

## **FISHER INDUSTRIES VERTICAL MULTISTAGE SEAWATER PUMP FEATURES**

***In a market where “cutting corners” has become the rule and not the exception, the Fisher Vertical Multistage Pump stands out in terms of engineering and reliability. Strict manufacturing practices combined with unique design features assure product consistency and maximum reliability.***

***Noteworthy standard features of our sea water design include:***

### **PUMP BOWL ASSEMBLIES**

Diffuser bowls, impellers, suction bell, and discharge case are precision cast Nickel-Aluminum-Bronze (41/2% nickel in accordance with ASTM B148-C95800) for superior resistance to chemical and biological corrosive attack. Impellers are positively locked to the pump-shaft with keys. All bowl assemblies are flange connected and machined with male/female concentric rabbets for precise alignment. Captive o-ring seals are installed at each flanged connection to prevent leakage which can cause “wash-out” that reduces performance, and eventually results in pump failure.

### **COLUMN SECTIONS**

Full slip-on, 150# ANSI, 316L Stainless Steel flanges are secured to Schedule 40 seamless A106B steel pipe with two (2) full 1/4 fillet welds per flange. (Socket type flanges often used by other pump manufacturers provide substantially lower vertical support strengths due to only one (1) 1/4 fillet weld with only a secondary seal weld on the top side). Steel pipe offers superior dimensional stability over non-metallic (Fiberglass) column materials such as *Bondstrand 2000* and others.

Machining of our column flanges and integral bearing retainers is performed after welding and heat treating are completed. This is to prevent distortion and to assure alignment and concentricity of the finished sections. (Pre-machined weld-on flanges commonly used by others to save cost should be avoided.) Our column flanges are machined with concentric rabbets, captive o-ring grooves, and faced to within .002”. As with pump bowl flanges, installation of captive o-ring seals at the column flange connections prevents any leakage of pressurized liquid moves through the column string.

Corrosion resistance for the steel pipe is achieved by sandblasting followed by an application, inside and outside, of 6-8 mils (dry film thickness) of *Ceramkote 54*. This is a new generation ceramic coating with excellent adhesion properties combined with superior corrosion/abrasion-resistance. Alternatively, two (2) coats of a Fiberglass Reinforced Polyester (FRP) resin coating can be applied. This generic coating system was ranked No. One (1) out of 29 different coating systems during a five year study conducted by the Army Corps of Engineers. Ease of touch up and repair make this system additionally attractive.

The low-carbon stainless steel (316LSS) flanges require no corrosion resistant coating. Thus, typical mechanical damage encountered on contact of coated steel flanges is eliminated.

### **SHAFTS**

Pump, head, and line shaft sections are available in several corrosion resistant materials including 316L Stainless Steel and C630 Nickel-Aluminum-Bronze. A surface finish of 8 micro-inches or better is achieved by using a special machining process. This is notably superior to the alternative method of grinding and polishing since no abrasive residues are available to undermine close bearing clearances.

### **DISCHARGE HEAD**

Similar attention is given to the manufacturing of Fisher Vertical Multistage Pump discharge heads. High grade carbon steel with 316L Stainless Steel column connection flanges are used in the fabrication process. Machining of flanges is performed only after welding and heat treating are completed. The column connection flange, stuffing box bore and motor (or gear) mounting flange are concentric and parallel to within .002” after machining. Like the column sections, steel waterway surfaces in the head are coated with *Ceramkote 54* or FRP. The discharge elbow is secured to the base of the head by welded ribs, instead of a plate, which allows more complete coating of inner recesses and prevents pooling of condensation. The design permits a chemical injection line to be run through the head and down the length of the pump, instead of separate installation run down the caisson.