall be high self-priming and produce low pulsation flow with flowrate directly proportional to rotational speed of rotor.

(b) The pump shall be suitable for bi-directional rotating operation. For standard direction of rotation producing suction in the chamber containing the drive shaft. For reverse rotation applications, this chamber becomes the discharge end and the mechanical seal shall be rated for the maximum design pressure of the pump.

1.2 Pump Casing

(a) The pump casing shall be designed so that it shall be able to be rotated in 90 degree intervals giving possible alternatives to positions of pump installation. The casing shall be fitted with drain point and two cleanout/inspection ports. Pump casing shall be manufactured from stainless steel grade 316 / 316L for water sampling or chemical handling applications and cast iron with appropriate coating system or other superior material to be accepted/approved by the *Project Manager*/the Engineer for handling sludge, slurry or water with solids in suspension.

(b) Flanges comply with BS EN 1092 with not less than PN16 rating shall be provided on the pump casing for suction and discharge pipework connection.

1.3 Shaft Seal

The pump shall be provided with mechanical seal for the drive shaft. Shaft seal leakage shall be collected in the lantern drip tray which shall be threaded for drainage pipework connection.

1.4 Drive Shaft

The generation of the eccentric motion shall be by either flexible drive shaft or by rigid drive shaft. Corrosion resistant shroud shall be fitted around the flexible drive shaft. Coupling rod and universal joints shall be made of stainless steel grade 316L or other superior material to be accepted/approved by the *Project Manager*/the Engineer for rigid drive shaft. Food grade lubricant shall be used at universal joints and being sealed by sleeve and protected by stainless steel cover. The shaft bearing shall be isolated from the pumped fluid.

1.5 Gear Reduction Unit

The pump shall be driven through an enclosed gear reduction unit. The gear reducer shall be oil-immersed helical type with running oil anti-friction bearing.

1.6 Rotor

(a) The rotor material shall be hard chrome plated stainless steel grade 316L or other superior material to be accepted/approved by the *Project Manager*/the Engineer.

(b) The maximum speed of rotor shall not exceed 500 rpm.

1.7 Stator

The stator shall be moulded from abrasion and chemical resistant natural or synthetic rubber or alternative material to be accepted/approved by the *Project Manager*/the Engineer to suit the application. The stator shall be fitted with a thermistor sensor as dry-run protection device to initiate pump trip for prevention of possible damage to the pump.

1.8 Baseplate

The pump and motor shall be mounted in line on a common baseplate. Coupling guards shall be provided on pump/motor coupling. Guards shall be rigid, securely fixed and designed so that removal is not necessary during normal operation, routine inspection and routine maintenance.

1.9 Potable Water Application

All immersed or wetted non-metallic materials of the pump to be used in water treatment works shall be suitable for potable water application and in compliance to BS 6920 or equivalent.

2. DRIVING MOTOR

(a) The driving motor for the progressive cavity pump shall be a squirrel-cage induction motor complying with WSD Standard Specification E-51-03 or E-51-04.

(b) Unless otherwise specified in the Particular Specification, a variable speed drive in accordance with WSD Standard Specification E-86-02 shall be provided for controlling the motor speed in chemical dosing application

(c) The pump motor with variable speed drive shall be fan cooled to IEC 60034-6, IC416 or IC411 with Class F insulation for Class B operation. It shall be suitably oversized or installed with fixed speed fan mounted on the motor top as recommended by the motor manufacturer, for operating within the speed range from 10% to 100% without any thermal damage to the motor winding. The motor shall be flange-mounted type suitable for mounting onto the pump for driving. Should foot-mounted motor be offered, it should be directly coupled to

and mounted on a common rigid baseplate with the pump unit. Where necessary, recesses shall be provided in the baseplate to accommodate cables.

3. VALVES AND ACCESSORIES

(a) Each progressive cavity pump supplied shall be complete with the following valves for installing on the pipework :-

(i) 1 no. of pressure relief valve; and
(ii) 1 no. of non-return valve

(b) Pressure relief valve shall be properly sized and provided with pipework for discharging to safe and suitable location to be specified.

(c) Non-return valve shall be provided for each pump at discharge pipework. Swing check type shall be used for handling sludge, slurry or fluid with suspended solids.

4. PUMP TESTS

Progressive cavity pumps shall be hydrostatically tested to at least 150% of the rated pressure for not less than 10 minutes without leaks nor seepage through the pressure containing part or joints is observed and performance tested at rated speed(s) and pressure(s) to verify the corresponding rated flowrate(s) without negative tolerance at the manufacturer's works.

- End of this Specification -