



# Technical Specification

## GRP 59-79-118 Series Grinder Pump Explosion Proof Construction

- **SCOPE**

These specifications cover the design, performance and installation of submersible Grinder pumps intended for wetwell applications. The pump assembly, including the liquid end and motor shall be of the design and production of only one manufacturer, and shall be in full compliance with these specifications.

- **GENERAL CONDITIONS**

Furnish and install Qty \_\_\_ HOMA Model GRP \_\_\_ Electric Submersible Grinder Pump(s), each consisting of a single-stage, non-clog centrifugal pump, with a cutter attachment, close coupled by a common shaft to a squirrel cage, induction type electric motor, assembled in a single body, watertight aggregate, suitable for wet well.

- **PERFORMANCE GUARANTEE**

The pump shall be capable of delivering raw, unscreened sewage at: \_\_\_ GPM at \_\_\_ FT TDH.

- **PUMP DESIGN**

The liquid end shall be a centrifugal pump with a rotating cutter mounted on the shaft immediately adjacent to the impeller. The stationary cutter disk shall be mounted in an axially adjustable bottom plate. A short overhang shaft, shared by the rotating cutter, impeller and motor, will have generous shoulder fillet radii to minimize stress concentration and fatigue. The shaft shall be supported by anti-friction bearings. The lower bearing shall be a double-row, deep groove ball bearing, axially retained to sustain both axial and radial loads. The upper bearing shall be a single-row, deep groove ball bearing, axially floating to sustain radial loads only. The impeller shall be cast in one piece and of the multi-vane, centrifugal (radial) design. Watertight integrity shall be maintained by a Cable Entry Assembly, an isolated Junction Box, Mechanical Shaft Seal and, between major castings, by O-Rings, confined within closely fitted, high surface quality rabbet joints, compressed to the prescribed dimension only by metal-to-metal contact.

- **MATERIALS OF CONSTRUCTION**

Major castings: ASTM A48 Class 40B Cast Iron,- The cutter parts shall be made of Stainless Steel similar to AISI 440C, alloyed with cobalt, vanadium and molybdenum for a hardness of 55 Rockwell C minimum, to provide lasting abrasion resistance.- Shaft: AISI 430F Stainless Steel. - Fasteners: AISI 304 Stainless Steel. - All O-Rings: Nitrile Rubber. - Shaft Seals: Impeller and Motor side; Silicon Carbide/Silicon Carbide. Cable Jacket: Chloroprene Rubber. Exterior Protective Coating: High Build Epoxy.

- **SHAFT**

Pump shaft must have generous shoulder fillet radii to minimize stress concentration and fatigue. Deflection at the Shaft Seal within the operating range shall not be more than 0.002 inch.

- **BEARINGS**

Pump shaft shall be supported by anti-friction bearings, designed for minimum 50,000 hours B-10 Life at the pumps Best Efficiency Point ,and shall be factory pre-lubricated. The lower impeller-side bearing will be a double-row, deep groove ball bearing, axially retained, to sustain both axial and radial loads. The upper motor-end bearing is a single-row, deep groove ball bearing axially floating, to sustain radial loads only.

- **WATERTIGHT INTEGRITY**

The watertight integrity of the single-body pump-motor assembly shall be assured.

Each Cable Entry Assembly shall contain an elastomer grommet, flanked by two washers, closely fitted to the cable O.D. A watertight seal shall be maintained by screwing a threaded cable entry gland into a cable inlet flange which bolts into the motor cap. The cable entry gland threads down to a positive stop, thereby tightly compressing the grommet around the cable. The gland will provide a strain-relieving , anti-kink feature, functioning independently from the separate sealing action. The cable inlet flange shall contain an oring groove on the bottom side of the flange to allow for watertight integrity of the bolt-on cable entry assembly when bolted into the entry holes in the motor cap. For pumps above 10 horsepower an isolated Junction Box containing the Terminal Board, and sealed from the Motor Compartment by a watertight isolation plate, will provide a secondary barrier against water or moisture penetration. Each pump shall be supplied with 30 feet of SO Type power cable.



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- **SEALS**

Motor Compartment shall be isolated from the Liquid End by Single Mechanical Shaft Seals in tandem arrangement (dual-independent, both oriented to resist pressure from the impeller). The upper motor side seal shall run in an Oil Chamber, which separates the Motor Compartment from the Liquid End and provides permanent lubrication and cooling. The lower impeller side seal will also get lubrication from the Oil Chamber. Each seal will have a stationary portion and a positively driven rotary portion. Springs must be protected from the pumped liquid; and under no circumstances can solid particles accumulate on the external spring and hamper its effectiveness. Seals must not require repeated checking or re-adjustment, except periodic inspection of the oil chamber. At the interfaces of major castings, sealing shall be accomplished by resilient Buna-N O-Rings, confined within closely fitted, high surface quality rabbet joints, compressed only to the prescribed dimension by metal-to-metal contact, allowing radial movement and preventing permanent set. Flat gaskets and seal rings, which may be squeezed unevenly or beyond the permanent deformation limit, are not allowed.

- **SEAL PROBE**

A two wire conductive seal probe shall be provided with pump. Probe shall be mounted into mechanical seal chamber and when interlocked with control panel, probe shall indicate the presence of contaminants within mechanical seal chamber. Option for external seal probe devices shall be readily available and field retrofittable for all pumps.

- **ELECTRIC MOTOR**

Each pump shall be driven by a Submersible Squirrel Cage Induction Motor in accordance with NEMA MG I Section IV Part 30, rated at \_\_\_\_\_ HP 3450 RPM \_\_\_\_\_ Volts \_\_\_\_ Phase. Motor shall be NEMA Design B for continuous duty, capable of sustaining 15 starts per hour. The pump and motor shall be produced by one manufacturer and shall be of submersible design.

All stator windings and leads shall be insulated with moisture resistant Class F insulation, capable of withstanding 155°C Max. temperature, dipped and baked three times. Upon assembly, the stator shall be heat-shrink fitted into the stator housing; the use of bolts, pins or other fastening devices which would require penetration of the stator housing, shall not be acceptable.

In each phase winding there shall be embedded a temperature sensor, wired in series. Any of these thermal sensors shall cut out electric power if the temperature in its winding exceeds 140°C, but shall automatically reset when the winding temperature returns to normal. The motor shall have a SF (Service Factor) of 1.15 and shall be non-overloading for the selected performance curve. Full load current shall not exceed \_\_\_\_ FLA at \_\_\_\_ Volts.

When the application requires, motor shall be approved for use in Hazardous (Classified) areas. Pumps shall be suitable for operation in Class I, Division 1 Groups C & D Areas only, and shall be approved by Factory Mutual (FM) for use in the area classification indicated.

- **WETWELL AUTOCOUPLING APPLICATION**

An Autocoupling assembly shall be employed to eliminate the need for entering the wet well to service pumps. The system shall allow the lowering of the pump unit(s) into the well along 2 rigid guide pipes, resulting in a self-engaging, firm, leakproof coupling of the volute outlet to a receiving Base anchored to the floor which forms the discharge pipe connection. To assure a leakproof junction between movable and stationary components, a retained resilient seal ring shall be employed which is easily replaceable as part of the pump assembly, is axially and evenly compressed upon contact. O Ring Design Seals or Metal-to-metal contact faces shall not be allowed. Once seated, the pump shall be entirely supported by the Autocoupling Base, without any reliance on additional supports. Autocoupling discharge connection shall be flanged for all Grinder pumps above 5 HP to assure positive, permanent sealing.

- **WETWELL PORTABLE APPLICATION**

The pump unit, without modification to the basic, watertight pump-motor aggregate, shall be suitable for portable use when combined with a ring stand.