

**CRANE**

PUMPS & SYSTEMS

# BARNES® SH Series

TECH NOTES

#1

## Frequently Asked Questions

### 1. Are the impellers on the Barnes SH series available in hard chrome iron?

Different suppliers provide different impeller materials, including gray iron, ductile iron and chrome iron. The Barnes SH series uses ductile iron. Ductile iron is significantly stronger than gray iron and has better abrasion resistance. Chrome iron provides better abrasion resistance than ductile iron, but at the cost of lower impact resistance. Greater hardness is accompanied by greater brittleness, making chrome iron impellers much more susceptible to broken vanes when impacted by hard solids. Therefore, ductile iron impellers last much longer than gray iron and tend to perform better in the long run than chrome iron.

### 2. What material is used for casing wear rings in conjunction with enclosed impeller SH Pumps?

Barnes uses ASTM C954 lead-free bronze.

### 3. Why is the full load current higher than NEMA standards for some of the lower HP Barnes SH ratings?

There are two reasons, both related to the superior cooling capability of an oil-filled motor. First, the 1.2 Service Factor is MINIMUM; the smaller ratings actually have higher service factors. Secondly, exhaustive output torque versus heat rise testing performed during motor development has shown that we can get more power from our motors than the nominal rating.

### 4. Do the Barnes SH power cables meet P-MSHA approvals?

No, the pumps do not meet P-MSHA approvals because they are designed for sewage service, not mining. The power cables do meet FM and CSA certifications with regard to temperature, moisture, resistance, chemical resistance and flammability.

### 5. Do the Barnes SH pumps have watertight integrity to 65 feet?

Yes, confirmed by test, to meet FM and CSA requirements.

### 6. How does the plug and play Power Cord work?

The 300°F rated plug includes pins for three phase power, ground plus safety ground, moisture sensor leads and temperature sensor leads. Nine power leads are converted to three leads for voltage selection within the plug; an orange plug is for high voltage (460-575V) and a black plug is for low voltage (208-230V). An investment cast stainless steel retaining plate, marked with voltage and max current, retains the plug in the top housing. When the plate is bolted down metal-to-metal, the plug is sealed, rated to 65 feet of submergence and certified by FM and CSA as explosion-proof.

### 7. Why is the Power Plug not offered on all sizes?

On the larger frame motors the conductor sizes preclude the use of a plug, so they use a hard-wired design that still permits pump change-out without having to pull the power cord from the conduit. The plug design makes the Barnes SH pump very versatile.

### 8. Don't all non-clog pump manufacturers claim their bearings are suitable for 50,000 hours?

Yes, but that doesn't tell the whole story. Most make the claim, "...when operated at a normal part of the curve..."

without specifying what is “normal”. One leading manufacturer claims 50,000 hours in their sales literature but states in their Instruction Manual that 20,000 hours life could be expected, depending on operating conditions. The Barnes 4SH is rated for 50,000 hours anywhere on the curve from run-out back to minimum flow; minimum flow is 80 GPM or 2 ft/sec in a 4 inch pipe. Please note that actual minimum flow should be considered to be 3 ft/sec in the vertical riser pipe to minimize the possibility of clogging.

### **9. What is so special about the coating system on the Barnes SH?**

Barnes utilizes DuPont Corlar ST2.1 high solids mastic epoxy, two coats with a total dry film thickness of 10-12 mils. This external coating system is designed specifically for submersion and proven by salt spray testing to be superior to other pump manufacturer’s standard paint systems.

### **10. Does the Barnes SH pump have true 3” spherical solid passage capability as required in the Ten States Standard?**

All Barnes SH models have the capability of passing 3” spherical solids. It should be noted that this requires impeller and volute designs that are not ideal for pumping efficiency, and that manufacturers touting high efficiency non-clog pumps typically cannot pass anything close to 3” spherical solids.

### **11. Do the mechanical seals in the Barnes SH pumps stand up to wear from grit?**

Yes, the lower of the two mechanical seals is normally fitted with silicon carbide vs. silicon carbide seal faces for grit resistance, while the upper seal, which only sees motor and seal chamber oil, uses carbon vs. ceramic faces. The upper seal can be provided in silicon carbide vs. silicon carbide. If desired either of the two seals can be provided with tungsten carbide vs. tungsten carbide seal faces. Although tungsten carbide seal faces have been used for many decades, silicon carbide has emerged over the last fifteen years as an equally grit resistant but more economical face material.

### **12. Whose motor do you use for explosion-proof construction?**

It is our own design, integrated within our own housing. The pump is rated Class I Groups C&D Division 1, T4 Temperature rating, by both FM and CSA. One key difference between the Barnes XSH and many competitors is that we use the SAME construction for both X-Pruf® and standard construction so there is NO difference in lead time: three weeks!

### **13. How do you prevent false seal alarms or a flickering light when there is a very slight amount of moisture in the seal chamber?**

The Barnes SH is fitted with dual moisture sensor probes connected by a high ohm resistor. The use of single probes, or dual probes not connected, allow slight amounts of moisture, such as from re-building a pump on a high humidity day, to begin to conduct slightly, causing the alarm light to flicker. The shorting resistor allows a controlled current to flow continually, and the control relay is adjusted to actuate when there is higher current.

### **14. Isn’t a dry float switch preferable to the monitored probe?**

NO! The moisture sensor approach activates the alarm light when the lower seal is starting to see leakage into the oil chamber. A dry float switch only activates when water has breached both the lower and upper mechanical seals and is threatening both the lower bearing and the motor.

### **15. What does it mean to be “Inverter Duty Rated”?**

Inverter Duty Rated means all the motors for the Solids Handling pumps have special insulation and spike resistant wire and slot liners to make them resistant to spike voltage. A Variable Frequency Drive (VFD) operates by generating a series of short pulses of varying peak voltages to emulate the shape of a normal sine wave. Each pulse has a theoretically square wave, but there is still a series of spikes that emanate from the leading corner of each pulse. These spikes generate much higher voltage than a normal sine wave.

### **16. Where are the SH pumps manufactured?**

Barnes SH pumps are machined, assembled and tested in our Piqua, OH USA factory utilizing North American components.