PUMP REQUIREMENTS

Supply (Qty) ____, _____inch discharge electric submersible heavy duty agitator slurry pump(s). The pump shall be driven by a close coupled ____HP, submersible electric motor with a nominal rating of _____ volts, 3 ph, 60 Hz, 1750 RPM.

The pump shall be capable of delivering _____ US GPM flow at _____FT TDH. The pump shall also be able to delivering _____US GPM at _____FT TDH. The pump shutoff head shall be at least_____FT TDH. The pump shall be capable of a maximum submergence depth of 65 ft.

Maximum recommended starts should not exceed 10 times per hour.

DESIGN AND CONSTRUCTION

The pump shall be designed and constructed to pump non-flammable liquids containing up to 70% (concentration by weight) abrasive solids without causing excessive wear or early pump failure.

Agitator

The pump shall be designed and fitted with a replaceable agitator to lift solids that have settled to the bottom of the pumping area, and to move these solids into suspension with the pumped liquid. The agitator design shall have at least 4 conical vanes angled to propel solids into the suction inlet of the pump. The agitator shall be made of cast chrome iron with hardness of at least 550 BHN. The agitator shall be attached directly to the pump shaft at the eye of the pump impeller.

Wear Plate

The pump shall be supplied with a hardened wear plate to prevent erosion and increasing the clearance between the impeller and suction cover of the pump; a condition that would reduce the pump's hydraulic performance. The wear plate shall be replaceable, constructed of cast chrome-iron with a minimum hardness of 550 BHN, and installed in front of the impeller.

Wear plates constructed with a casting hardness less than 550 BHN shall not be accepted. Wear plates installed on the back side of the impeller shall not be accepted.

Impeller

The pump shall be supplied with a dynamically balanced semi-open, multi-vane impeller designed for superior hydraulic efficiency and capable of handling _____inch spherical solids without clogging. Impeller shall be constructed from cast chrome-iron with a minimum hardness of 550 BHN.

Volute/ Pump Housing

The pump volute shall be split case and constructed from cast chrome-iron with a minimum hardness of 550 BHN.

Discharge

The pump design and construction shall have a top discharge, with a NPT connection. Pumped liquid shall pass from the volute through the pump housing cast around the motor housing. The pumped liquid shall act as a water jacket to cool the motor and to permit pumping down to a depth of *(choose one)* ___inches without overheating the motor.

Seals

The pump shall be supplied with four independent seals designed to prevent fluid from entering the motor housing.

The pump seal chamber shall be isolated from the pumped liquid by a lip seal constructed from (BUNA N) rubber.

Two mechanical shaft seals shall be installed in an oil filled seal chamber designed to permit inspection and drainage and prevent over-filling without disassembly of the pump stand, agitator and impeller.

The two mechanical seals constructed from (FKM) rubber shall be lubricated hydro-dynamically by Shell FM32 – Food grade NSF approved non toxic oil.

The rotating and the stationary seal rings in both the lower mechanical and upper mechanical seals shall be constructed of Silicon Carbide and shall be held in contact by a common 304SS spring.

The volute gasket shall be constructed from AF fibre joining sheet – AF159.

The power cord entry shall be sealed by a cast iron gland fitted with a Fluorelastomer (FKM) molded power cord boot, attached to the motor cover, and the power wire leads shall be independently connected to the motor wire leads in an epoxy potting. The potting shall be done in a manner to establish an anti-wicking block; each wire lead shall be cut and connected with a non insulated butt connector and then sealed with epoxy resin to form a solid barrier.

Seal Minder®

Optional: *(delete if not specified)* the motor shall be protected from shorting due to mechanical seal failure by a **Seal Minder®**, to detect the presence of water in the seal oil chamber. The probe is connected to a 24 VAC power source (by operator). The probe in the seal chamber measures the resistance in the fluid (oil). If the resistance drops below a preset amount, an alarm is triggered in the control panel.

Motor

The pump motor shall be designed specifically for submersible pump usage and continuous duty (Refer to Datasheet) of pumped liquid up to 104° F. The motor shall be a Nema B design induction type in an oil filled chamber. The stator windings and leads shall be insulated with moisture resistant Class H insulation rated for 356° F.

The motor horsepower shall be non-overloading over the full range of the performance curve, from shut-off to full-flow. The combined service factor (frequency, voltage and liquid specific gravity) of the motor shall be 1.15.

The motor shall be protected from failure from overheating by a thermal switch attached to the stator and from low voltage or high amperage by a separate overload switch installed in the motor cover housing.

The motor design is capable of a turn down ratio that will allow a frequency operation range from 60Hz to 45Hz.

The motor cover shall have a threaded fitting to permit air testing of the motor cover and power cord inlet seal against leakage.

Power Cord

The pump shall be supplied with a 50 foot power cord (alternative lengths optional) connected to the motor lead wires in water and oil resistant sealed epoxy potting. The five lead, redundant ground, SOOW power cord shall be sized in accordance with NEC standards. The outer jacket of the power cord shall be oil resistant and capable of submergence in water up to 104°F.

Optional: *(delete above and insert)*: The pump shall be supplied with a _____foot power cord.

The power cord shall be protected by a strain relief, attached to the motor cover. The strain relief will be sized to absorb the load and prevent the power cord leads from being separated from their connection to the motor lead wires, if the power cord is pulled, as in the act of attempting to lift the pump by the cord.

The power cord entry shall be sealed by a gland fitted with a BUNA rubber molded power cord sleeve, attached to the pump cover, and the power wire leads shall be independently connected to the motor wire leads in an epoxy potting.

Rotor Shaft

The rotor (pump) shaft shall be constructed of corrosive resistant 410SS and be of sufficient diameter to handle radial loads over the full range of the pump's performance curve while pumping high concentrations of solids.

The rotor (pump) shaft shall be protected by a replaceable hardened shaft sleeve.

Bearings

The upper bearing shall be single row deep groove ball bearing for all KZN models.

The lower bearing shall be sized to carry radial and thrust loads typical of pumping large concentrations of slurry solids. The lower bearing shall be a single row deep groove ball bearing for 5, 7.5, 10, 15, 20 HP pump models.

The lower bearing for the 30HP pump model shall be tandem deep groove ball bearing.

The bearings shall be sized for 50,000 L10 life.

The upper and lower bearings shall be lubricated by Chevron SRI high temperature grease.

Supporting the Pump

The pump shall be mounted on an integral stand constructed of steel. The stand shall incorporate a strainer to prevent large solids from entering the pump.

The pump shall be fitted with 2 lift rings, screwed into the motor cover. Lifting chains shall be supplied by others.

TESTING

The pump shall undergo the following tests, which shall be recorded and certified.

Air pressure	Winding: phase angle and impedance tests
Noise	Insulation to ground
Vibration	

A copy of the test record tag shall be attached to the pump when delivered to the customer or job site.

OVERALL

The pump shall be a BJM Pumps® KZNMD series model _____.
The pump shall be _____inches in height; _____inches in diameter and shall weigh _____lbs.

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