BUFFALO “SH” SOLIDS HANDLING PUMPS

BULLETIN 964-J
Background
The solids handling pumps described in this Bulletin are based on Buffalo's over 75 years of experience in designing and manufacturing centrifugal pumps for handling solids in industrial process and waste liquid systems. These latest models incorporate the time proven Buffalo enclosed extra-wide non-clog impeller, and bearing frames from the highly successful Buffalo Four-Way Pump series. The result is a comprehensive line of efficient, easily serviced, long-lived solids handling pumps offering a high degree of parts interchangeability to reduce your parts inventory requirements.

Applications
These solids handling pumps have proven their capability on thousands of applications. They are in use handling raw sewage, paper stock, slurries from paint spray booths, waste from food processing, coal slurries in power plants, bagasse slurries in sugar mills and numerous other applications requiring the handling of solids and slurries.

Overall Specifications
The "SH" Solids Handling Pump is a frame mounted, back pull-out single suction pump featuring an enclosed impeller, oversize bearings, rotatable discharge, and overall rugged construction.

Models Available
HORIZONTAL
VERTICAL NON-SUBMERGED
VERTICAL SUBMERGED
CLOSE COUPLED

CAPACITIES TO: 6000 GPM
WORKING PRESSURE: TO 100 PSI
HEAD: TO 225'
SOLIDS HANDLED: UP TO 4"
EFFICIENCIES: TO 88%
BEARING LIFE: Minimum L (10) exceeds 2 years

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Buffalo "SH" Inlet View
Note the quick release lugs, impeller locking nut and rounded impeller vanes designed to readily accept solids into the impeller.

Buffalo "VNS-SH" Vertical Non-Submerged Pump
This configuration may be shaft driven from the floor above (as model illustrated) or have a motor mounting flange attached to the bearing frame.

Buffalo "VS-SH" Vertical Submerged Pump
Ready for shipment, this VS pump is equipped with a float and float activated switch.

Buffalo "VS-SH" Vertical Submerged Pump
A large size VS without float and switch. Discharge is not threaded since piping will be welded.

Buffalo "H-SH" Horizontal Pump
Typical horizontal model showing coupling guard, bearing stand, pump and motor base, all mounted on a common steel base. Note "hand hole" in casing for easy inspection.
"SH" Design/Construction Features

RUGGED BEARING – SHAFT ARRANGEMENT
Solids handling pumps place heavy demands on shafts and bearings. Buffalo design engineers have selected bearing-shaft combinations which are best suited to the three pump configurations in the "SH" line.

Buffalo horizontal "SH" pumps utilize heavy duty ball type thrust bearings, with oil lubrication, mounted in a rugged cast iron bearing frame. Vertical submerged pumps have a Cutless rubber sleeve bearing at the pump end, with a grease lubricated ball type thrust bearing at the upper end of the shaft.

Vertical non-submerged pumps feature a roller bearing at the pump end of the bearing stand and a ball type thrust bearing at the motor end.

Pump shafts are of 4340 steel hardened to 500 Brinell through the stuffing box. When a mechanical seal is specified, the shaft is of 303SS.

In each instance, Buffalo engineers have selected the best combination of design and materials of construction to meet the operating conditions.

QUICK RELEASE LUGS – INSPECTION PORT
The ability to easily gain access to the inside of the pump casing, and to quickly remove the impeller are prime requirements of solids handling pumps. Each Buffalo "SH" Pump has a hand hole port in the casing. Quick release locking lugs of high strength sintered metal allow fast withdrawal of back-removal element from the casing. The piping remains undisturbed. These features make Buffalo "SH" Pumps among the easiest to service.
HIGH EFFICIENCY IMPELLERS
Impellers for "SH" Pumps are of an extra wide enclosed non-clog design, having two, three or four vanes, depending on the pump size. They are keyed to the shaft and secured by a cap screw and washer together with either a locking pin or a locking plate. This prevents loosening with reverse rotation. The vanes at suction are rounded from the impeller inlet to offer maximum acceptance of solids. Auxiliary vanes on the external face of the back shrouds assist in clearing the casing area adjacent to the shrouds.

These unique impellers handle solids effectively while maintaining up to 88% mechanical efficiencies.

VERSATILITY OF INSTALLATION
The ability to select a discharge position best suited to your installation requirements adds to the ease of installation. Buffalo "SH" Pumps provide the discharge position shown in the diagrams at the right. Rotation of discharge is easily accomplished due to the quick release casing lugs.

LONG SERVICE LIFE
Correct design, properly sized components, quality construction and ease of service all contribute to an extended service life for Buffalo "SH" Solids Handling Pumps. Add the economy of efficient operation and you realize a very favorable long-term cost of ownership.
SOLIDS HANDLING PUMPS / “SH”

Concept

The design criteria for centrifugal pumps to handle solids in suspension differs in several ways compared to pumps for handling clear liquids.

The ability to handle solids must be achieved without a sacrifice in hydraulic efficiency. Pumps handling solids are subjected to operating conditions which place a premium on rugged construction. Ease of disassembly, for inspection and maintenance, is of paramount importance. Several configurations are needed to meet installation requirements frequently encountered in process systems containing solids.

Parts interchangeability is a very desirable feature too, since more than one model solids handling pump type may be used within a given plant.

Buffalo “SH” Solids Handling Pumps meet all of these criteria, as detailed feature-by-feature in this Bulletin. You may choose your solids handling pumps from the Selection Chart on the facing page with the assurance that it will meet your requirements.

### PARTS INTERCHANGEABILITY

<table>
<thead>
<tr>
<th>Pump Sizes</th>
<th>H-3SH H-4SH</th>
<th>H-4SHL H-6SHL H-8SHL H-10SHL</th>
<th>VNS-3SH VNS-4SH</th>
<th>VNS-4SHL VNS-6SHL VNS-8SHL VNS-10SHL</th>
<th>VS-3SH VS-4SH</th>
<th>VS-4SHL VS-6SHL VS-10SHL</th>
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</thead>
<tbody>
<tr>
<td>Bearing Frame or Shaft Group</td>
<td>M3-S M4-S M3-VNS</td>
<td>M4-VNS</td>
<td>VC-3S</td>
<td>VC-4S</td>
<td>VC-5S</td>
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<td>Pump Component Parts</td>
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<tr>
<td>Shaft</td>
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<td>M-4</td>
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<td>M-4</td>
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<tr>
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<td>VC-3</td>
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<td>Gland</td>
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<tr>
<td>Bearing Frame</td>
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<td>Bearing Cover</td>
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<td>M3-VNS</td>
<td>M4-VNS</td>
<td>VC-3</td>
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<td>M-4</td>
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</table>

NOTE: Parts listed in vertical columns are interchangeable for pump models listed at the top of the column. Further, parts that have the same designation in more than one column are interchangeable with parts on pumps listed in each column where the part designation appears. For example, the same shaft is interchangeable on pump models H-3SH, H-4SH, VNS-3SH and VNS-4SH.

NA: Not applicable. Part not used on this model.
Selection Chart

MAXIMUM SIZE OF SOLIDS HANDLED/PUMP SIZE

Horizontal & Vertical Models

<table>
<thead>
<tr>
<th></th>
<th>3SH</th>
<th>4SH</th>
<th>4SHL</th>
<th>6SHL</th>
<th>8SHL</th>
<th>10SHL</th>
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<tr>
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<td>M-4</td>
<td>M-4</td>
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<tr>
<td>Max. Working Pressure PSIG</td>
<td>65</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Max. Size of Solids</td>
<td>2½&quot;</td>
<td>3&quot;</td>
<td>2½&quot;</td>
<td>3&quot;</td>
<td>4&quot;</td>
<td>4&quot;</td>
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<tr>
<td>No. of Impeller Vanes</td>
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<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
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<tr>
<td>Rotation Available</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
<td>CW</td>
<td>Both</td>
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</tbody>
</table>
Design Configurations

BUFFALO VERTICAL NON-SUBMERGED PUMP VNS
This popular space saving configuration has the motor mounted directly to the top flange. The motor used would be a normal thrust, vertical P-base design connected to the pump shaft through a flexible coupling.

BUFFALO VERTICAL NON-SUBMERGED VNS
When the motor is to be mounted on the floor above the pump floor, this configuration is required. The tubular drive shaft has needle bearing universal joints, a split pillow block intermediate bearing, if required, and a splined slip joint at the pump end.

BUFFALO VERTICAL SUBMERGED VS
Designed for wet pit installation, the submerged pump is suspended from the pit cover plate. The motor, motor stand and float controlled motor switch are mounted above the cover plate as shown.
BUFFALO HORIZONTAL H
A standard horizontal configuration with pump and motor mounted on a common steel base plate.

BUFFALO HORIZONTAL CLOSE COUPLED CC
Designed for limited space applications, this configuration has the motor connected directly to the pump by a motor-pump adapter.

BUFFALO VERTICAL CLOSE COUPLED NON-SUBMERGED VCCNS
For space saving conditions where a vertical non-submerged pump is required. The motor is mounted to the pump by a pump-motor adapter.
Other Buffalo Pumps

4-Way Frame Mounted Pumps
Buffalo 4-Way Pumps are designed to operate with reduced axial and radial loads for long maintenance-free service in the chemical process and allied industries. 21 sizes. Capacities to 5000 gpm. Pressures to 300 psi. Bulletin 903.

Leakproof Can-O-Matic® Pumps
The reliable hermetically sealed pump designed to handle toxic, volatile and corrosive liquids, refrigerants and high temperature water. 17 sizes. Capacities to 1200 gpm. Heads to 480 ft. Temperature from -120°F to +490°F. Pressures to 600 psi. Bulletin 979.

Vortex Pumps
Designed to handle abrasive slurries and solids, this new line of vortex type pumps features an adjustable, replaceable vane impeller. One impeller hub size and three vane lengths provide impeller diameters from 7” to 13” at ½” increments. Adjustability feature provides modification of pump output and compensation for wear. Capacities to 2000 gpm. Heads to 190 ft. Bulletin 902. Patent Pending.