Typical Specifications
8SHV Submersible Solids-Handling Sewage Pumps

**Solids Handling Submersible Pumps**

**SCOPE:** Furnish and install ________________ submersible solids handling sewage pump(s). Each pump shall be capable of delivering the following performance points, ________________ U.S. GPM at ________________ TDH; ________________ U.S. GPM at ________________ TDH; and ________________ U.S. GPM at ________________ TDH, with a shut off head of ________________ TDH (minimum) and ________________ % minimum efficiency at ________________ U.S.GPM at ________________ TDH (operating point). The pump motor shall be ________________ RPM, ________________ HP (maximum), ________________ Phase, 60 Hertz, ________________ Volts. The pump(s) shall be manufactured by a company regularly engaged in the manufacture and assembly of similar units for a minimum of five (5) years. The pump(s) shall be Barnes® Pumps model 8SHV.

**PUMP DESIGN:** Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water, fibrous materials, and up to 4 inch diameter spherical solids. The pump(s) shall be capable of handling liquids with temperatures to 104 degrees F continuous, 160 degrees F intermittent. Bearings shall be oil-lubricated and designed for 50,000 hours operating at minimum flow. Product shall be furnished with oil filled Inverter Duty Motors per NEMA MG-1, Part 31 with stator winding of the open type with Class H insulation. The motor shall be Inverter Duty Rated per NEMA MG1, part 31.

**PUMP CONSTRUCTION:** The volute, seal plate, adapter, motor housing and motor housing cap shall be constructed of high quality, ASTM A-48 Class 30 cast iron. Impeller shall be furnished in ASTM A-536 ductile iron (ASTM A-532 class III Type A White Iron for abrasive applications) with a keyed, tapered shaft bore. Pump(s) shall be coated with two coats of Axalta™ amido amine modified polymer satin gloss epoxy with a total 10 mil minimum thickness in the manufacturer’s standard color. All exposed hardware shall be 300 series stainless steel including the lifting bail. The pump construction shall contain no points of critical clearance nor require periodic adjustment or replacement to maintain operating efficiency. Discharge connection shall be a standard 4 inch spherical solids. The pump(s) shall be capable of handling liquids containing ________________ U.S. GPM at ________________ TDH; and ________________ U.S. GPM at ________________ TDH; and ________________ U.S. GPM at ________________ TDH with each pump.

**DOCUMENTATION:** The manufacturer, if requested, will supply a minimum of ________________ sets of standard submittal data; Standard submittal data consist of:

a. Pump catalog data;
b. Pump performance curve;
c. Break Away Fitting (BAF) data;
d. Access cover data;
e. Typical installation drawing;
f. Control panel data;
g. Panel wiring schematic;
h. Accessory data;
i. Installation & Operation Manuals with Parts List.
SCOPE: Furnish and install _______ submersible solids handling sewage pump(s). Each pump shall be capable of delivering the following performance points, _______ U.S. GPM at _______ TDH; _______ U.S. GPM at _______ TDH; and _______ U.S. GPM at _______ TDH, with a shut off head of _______ TDH (minimum) and _______% minimum efficiency at _______ U.S. GPM at _______ TDH (maximum). The pump(s) shall be Barnes® Pumps model BSHD _________.

PUMP DESIGN: Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water, fibrous materials, and up to 4 inch diameter spherical solids. The pump(s) shall be capable of handling liquids with temperatures to 104 degrees F continuous, 160 degrees F intermittent. Bearings shall be oil-lubricated and designed for 50,000 hours operating at minimum flow. Product shall be furnished with oil filled Inverter Duty Motors per NEMA MG-1, Part 31 with stator winding of the open type with Class H spike resistant magnet wire.

PUMP CONSTRUCTION: The volute, seal plate, adapter, motor housing and motor housing cap shall be constructed of high quality, ASTM A-48 Class 30 cast iron. Impeller shall be furnished in ASTM A-536 ductile iron (ASTM A-532 class III Type A White Iron for abrasive applications) with a keyed, tapered shaft bore. Pump (s) shall be coated with two coats of Axalta™ amido amine modified polymer satin gloss epoxy with a total 10 mil minimum thickness in the manufacturer's standard color. All exposed hardware shall be 300 series stainless steel including the lifting bail. The pump construction shall contain no points of critical clearance nor require periodic adjustment or replacement to maintain operating efficiency. Discharge connection shall be a standard 125 pound 8 inch flange, slotted to accommodate 8" ANSI or 200mm ISO flanges. The pump shaft shall be 416 stainless steel with a tapered impeller fit to reduce rotor imbalance and minimize stress risers associated with stepped shafts. All gaskets shall be of the angular gland compression o-ring type eliminating critical slip fits and the possibility of damage during service associated with sliding o-ring sealing arrangements.

The impeller shall be a dual vane design with pump out vanes on both sides. The impeller shall be dual plane dynamically balanced to ISO G6.3 specifications. The impeller and matching volute shall be provided with replaceable bronze wear rings at the inlet.

The tandem mechanical shaft seals shall be of the single spring design operating in an intermediate oil-filled seal cavity. Pump-out vanes on both sides of the impeller shroud shall be large enough to efficiently expel solids away from the seal area. The materials of construction shall be silicon carbide vs. silicon carbide for the pump-end seal and carbon vs. ceramic for the motor-end seal, lapped and polished to a tolerance of one light band, 300 series stainless steel hardware, and Buna-N elastomeric parts. The pump-end seal shall be pinned in place to prevent rotation of the stationary seat and shall seal to the pump housing via an o-ring to maximize heat transfer. Cup mounted seats shall not be considered equal. The seal shall be commercially available and not a pump manufacturer’s proprietary design. A moisture sensor detection system consisting of two probes shall be integrated within the oil-filled seal chamber which is isolated from the motor chamber. Units sensing moisture within the motor chamber are not considered acceptable. Moisture sensing devices utilizing one probe and grounding through the pump case or utilizing a float device are not acceptable. The leads for the moisture detector and temperature sensors shall be contained within the power cable, except that for 1/0 cables, the sensor leads will be in a separate cable.

The pump motor shall be sized to be non-overloading throughout the entire system operating range. The rotor and stator assembly shall be of the standard frame design and the stator pressed into the motor housing for mechanical stability. The motor shall be constructed with the windings operating in a sealed environment containing clean dielectric oil. Manufacturer to supply submergence requirements for continuous operation.

Motors shall be dielectric oil filled for optimal thermal management and maximum bearing life. Air-filled motors with grease-filled bearings shall not be acceptable. The motor windings shall be of Class H, spike-resistant insulation. The motor shall meet the NEMA Design B standard and be Inverter Duty Rated per NEMA MG1, part 31.

The pump shaft shall be of 416 stainless steel, keyed and tapered for the matching impeller. The lower bearing shall be of the double row ball type, locked in position to accept radial and axial thrust loads, and the upper bearing of the single ball type for radial loads. Bearings shall operate in an oil bath environment for superior lubrication, cooling and life.

THREE PHASE: Three thermal sensors (one per phase) shall be embedded in the end coil of the stator windings, wired in series and used to monitor stator temperatures. This shall be used in conjunction with an external motor overload protection device and wired to the control panel through the single power cable.

The pump shall be equipped with (50/75/100) ft. of a CSA-qualified submersible power cable constructed in accordance with type W guidelines and shall include the moisture and temperature sensor leads. For 18 & 21 Frame pumps, the cable entry system shall consist of a voltage-selectable expanding elastomeric plug held in place by a cast stainless steel plate indicating voltage and max amps. For 28 & 32 Frame pumps, cord connection shall be a pump-mounted plug and a rigid cord socket contained by a cast iron housing bolted to the motor with epoxy-potted cable connections and sealed by compressed o-rings.

PUMP TEST: The pump manufacturer shall perform a standard three point performance test at the minimum. If certified testing is required, the manufacturer shall offer to perform tests in accordance with Grades B, E and U of Hydraulic Institute standards. Additionally:

1. A check of the motor voltage and frequency shall be made as shown on the name plate.
2. A motor and cable insulation test for moisture content or insulation defects shall be made per CSA criteria.
3. A performance curve from the production line test showing head versus flow shall be included in the Installation and Operation Manual shipped with each pump.
4. A written report shall be available showing the aforementioned tests have been performed in accordance with the specifications.

START-UP: The pump(s) shall be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump(s).

DOCUMENTATION: The manufacturer, if requested, will supply a minimum of _______ sets of standard submittal data; Standard submittal data consist of:

a. Pump catalog data;
b. Pump performance curve;
c. Break Away Fitting (BAF) data;
d. Access cover data;
e. Typical installation drawing;
f. Control panel data;
g. Panel wiring schematic;
h. Accessory data;
i. Installation & Operation Manuals with Parts List.
Typical Specifications
8SHT Submersible Solids-Handling Sewage Pumps

Solids Handling Submersible Pumps

8" Horizontal Discharge, Enclosed Tri-vane Impeller Tandem Seal, Oil-Filled

SCOPE: Furnish and install _______ submersible solids handling sewage pump(s). Each pump shall be capable of delivering the following performance points, [U.S. GPM at _______ TDH; U.S. GPM at _______ TDH; and _______ minimum efficiency at _______ U.S. GPM at _______ TDH (operating point)]. The pump motor shall be _______ RPM, _______ HP (maximum), _______ Phase, 60 Hertz, _______ Volts. The pump(s) shall be manufactured by a company regularly engaged in the manufacture and assembly of similar units for a minimum of five (5) years. The pump(s) shall be Barnes® Pumps model 8SHT.

PUMP DESIGN: Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water, fibrous materials, and up to 4 inch diameter spherical solids. The pump(s) shall be capable of handling liquids with temperatures to 104 degrees F continuous, 160 degrees F intermittent. Bearings shall be oil-lubricated and designed for 50,000 hours operating at minimum flow. Product shall be furnished with oil filled Inverter Duty Motors per NEMA MG-1, Part 31 with stator winding of the open type with Class H spike resistant magnet wire.

PUMP CONSTRUCTION: The volute, seal plate, adapter, motor housing and motor housing cap shall be constructed of high quality, ASTM A-48 Class 30 cast. Impeller shall be furnished in ASTM A-536 ductile iron (ASTM A-532 class III Type A White Iron for abrasive applications) with a keyed, tapered shaft bore. Pump(s) shall be coated with two coats of Axalta™ amido amine modified polymer satin gloss epoxy with a topcoat. The motor and control cabinet shall be completely assembled and tested before final acceptance of the pump(s).

PUMP TEST: The pump manufacturer shall perform a standard three point performance test at the minimum. If certified testing is required, the manufacturer shall offer to perform tests in accordance with Grades B, E and U of Hydraulic Institute standards. Additionally, the pump shall be tested and certified in accordance with Grades B, E and U of Hydraulic Institute standards. The pump shall meet the minimum efficiency requirements specified in the Hydraulic Institute standards. The pump shall be tested in accordance with the specifications of the Hydraulic Institute standards.

START-UP: The pump(s) shall be started at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump(s).

DOCUMENTATION: The manufacturer, if requested, will supply a minimum of _______ sets of standard submittal data; Standard submittal data consist of:

- a. Pump catalog data;
- b. Pump performance curve;
- c. Break Away Fitting (BAF) data;
- d. Access cover data;
- e. Typical installation drawing;
- f. Control panel data;
- g. Panel wiring schematic;
- h. Accessory data;
- i. Installation & Operation Manuals with Parts List.

The pump motor shall be sized to non-overloading throughout the entire system operating range. The motor and stator assembly shall be of the standard frame design and the stator pressed into the motor housing for mechanical stability. The motor shall be constructed with the windings operating in a sealed environment containing clean dielectric oil. Manufacturer to supply submergence requirements for continuous operation.

Motors shall be dielectric oil filled for optimal thermal management and maximum bearing life. Air-filled motors with grease-filled bearings shall not be acceptable. The motor windings shall be of Class H, spike-resistant insulation. The motor shall meet the NEMA Design B standard and be Inverter Duty Rated per NEMA MG1, part 31.

The pump shaft shall be of 416 stainless steel, keyed and tapered for the matching impeller. The lower bearing shall be of the double row ball type, locked in position to accept radial and axial thrust loads, and the upper bearing of the single ball type for radial loads. Bearings shall operate in an oil bath environment for superior lubrication, cooling and life.

THREE PHASE: Three thermal sensors (one per phase) shall be embedded in the end coil of the stator windings, wired in series and used to monitor stator temperatures. This shall be used in conjunction with an external motor overload protection device and wired to the control panel through the single power cable.

The pump shall be equipped with (50/75/100) ft. of a CSA-qualified submersible power cable constructed in accordance with type W guidelines and shall include the moisture and temperature sensor leads. For 18 & 21 Frame pumps, the cable entry system shall consist of a voltage-selectable expanding elastomeric plug held in place by a cast stainless steel plate indicating voltage and max amps. For 28 & 32 Frame pumps, cord connection shall be a pump mounted plug and a rigid cord socket contained by a cast iron housing bolted to the motor with epoxy-potted cable connections and sealed by compressed o-rings.

PUMP TEST: The pump manufacturer shall perform a standard three point performance test at the minimum. If certified testing is required, the manufacturer shall offer to perform tests in accordance with Grades B, E and U of Hydraulic Institute standards. Additionally,

1. A check of the motor voltage and frequency shall be made as shown on the name plate;
2. A motor and cable insulation test for moisture content or insulation defects shall be made per CSA criteria;
3. A performance curve from the production line test showing head versus flow shall be included in the Installation and Operation Manual shipped with each pump;
4. A written report shall be available showing the aforementioned tests have been performed in accordance with the specifications.

START-UP: The pump(s) shall be started at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump(s).

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- i. Installation & Operation Manuals with Parts List.