

## PUMP SPECIFICATION

### SV Vortex NON-CLOG PUMPS

#### PUMP REQUIREMENTS

Supply (qty) \_\_\_\_\_, \_\_\_\_\_ inch side discharge electric submersible non clog vortex pump(s). The pump shall be driven by a close coupled \_\_\_\_\_ HP, submersible electric motor with a nominal rating of \_\_\_\_\_ volts, \_\_\_\_\_ phase, 60 HZ, \_\_\_\_\_ RPM

The pump shall be capable of delivering \_\_\_\_\_ US GPM flow 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.

#### DESIGN AND CONSTRUCTION

The pump shall be designed and constructed to pump liquids containing solids up to \_\_\_\_\_ inch spherical diameter and not clog inside the pump or the discharge pipe.

#### Impeller

The pump shall be supplied with a dynamically balanced multi vane vortex style impeller made of cast iron. The vortex impeller is partially recessed to have limited contact with the solids and create efficient hydraulic pumping through a vortex swirling action.

The impeller shall be affixed to the motor rotor shaft on (choose one)

1 phase motor pumps by screwed on machined threads in the impeller bore and the shaft.

3 phase motor pumps by placing the impeller onto a shaft , locking it into place with an impeller key, and tightening it to the shaft with an impeller lock washer and nut screwed onto machined threads at the end of the motor shaft.

#### Volute

The volute shall be made of cast iron and bolted directly to the pump's seal housing. The volute shall be designed to incorporate the suction opening that is sized for the solids passage of the pump. For  $\frac{1}{3}$  and  $\frac{1}{2}$  hp pumps, the pump discharge shall be an integral part of the volute casting and include a 90 degree discharge elbow. For pumps 1 hp and larger, the pump volute shall incorporate a 4-bolt square flange to accept either a removable discharge elbow or a slide rail pump bracket.

#### Discharge Elbow

All 1hp and larger pumps shall be supplied with a separate 90 degree discharge elbow with four bolt mounting flange to the volute. The discharge elbow will be able to accommodate 2" or 3" Male NPT connections or 2", 3" or 4" NPT Female discharge connections.

All  $\frac{1}{3}$  hp and  $\frac{1}{2}$  hp pumps with integrally cast 90 degree discharge elbow shall accommodate either 2" or 3" NPT Male or 3" NPT Female discharge connection.

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#### Seals

The pump shall be supplied with two independent mechanical seals designed to prevent fluid from entering the motor housing. The lower seal faces shall be made of silicon carbide vs. silicon carbide. The upper seal faces shall be carbon vs. ceramic. For pumps less than 1 hp, the seal elastomers shall be made of Buna N rubber. For 1 hp and larger pumps, the seal elastomers shall be fluoroelastomer (FKM) rubber. The seals shall be held in contact by a common 304SS spring between the lower and upper seals.

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

The two mechanical shaft seals shall be lubricated by an ISO 32 – Food grade NSF approved, non toxic oil, in a seal chamber separate from the volute and motor pump housing.

#### Seal Minder<sup>®</sup>

The pump (choose one) shall / shall not be supplied with a **Seal Minder<sup>®</sup>** cable. The cable shall connect to the Seal Minder<sup>®</sup> probe allowing the user to detect the presence of water in the seal oil chamber. The probe is connected to a 12VAC 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 a NEMA design B induction air filled motor designed specifically for submersible pump usage and continuous duty of pumped liquid up to 104 degrees F.

The stator windings and leads for pump models with a 1HP – 5HP motors shall be insulated with moisture resistant Class F insulation rated for 311 degrees F.

The stator windings and leads for pump models with a 7.5HP – 10HP motors shall be insulated with moisture resistant Class H insulation rated for 356 degrees 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 1.10.

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

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

The motor housing shall be constructed of corrosive resistant 304SS for superior heat transfer.

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

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#### **Rotor / Pump Shaft**

The rotor (pump) shaft shall be constructed of corrosive resistant 304SS 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.

Rotor shall be made of steel with cast aluminum insulation and shall be dynamically balanced.

#### **Bearings**

The upper bearing shall be a single row deep groove ball bearing.

The lower bearing shall be single row deep groove ball bearing.

The upper and lower bearings shall be permanently lubricated by high temperature polyurea grease. Minimum bearing L10 life shall be 30,000 hours.

#### **Power Cable**

The pump shall be supplied with a 33 foot power cable (alternative lengths optional) connected to the motor lead wires in a water and oil resistant sealed epoxy potting. The power cable shall be sized in accordance with NEC standards. The outer jacket of the power cable shall be oil resistant and capable of submergence in water to 104°F.

For motors 1HP – 5HP, class STOW (SOOW optional) PVC jacket

For motors 7.5HP – 10HP, class SOOW (UL, CSA, MSHA) CPE jacket

Optional: (*delete above and insert*): The pump shall be supplied with a \_\_\_\_\_foot power cable.

The power cable 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 cable leads from being separated from their connection to the motor lead wires, if the power cable is pulled, as in the act of attempting to lift the pump by the cable.

For 2 hp and smaller models, the power cable entry shall be sealed by a gland fitted with a BUNA N rubber molded power cable sleeve, attached to the pump cover, and the power wire leads shall be independently connected to the motor wire leads in an epoxy potting.

For 3 hp and larger models, the power cable entry shall be sealed by a compression fitting utilizing an FKM gland, attached to the pump cover, and the power wire leads shall be independently connected to the motor wire leads in an epoxy potting.

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**Supporting the Pump**

The pump shall be mounted on base constructed of cast iron that may be removed by loosening bolts when the pump is mounted on a slide rail.

The pump shall be fitted with (choose one) 2 lift rings / handle, screwed into the pump 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 Pump® SV series model \_\_\_\_\_.

The pump shall be \_\_\_\_\_ inches in height; \_\_\_\_\_ inches in diameter and shall weigh \_\_\_\_\_ lbs.