

TYPE

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**VL**

## VERTICAL IN-LINE PUMP



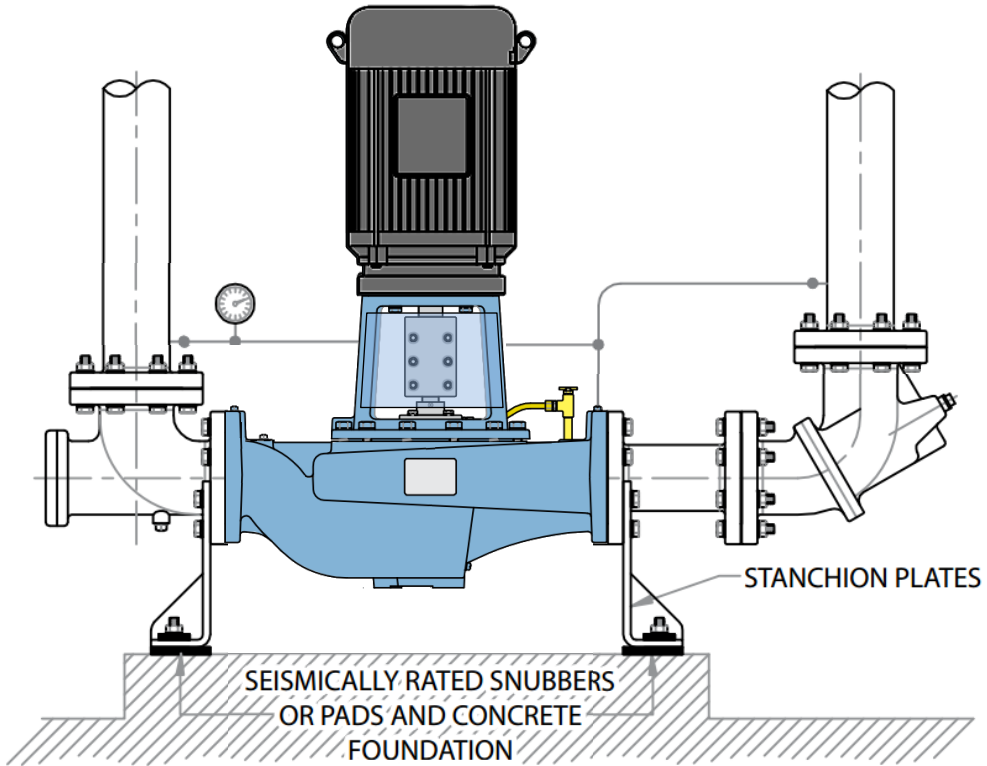
**PUMP WITH DISCHARGES SIZE UP TO 14"**  
**CAPACITIES TO 10000 GPM, HEADS TO 250**  
**FEET IN 1750 RPM OPERATION WITH UP TO**  
**400 PSI WORKING PRESSURE**

**SELF-ALIGNING AND SPACE-**  
**SAVING DESIGN WITH EASY**  
**ACCESS TO MECHANICAL SEAL**

### *HIGH LIGHT*

- Self-aligning coupling frame
- Space-saving vertical design
- Easy service and maintenance of mechanical seal assembly
- Designed for air conditioning, hot water, condensed water, and chilled water applications
- Control system available

## INTRODUCTION



SHOWN AS "VL" SERIES IN ONE OF ITS TYPICAL INSTALLATION CONFIG.

The vertical in-line pump provide pressure and flow for a number of HVAC applications. With its vertical orientation, the pump can potentially offer the same performance as a horizontal split case pump with as little as one-third the footprint.

With externally accessible mechanical seal assembly, self-aligning coupling bracket, and indirect pump support, the series "VL" offering not only offers a comprehensive performance, but also a low cost in maintenance.

Compatible with Federal Pump's control system, the VL series can support 24/7 automatic operation for HVAC application in residential and commercial buildings.

## VFD INTEGRATION

In addition to energy saving promoted through the use of variable speed operation, pump start up damp draw is reduced as compared with across-the-line type starting in constant speed operation. Coupled with reductions associated with water hammering from sudden start/stops, variable speed provides a “soft start” & “slow down” agenda further extending life cycle of the system.

Methods of controlling pump output may use any combination of temperature, pressure, or flow sensors to communicate to the pump. The pump can react to fit the desired effect(s) of the thermal transfer rates the system is looking to achieve.

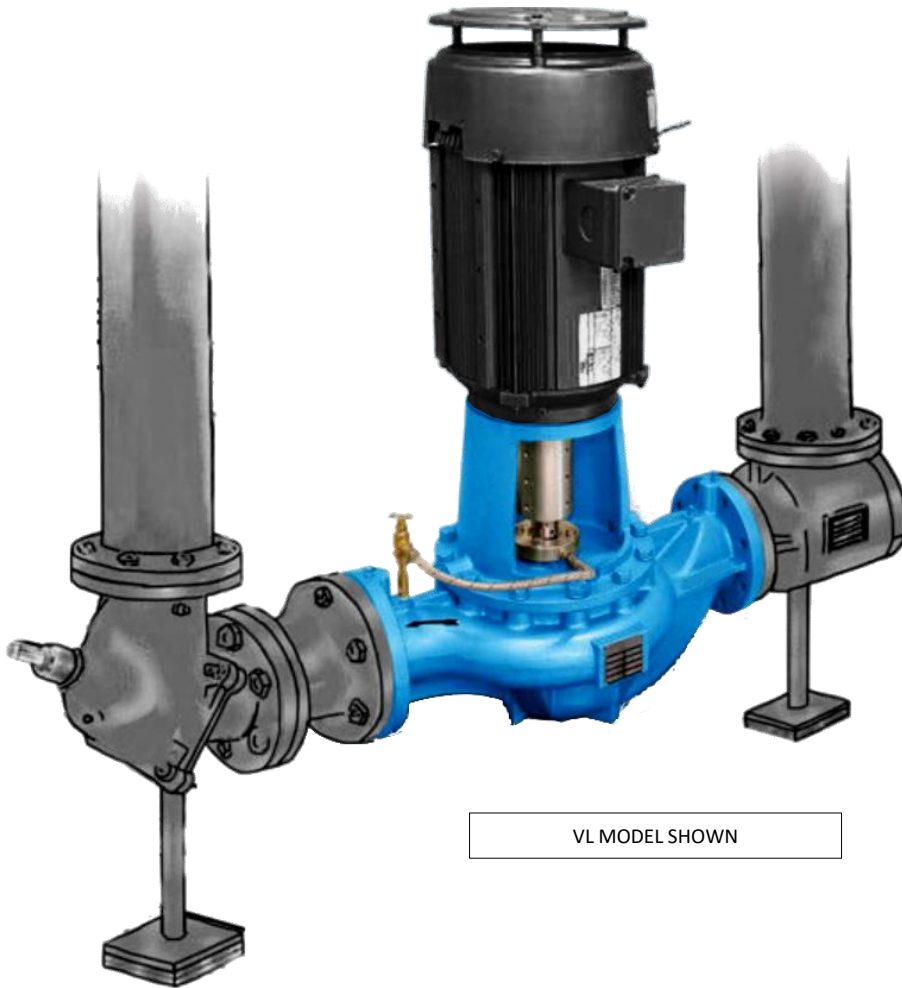
Analogous to an automobile operating at full speed while the driver throttles the brakes to meet the limitation of the road travelled, constant speed centrifugal pumps no longer have a seat at the energy table. As is the case with automobile use, changing the speed of the engine to meet the road(system) demand is preferred to throttling the brakes.

Common in many designs, major failure mode also has to be considered. Variable frequency drive by-pass allows the system to operate while the affected drive is being repaired or replaced. If a starter type by-pass is planned, the system should include balancing valves that limit the operation of the now constant speed pump. On the other hand, a VFD by-pass to another VFD may allow the system to operation in harmony–



assuming all pumps operating in variable speed mode. This would provide the system with a by-pass option without allowing a constant speed pump to operate in parallel with variable speed pumps and ensure the system is returned to its efficiency optimized design.

## PRODUCT DETAILS



VL MODEL SHOWN

**SUCTION & DISCHARGE**

1½" ~ 14" Dia.

**LIQUID TEMPERATURE**

194°F (90°C) continuous

**PUMP BODY**

Cast iron ASTM A-48 class 30

**SEAL**

Stainless steel multi-spring outside balanced type. Viton secondary seal, with carbon rotating face and silicon carbide stationary seat

**IMPELLER**

Closed cast iron ASTM A-48 class 30

**SHAFT**

416 series stainless steel

**HARDWARE**

304 series stainless steel

**FLANGE**

Class 150 to 300 flange design for up to 400PSI working pressure

**COUPLING**

6061-T6 Aluminum coupling for easy access of external mechanical seal and motor alignment

**BUSHING**

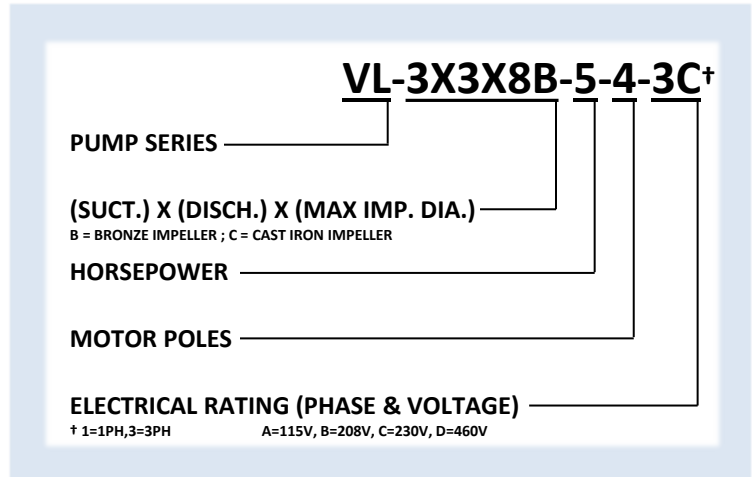
Self-lubricating graphite bushing to eliminate the need for radial bearings for pump

## SELECTION TABLE\*

### SYSTEM DESIGN COMPONENTS

The VL series pump is available in an array of sizes and should be reviewed in detail prior to order. Dimensions may vary based upon option requested and custom specification requirements. Every option will include a pump, coupling guard, and motor with standard mechanical seal rated to 194°F. **ALL SELECTIONS BELOW ARE DESIGNED TO OPERATE WITH FACTORY CHOICE OF 1750 RPM TEFC MOTOR.**

**NOTE: CONTACT FACTORY FOR HIGHER TEMPERATURE & WORKING PRESSURE**



| PSI | TDH | 250            | 500            | 750             | 1000            | 1250            | 1500            | 1750            | 2000              | 2250              | 2500              |
|-----|-----|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|-------------------|-------------------|
| 40  | 92  | 3X3X10<br>10HP | 4X4X13<br>20HP | 5X5X11½<br>25HP | 8X8X10<br>40HP  | 8X8X13<br>40HP  | 8X8X13<br>50HP  | 8X8X11½<br>50HP | 8X8X11½<br>60HP   | 10X10X13<br>75HP  | 10X10X13<br>100HP |
| 45  | 104 | 3X3X13<br>15HP | 4X4X13<br>25HP | 6X6X11½<br>30HP | 8X8X13<br>40HP  | 8X8X13<br>50HP  | 8X8X11½<br>50HP | 8X8X11½<br>60HP | 10X10X13<br>75HP  | 10X10X13<br>100HP | 10X10X13<br>100HP |
| 50  | 116 | 3X3X13<br>15HP | 4X4X13<br>30HP | 6X6X11½<br>40HP | 8X8X13<br>50HP  | 8X8X13<br>60HP  | 8X8X13<br>60HP  | 8X8X11½<br>75HP | 10X10X13<br>75HP  | 10X10X13<br>100HP | 10X10X13<br>100HP |
| 55  | 127 | 3X3X13<br>15HP | 4X4X13<br>30HP | 6X6X13<br>40HP  | 8X8X13<br>50HP  | 8X8X13<br>60HP  | 8X8X13<br>75HP  | 8X8X15<br>75HP  | 10X10X13<br>100HP | 10X10X13<br>100HP | 10X10X13<br>125HP |
| 60  | 139 | 3X3X13<br>20HP | 4X4X13<br>30HP | 6X6X13<br>40HP  | 8X8X13<br>60HP  | 8X8X13<br>75HP  | 8X8X13<br>75HP  | 8X8X15<br>100HP | 10X10X13<br>100HP | 10X10X13<br>100HP | 10X10X13<br>125HP |
| 65  | 150 | 3X3X13<br>20HP | 4X4X13<br>40HP | 6X6X13<br>50HP  | 8X8X13<br>75HP  | 8X8X13<br>75HP  | 8X8X15<br>100HP | 8X8X15<br>100HP | 10X10X13<br>125HP | 10X10X13<br>125HP | 10X10X13<br>125HP |
| 70  | 162 | 3X3X13<br>25HP | 4X4X13<br>40HP | 6X6X13<br>50HP  | 8X8X13<br>75HP  | 8X8X15<br>100HP | 8X8X15<br>100HP | 8X8X15<br>100HP | 10X10X13<br>125HP | 10X10X13<br>150HP | 10X10X15<br>150HP |
| 75  | 173 | RTF            | 4X4X13<br>40HP | RTF             | 8X8X15<br>100HP | 8X8X15<br>100HP | 8X8X15<br>100HP | 8X8X15<br>125HP | 8X8X15<br>125HP   | 8X8X15<br>150HP   | 10X10X15<br>200HP |
| 80  | 185 | RTF            | RTF            | RTF             | 8X8X15<br>100HP | 8X8X15<br>100HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>150HP   | 8X8X15<br>150HP   | 10X10X15<br>200HP |
| 85  | 196 | RTF            | RTF            | RTF             | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>150HP   | 8X8X15<br>150HP   | 10X10X15<br>200HP |
| 90  | 208 | RTF            | RTF            | RTF             | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>150HP   | 8X8X15<br>150HP   | 10X10X15<br>250HP |
| 95  | 219 | RTF            | RTF            | RTF             | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>125HP | 8X8X15<br>150HP | 8X8X15<br>150HP   | 10X10X15<br>250HP | 10X10X15<br>250HP |
| 100 | 231 | RTF            | RTF            | RTF             | 8X8X15<br>125HP | 8X8X15<br>150HP | 8X8X15<br>150HP | 8X8X15<br>150HP | RTF               | RTF               | RTF               |

\*Table is used for quick sizing only. Refer to pump performance curve for exact pump operation over its range.

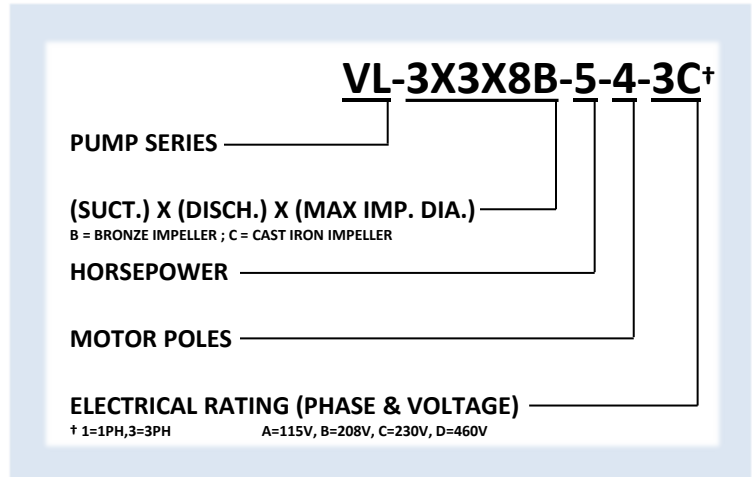
\*Refer to motor manufacturer for amp draw on the each pump and model selection

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**NOTE: CONTACT FACTORY FOR HIGHER TEMPERATURE & WORKING PRESSURE**



| PSI | TDH | 3000              | 3500              | 4000              | 4500              | 5000              | 5500              | 6000              | 6500              | 7000              | 7500              |
|-----|-----|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 40  | 92  | 12X12X13<br>125HP | 12X12X13<br>125HP | 12X12X13<br>125HP | 14X14X14<br>150HP | 14X14X14<br>150HP | 14X14X14<br>200HP | 14X14X14<br>200HP | RTF               | RTF               | RTF               |
| 45  | 104 | 12X12X13<br>125HP | 12X12X13<br>125HP | 12X12X13<br>150HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X15<br>250HP | 14X14X15<br>250HP | RTF               |
| 50  | 116 | 12X12X13<br>125HP | 12X12X13<br>150HP | 12X12X13<br>150HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X15<br>300HP |
| 55  | 127 | 12X12X13<br>150HP | 12X12X13<br>200HP | 12X12X13<br>200HP | 14X14X14<br>200HP | 14X14X14<br>200HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X15<br>300HP | 14X14X15<br>350HP |
| 60  | 139 | 10X10X13<br>150HP | 10X10X13<br>200HP | 12X12X13<br>200HP | 12X12X13<br>250HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X14<br>300HP | 14X14X15<br>350HP | 14X14X15<br>350HP |
| 65  | 150 | 10X10X13<br>200HP | 10X10X13<br>200HP | 12X12X13<br>250HP | 14X14X14<br>250HP | 14X14X14<br>250HP | 14X14X15<br>300HP | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>350HP |
| 70  | 162 | 10X10X13<br>200HP | 10X10X13<br>200HP | 10X10X15<br>250HP | 14X14X14<br>250HP | 14X14X14<br>300HP | 14X14X15<br>300HP | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP |
| 75  | 173 | 10X10X13<br>200HP | 10X10X13<br>250HP | 10X10X15<br>250HP | 14X14X15<br>300HP | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP |
| 80  | 185 | 10X10X13<br>200HP | 10X10X13<br>250HP | 10X10X15<br>250HP | 14X14X15<br>300HP | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP |
| 85  | 196 | 10X10X13<br>250HP | 10X10X13<br>250HP | 10X10X15<br>300HP | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>450HP |
| 90  | 208 | 10X10X13<br>250HP | 10X10X13<br>300HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP | 14X14X15<br>500HP |
| 95  | 219 | 10X10X13<br>300HP | RTF               | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP | 14X14X15<br>500HP | RTF               | RTF               |
| 100 | 231 | RTF               | RTF               | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP | 14X14X15<br>500HP | RTF               | RTF               | RTF               | RTF               |

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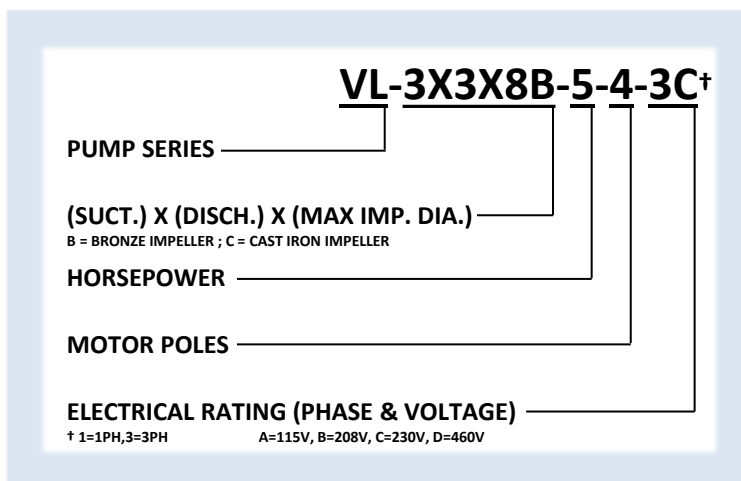
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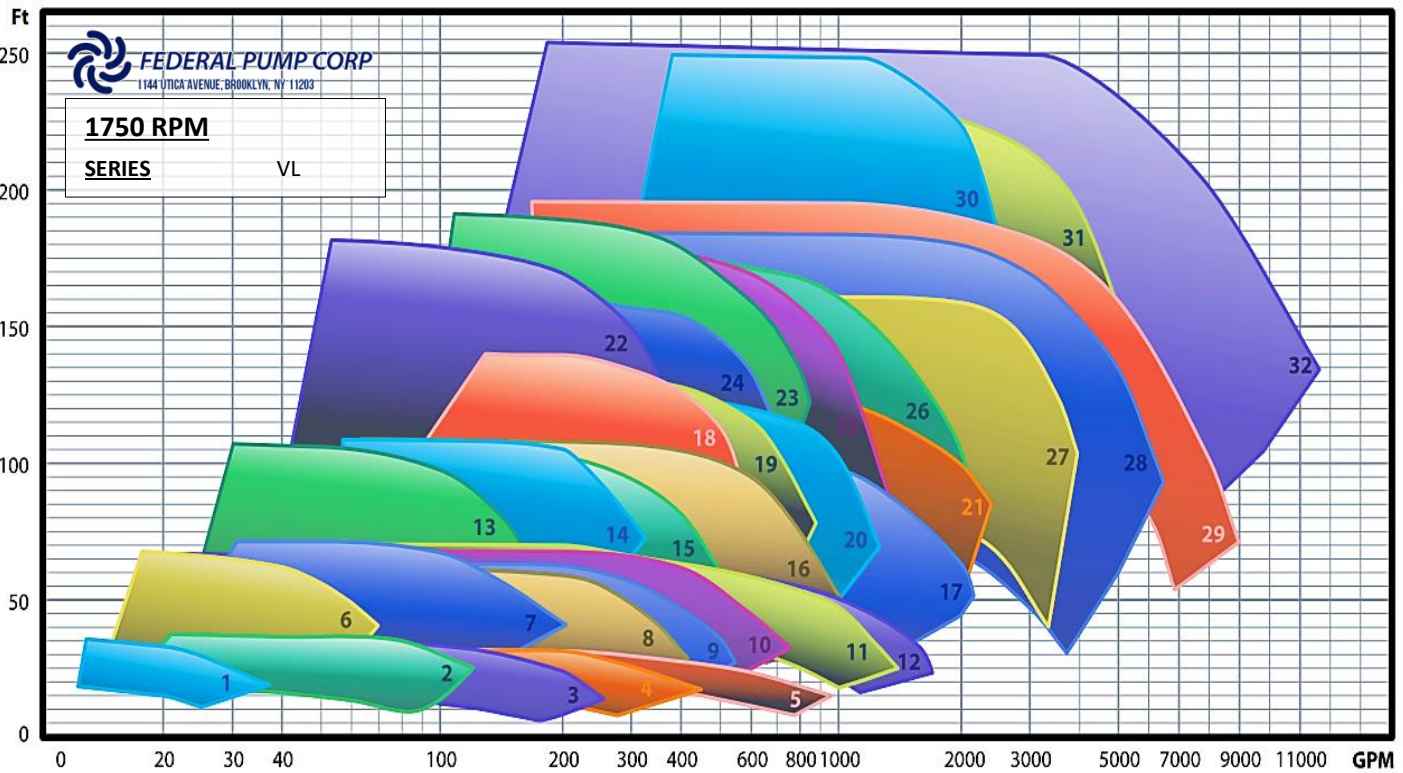
| PSI | TDH | 8000              | 8500              | 9000              | 9500              | 10000             |
|-----|-----|-------------------|-------------------|-------------------|-------------------|-------------------|
| 40  | 92  | RTF               | RTF               | RTF               | RTF               | RTF               |
| 45  | 104 | RTF               | RTF               | RTF               | RTF               | RTF               |
| 50  | 116 | RTF               | RTF               | RTF               | RTF               | RTF               |
| 55  | 127 | 14X14X15<br>350HP | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP |
| 60  | 139 | 14X14X15<br>350HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP |
| 65  | 150 | 14X14X15<br>400HP | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP |
| 70  | 162 | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP |
| 75  | 173 | 14X14X15<br>400HP | 14X14X15<br>450HP | 14X14X15<br>450HP | 14X14X15<br>500HP | 14X14X15<br>500HP |
| 80  | 185 | 14X14X15<br>450HP | 14X14X15<br>500HP | RTF               | RTF               | RTF               |
| 85  | 196 | 14X14X15<br>500HP | RTF               | RTF               | RTF               | RTF               |
| 90  | 208 | RTF               | RTF               | RTF               | RTF               | RTF               |
| 95  | 219 | RTF               | RTF               | RTF               | RTF               | RTF               |
| 100 | 231 | RTF               | RTF               | RTF               | RTF               | RTF               |

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## SERIES PERFORMANCE RANGE

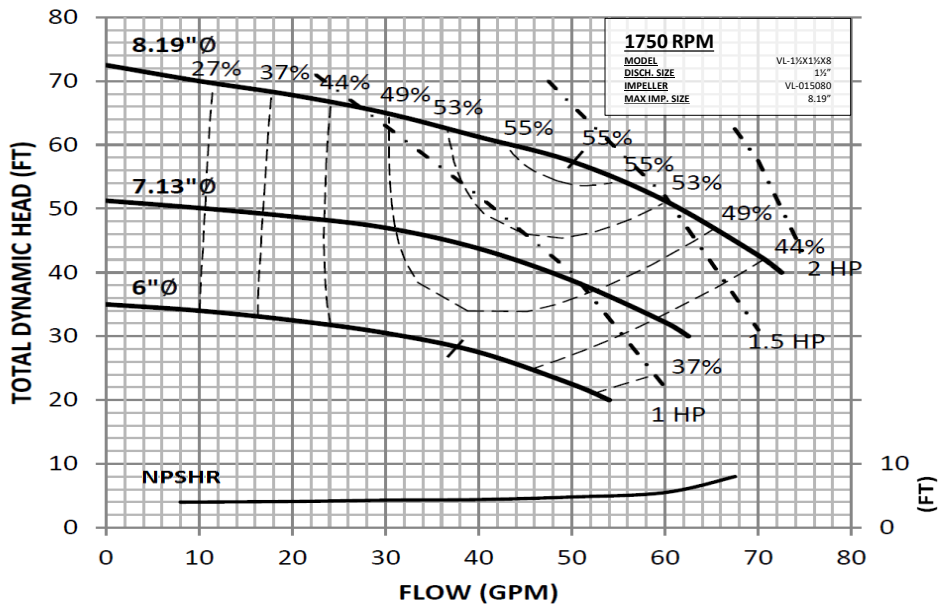
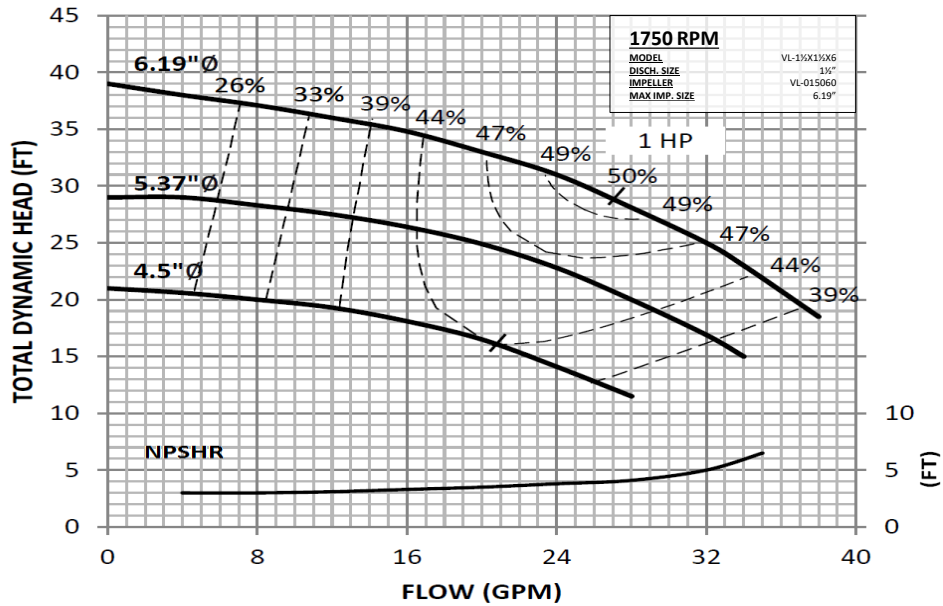


| PUMP MODELS |            |            |             |             |              |              |
|-------------|------------|------------|-------------|-------------|--------------|--------------|
| 1) 1½X1½X6  | 6) 1½X1½X8 | 11) 6X6X8  | 16) 6X6X10  | 21) 8X8X11½ | 26) 8X8X13   | 31) 10X10X15 |
| 2) 2X2X6    | 7) 2X2X8   | 12) 8X8X8  | 17) 8X8X10  | 22) 3X3X13  | 27) 10X10X13 | 32) 14X14X15 |
| 3) 3X3X6    | 8) 3X3X8   | 13) 2X219  | 18) 4X4X11½ | 23) 4X4X13L | 28) 12X12X13 |              |
| 4) 4X4X6    | 9) 5X5X8   | 14) 3X3X10 | 19) 5X5X11½ | 24) 4X4X13  | 29) 14X14X14 |              |
| 5) 6X6X6    | 10) 4X4X8  | 15) 4X4X10 | 20) 6X6X11½ | 25) 6X6X13  | 30) 8X8X15   |              |



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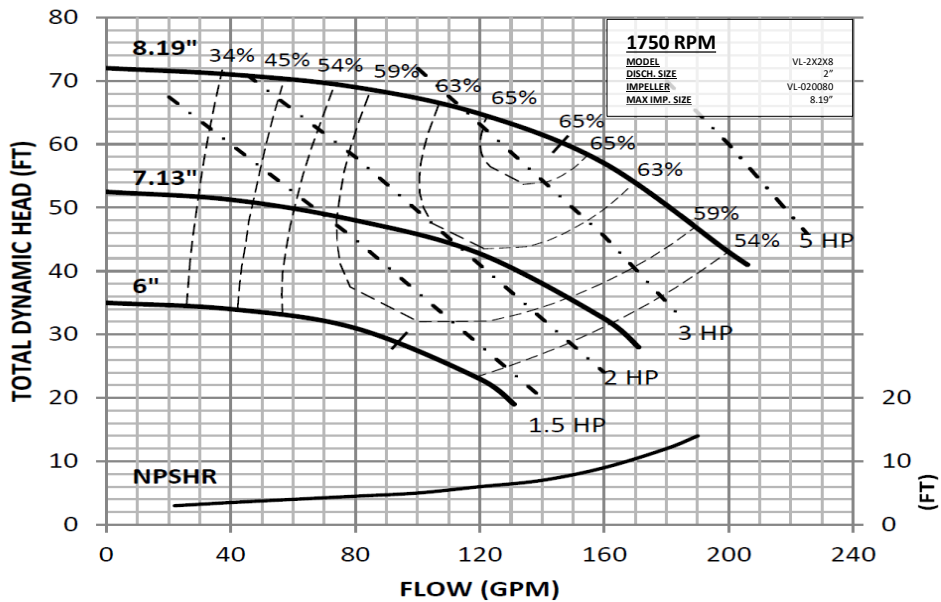
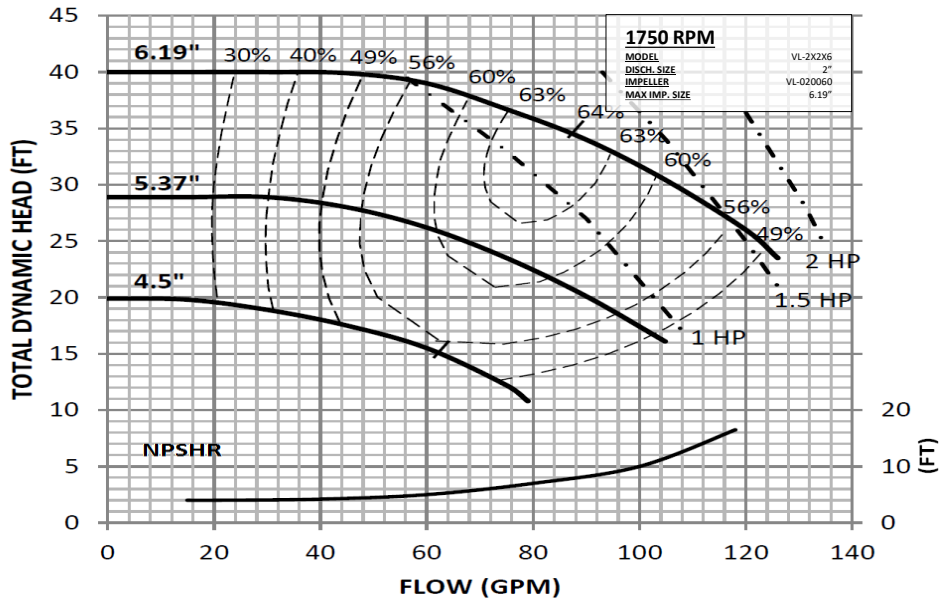
### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

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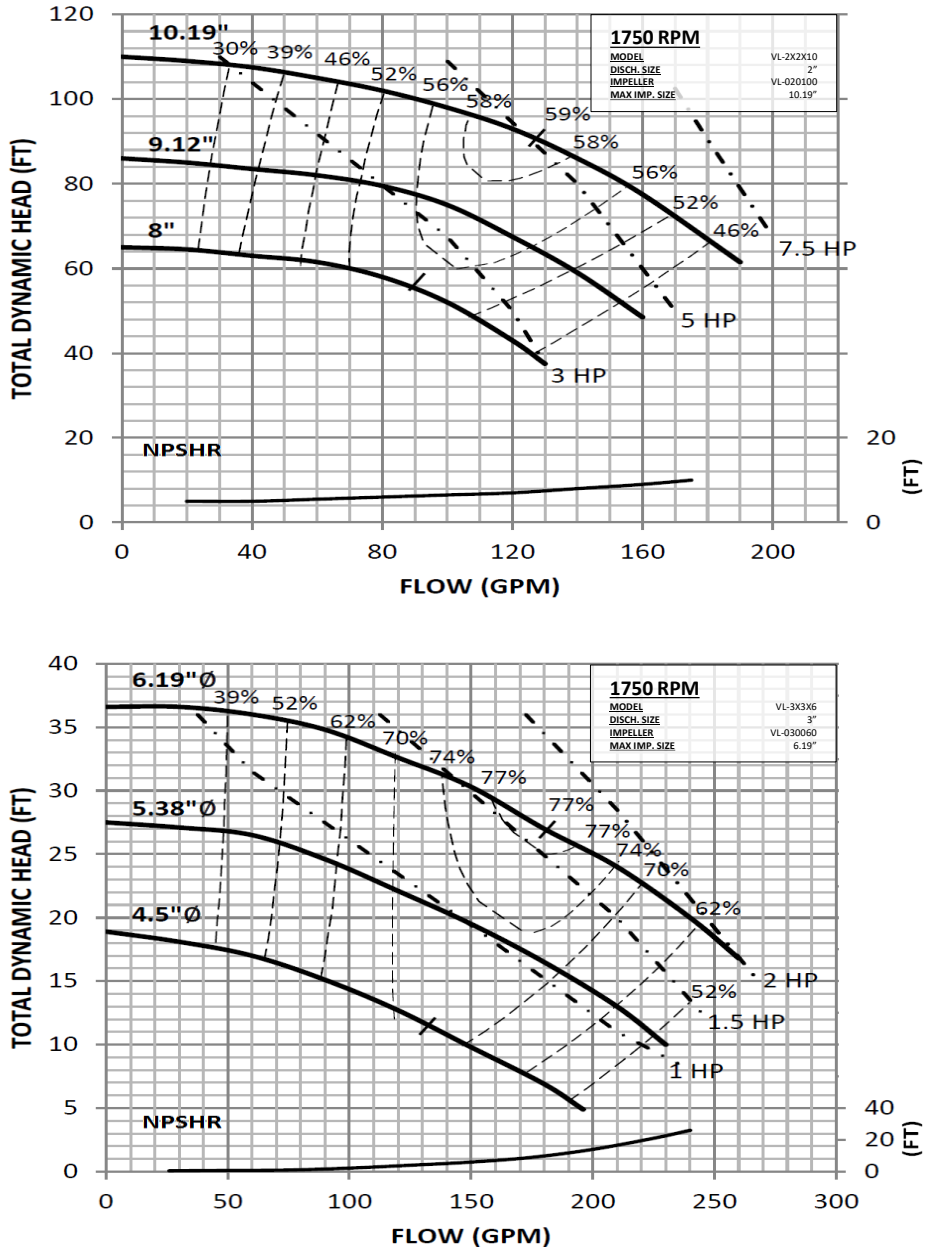
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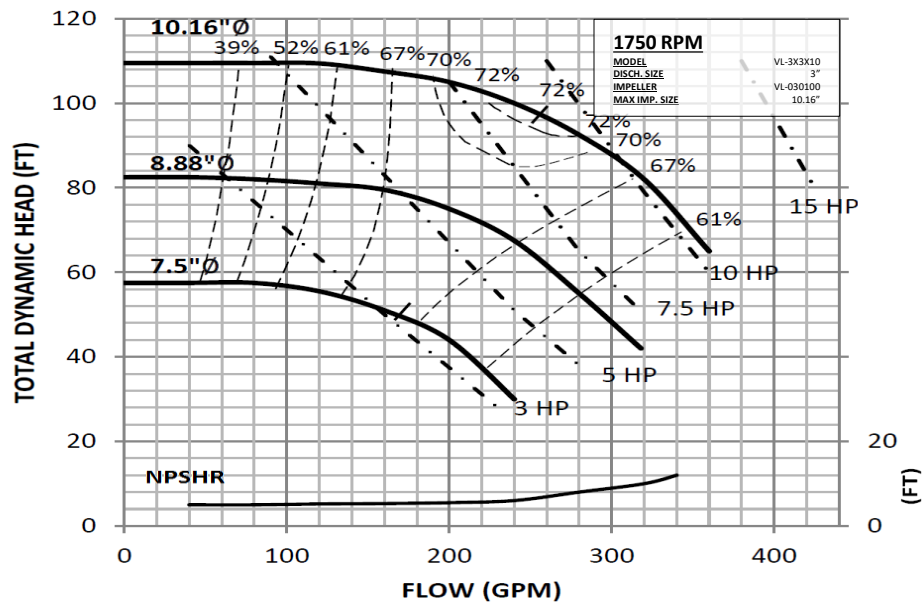
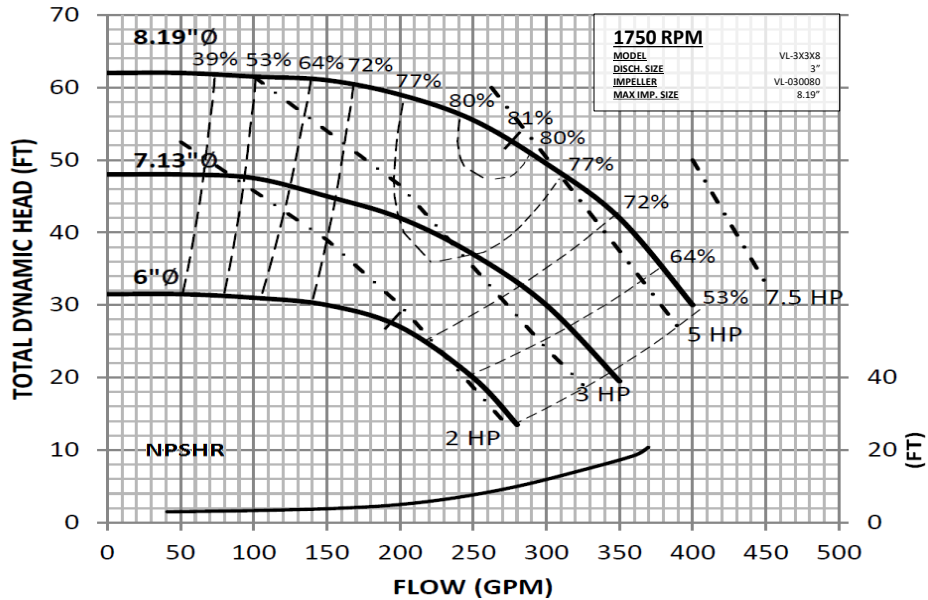
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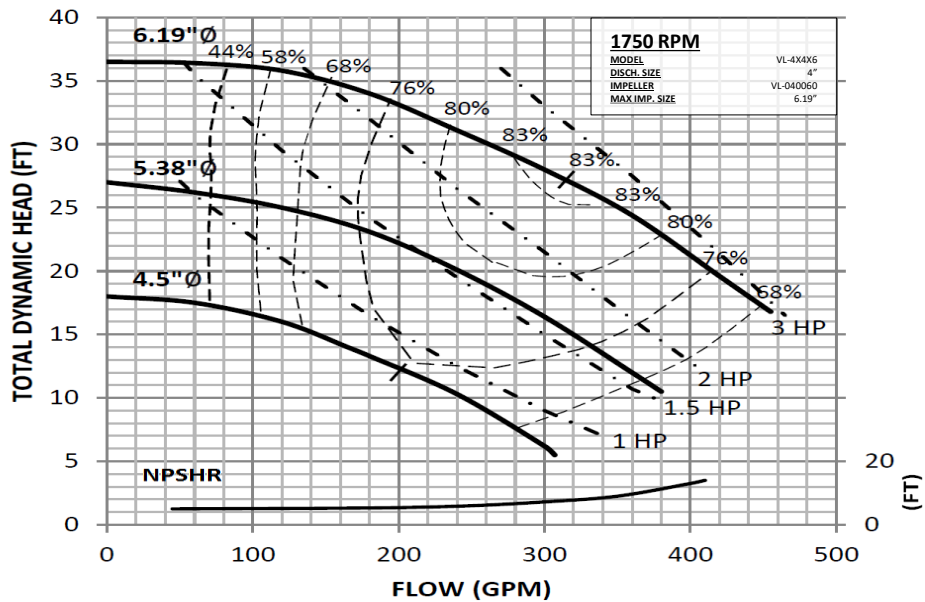
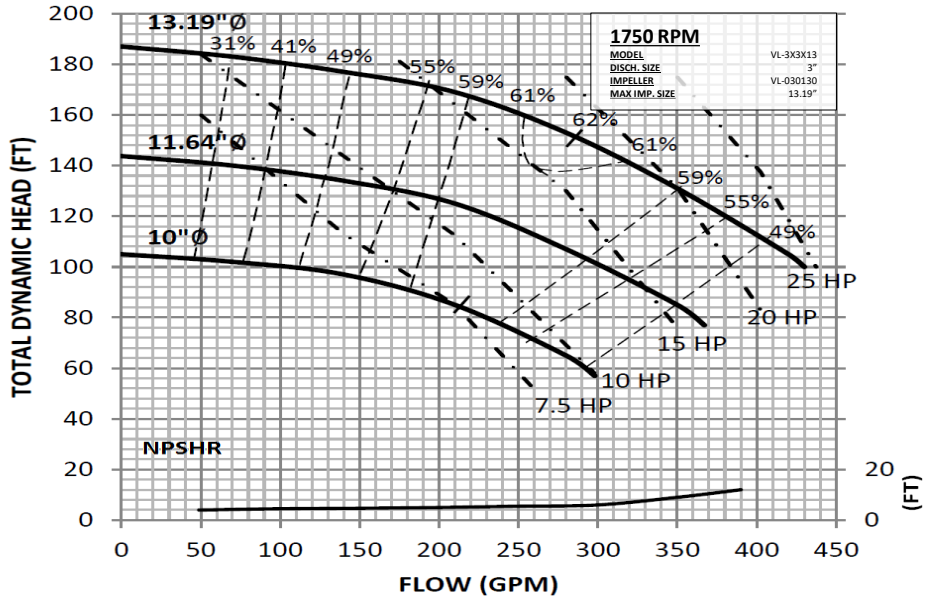
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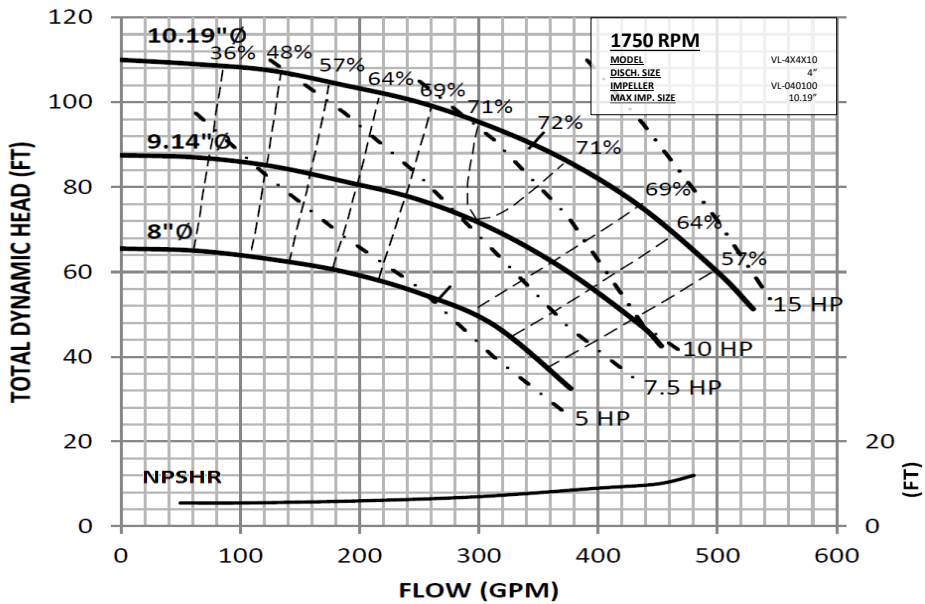
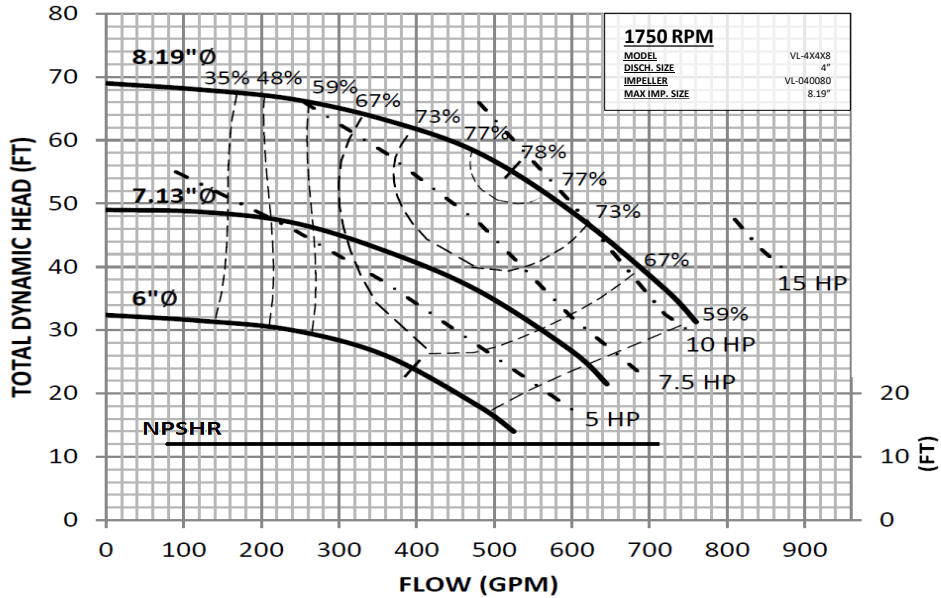
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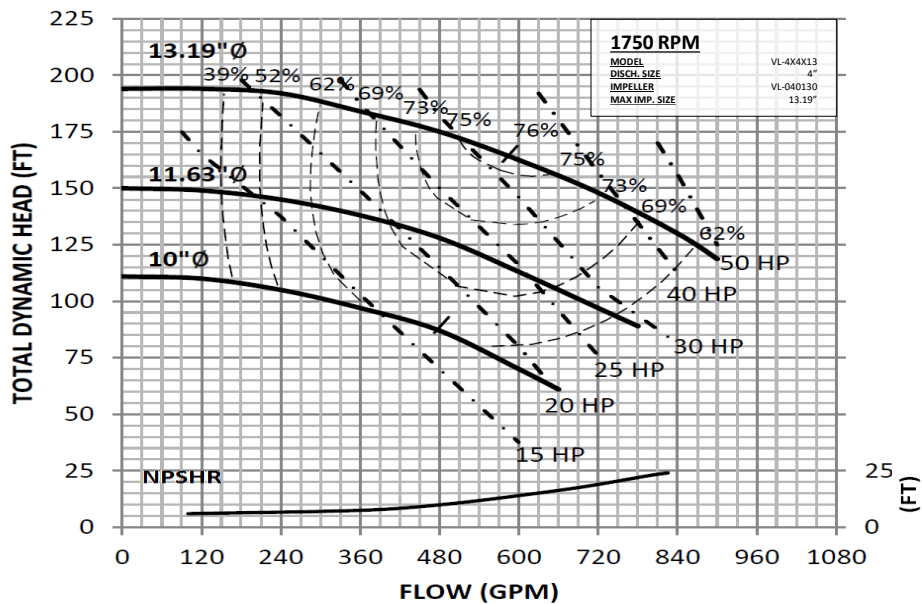
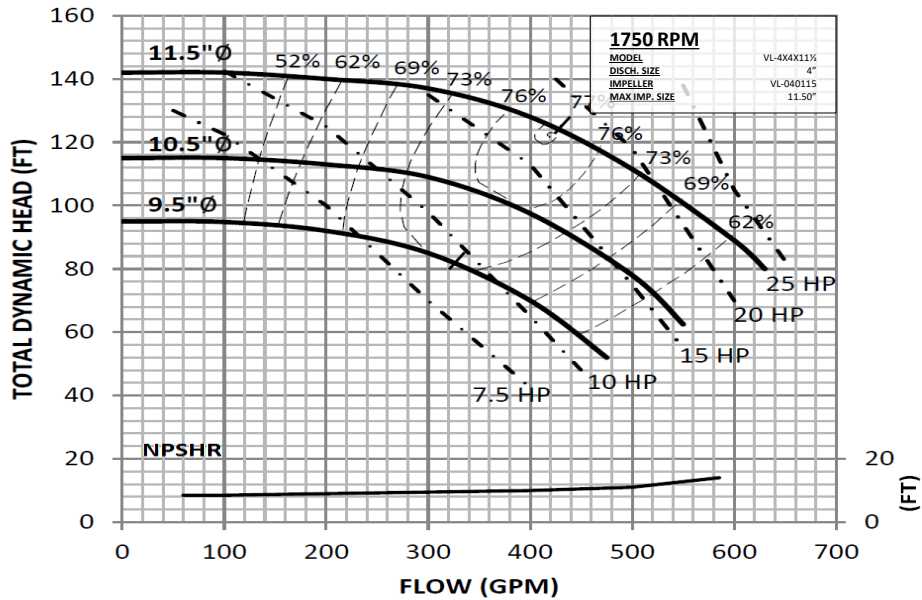
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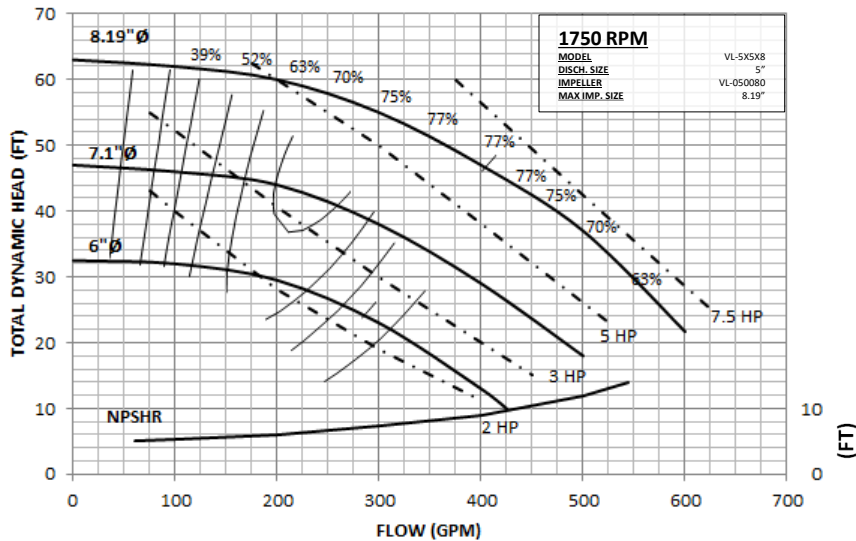
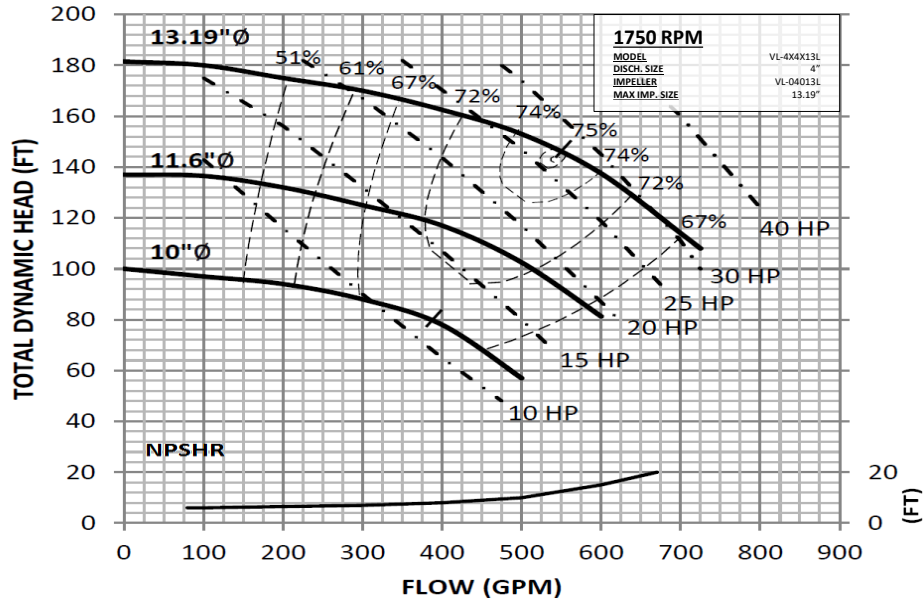


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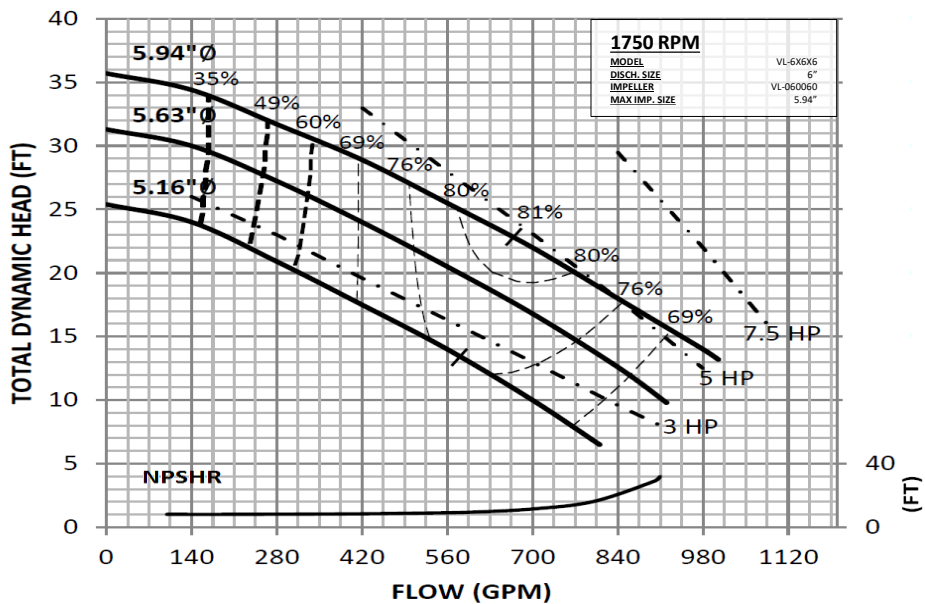
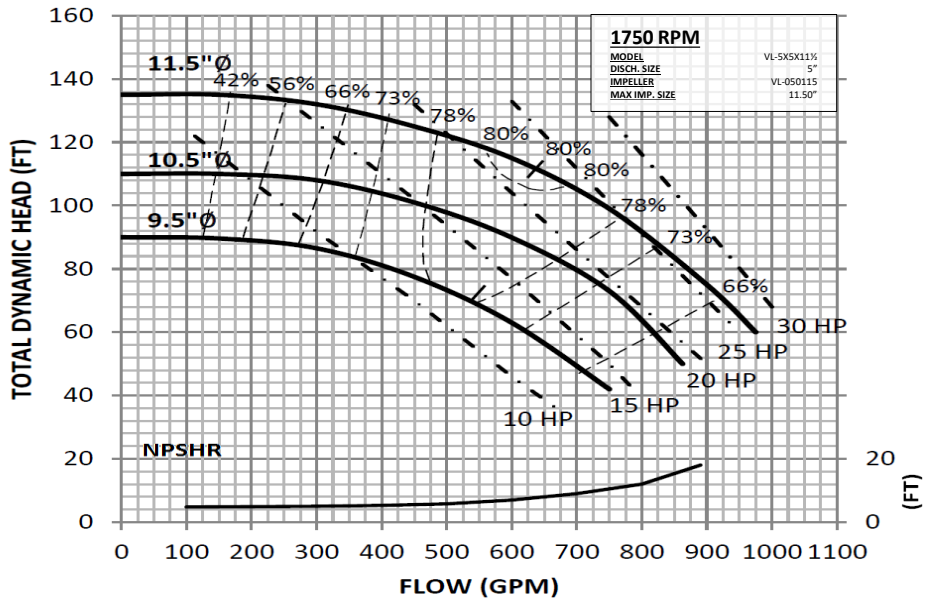
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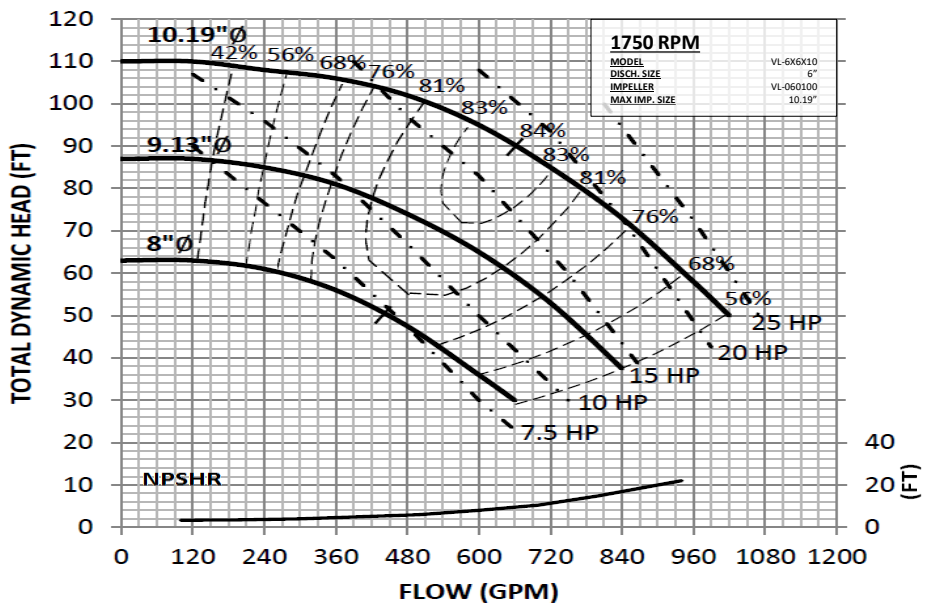
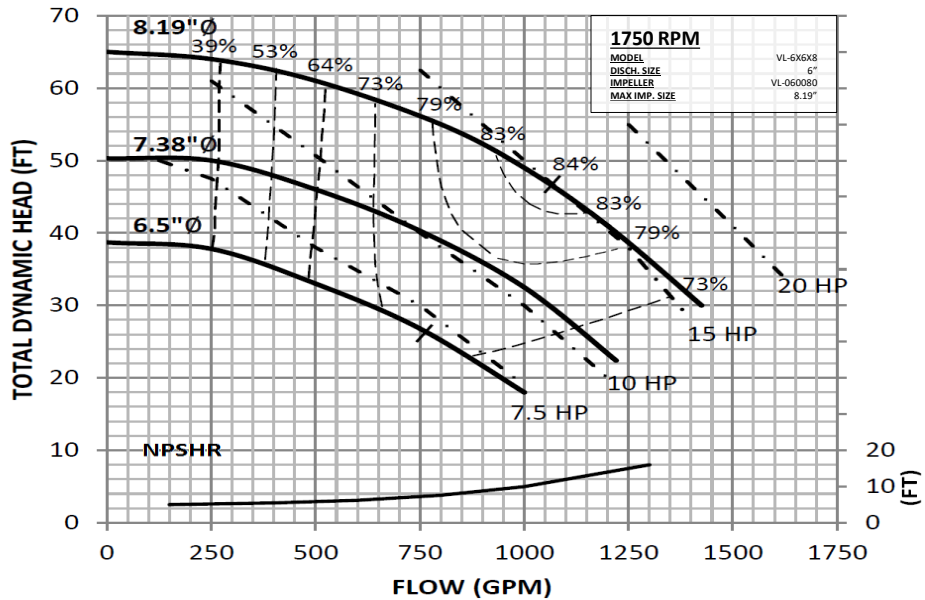
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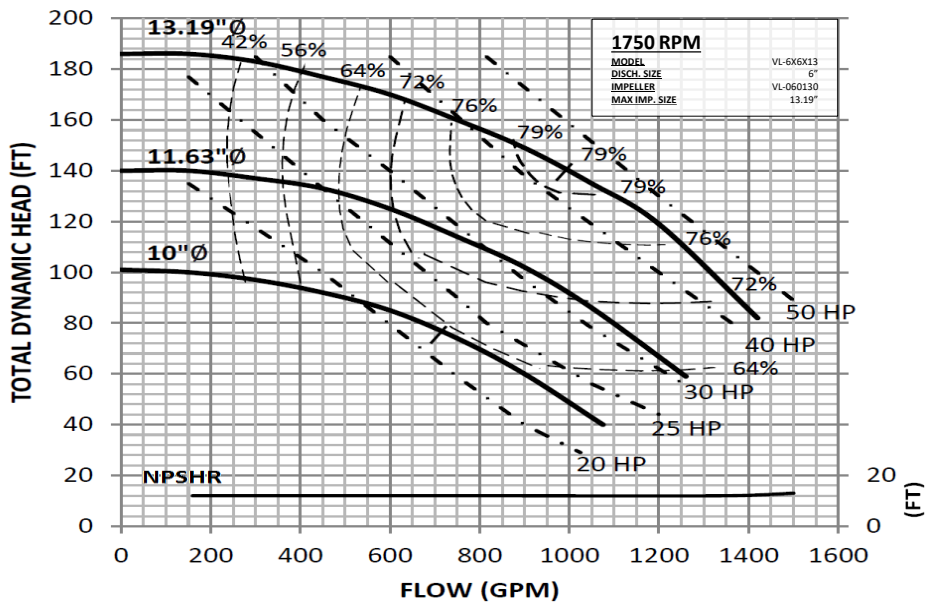
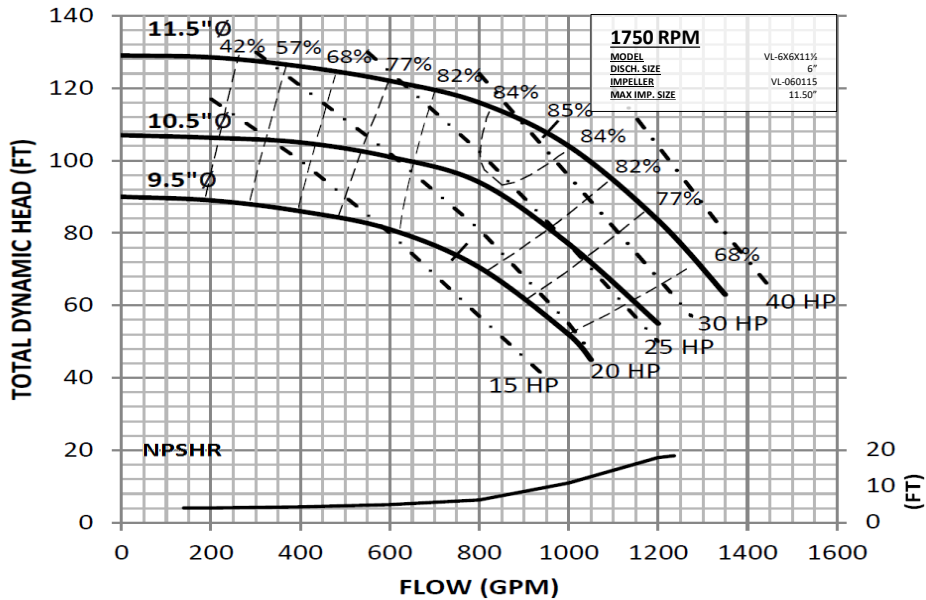
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Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SERIES PERFORMANCE RANGE

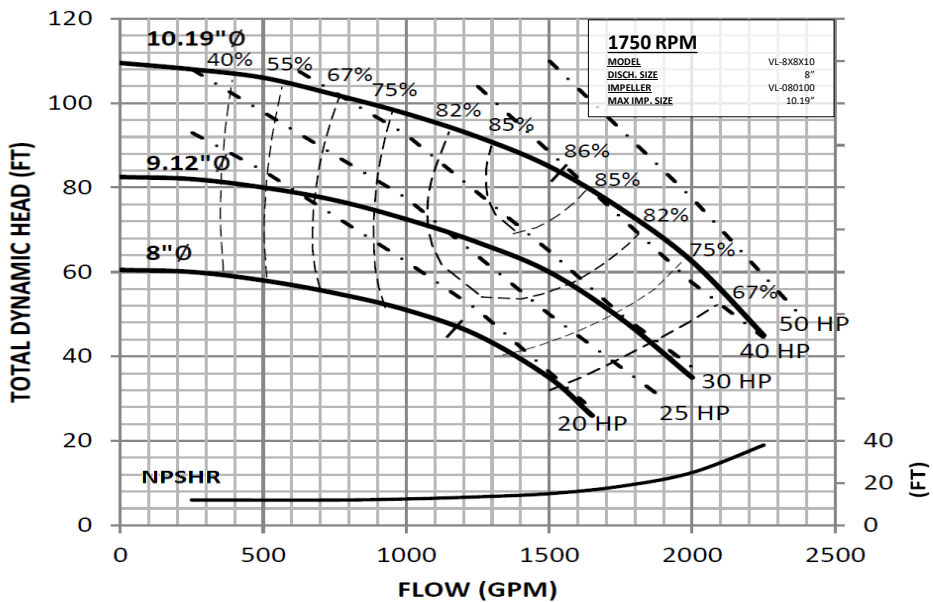
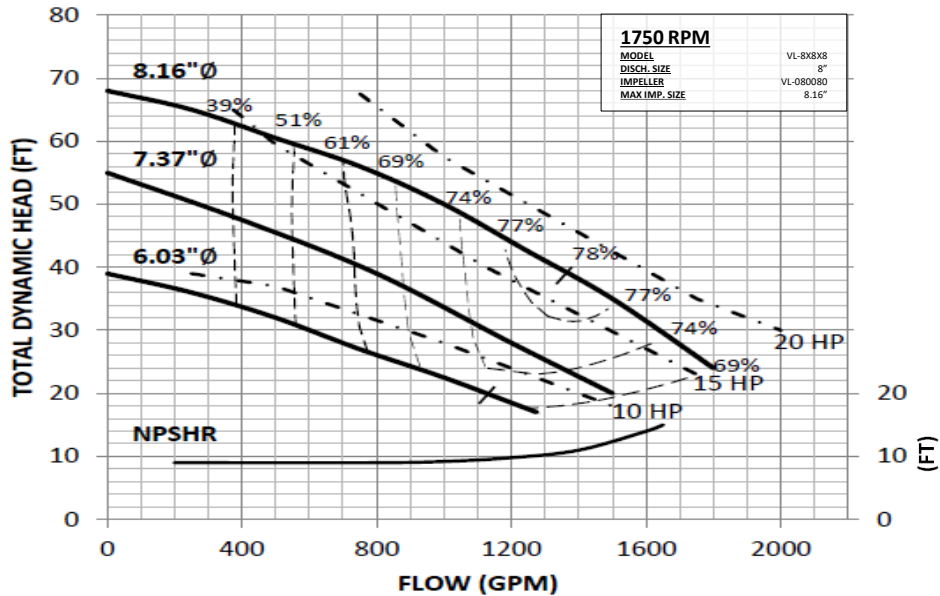
### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SERIES PERFORMANCE RANGE

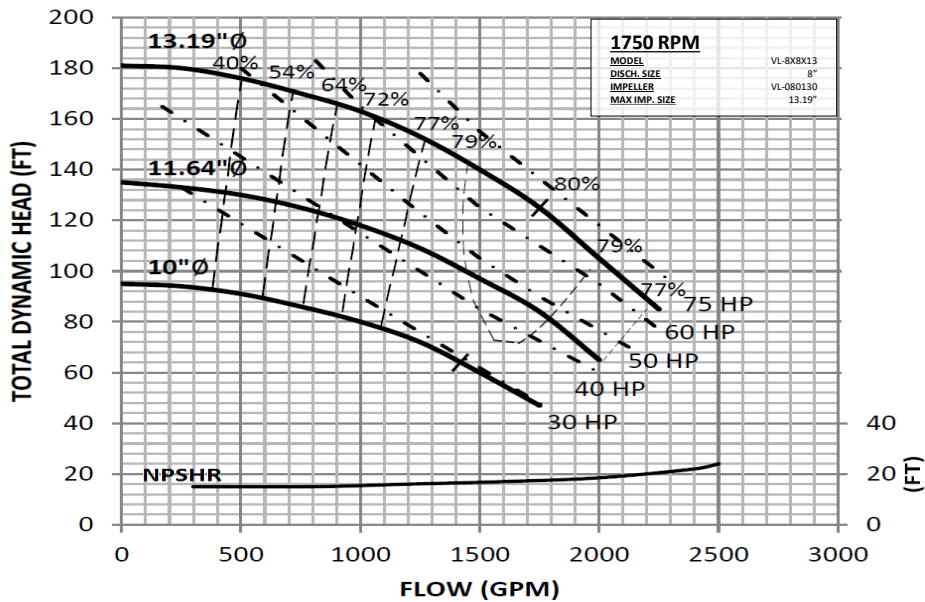
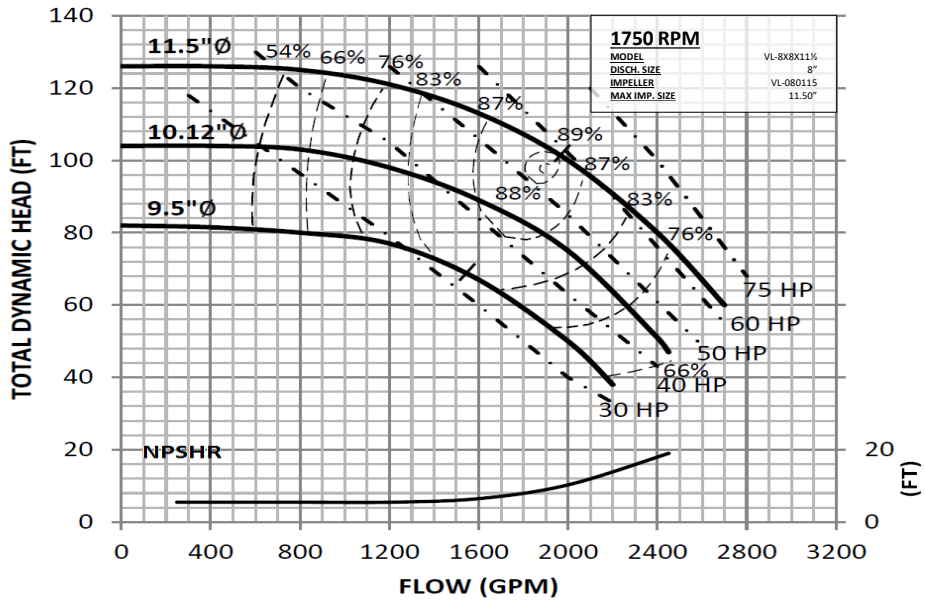
### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SERIES PERFORMANCE RANGE

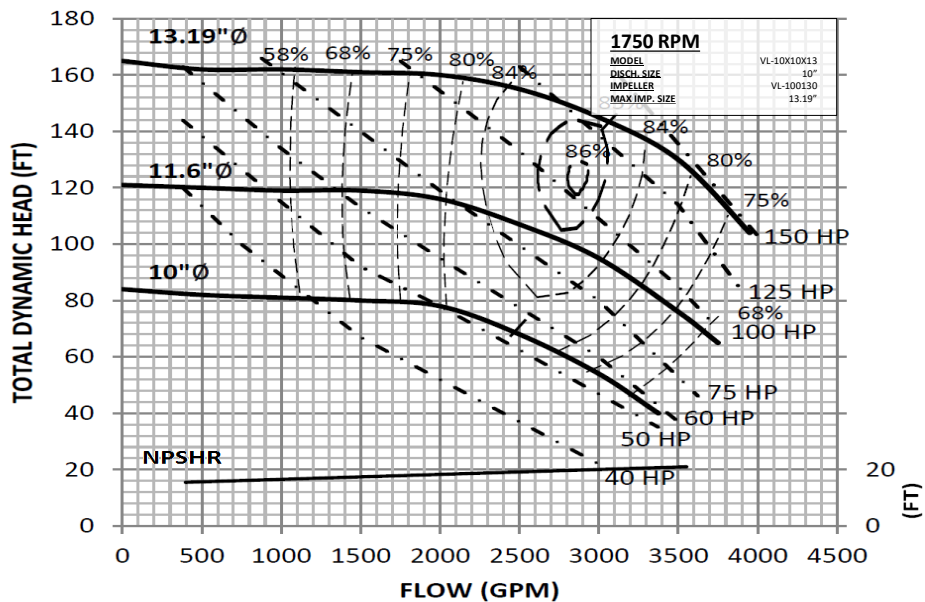
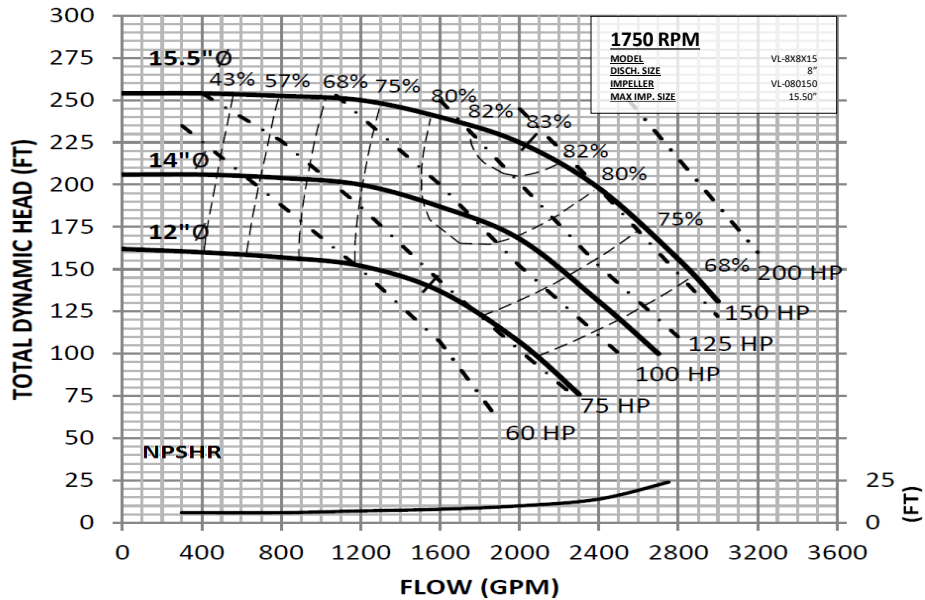
### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SERIES PERFORMANCE RANGE

### SERIES VL @ 1750RPM

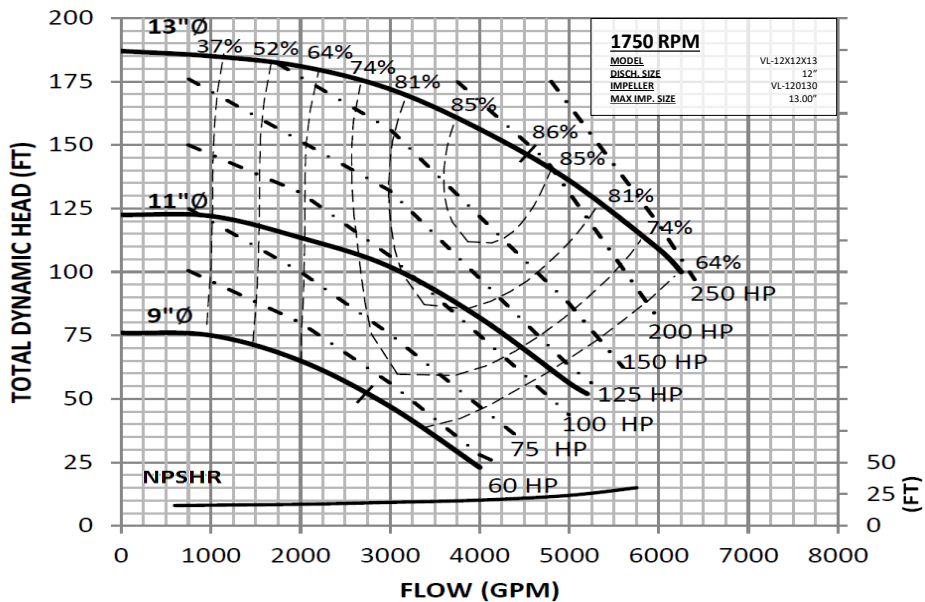
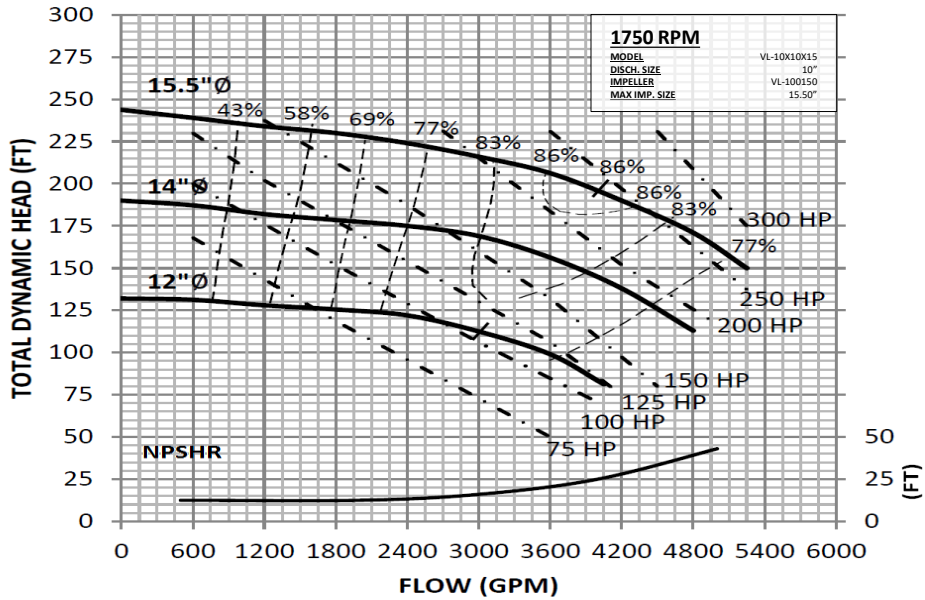


Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance



## SERIES PERFORMANCE RANGE

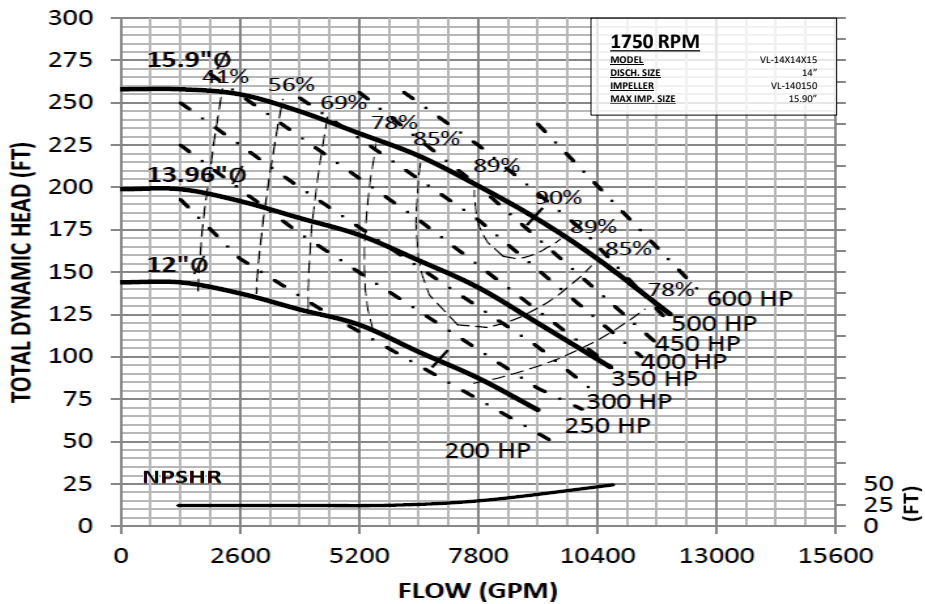
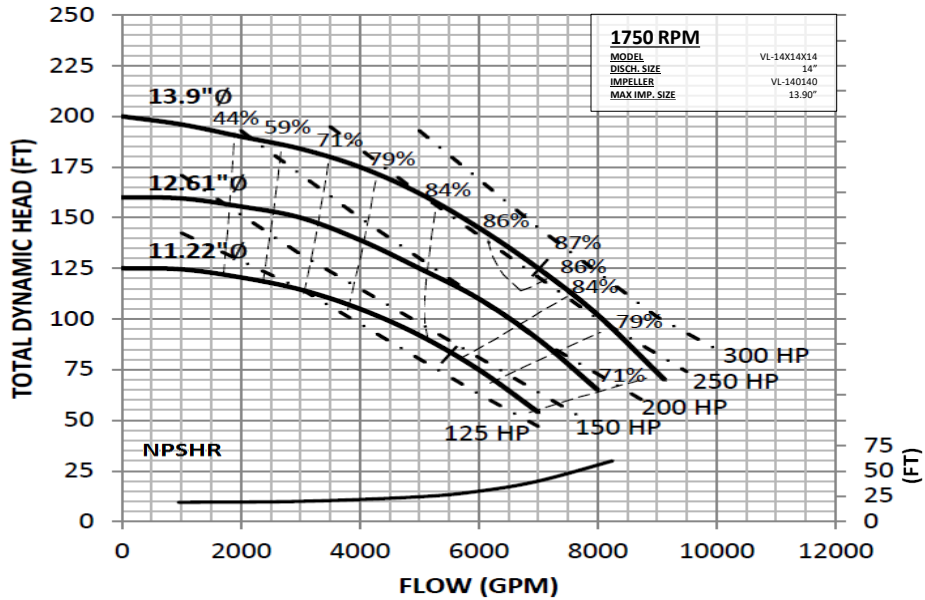
### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SERIES PERFORMANCE RANGE

### SERIES VL @ 1750RPM



Note: Testing is performed with water (S.G. = 1 @ 68 F). Using the pump for different fluids might vary performance

## SUGGESTED SPECIFICATIONS

Furnish and install where shown in the plan, as outlined in these specifications, Federal Pump Series VL vertical inline pump sized for capacity and discharge head as outlined in the equipment schedule.

### Casing

Pumps shall have casing design for suction and discharge connections on the same centerline 180 degrees opposite of each other suitable for pipeline mounting. Casing shall be accurately machined and provided with 125LB ANSI rated flange connections and machined flat faced. Casing shall be constructed of cast iron ASTM A48 Class 30 bolted to back seal plate also constructed of cast iron ASTM A48 Class 30 material. Casing connection to back seal plate will include non-asbestos gasketing material. Casing shall be tested to 1.25 times working pressure. Casing shall include drain connections and gauge connections at each flange.

### Impeller

The impeller shall be cast iron enclosed type design, balanced during manufacturing, and securely fastened to the pump shaft with a stainless steel impeller key to the pump shaft with 416 stainless steel key that shall fit firmly into the machined shaft keyway.

### Shaft Seal

Outside type balanced mechanical seal shall be provided with Viton elastomer, carbon rotating face and silicon carbide stationary face allowing for mechanical seal maintenance without removing motor from the pump unit. A stainless steel seal gland will be provided with seal flush connections to pump discharge to provide flushing between seal faces.

### Coupling

A split type machined aluminum spacer coupling will be provided connecting the pump shaft to the motor shaft and sized by the pump manufacturer to withstand pump HP requirements. Split type spacer coupling will allow inspection, removal and maintenance of the mechanical seal without disturbing pipe connections and without removal of the motor and rotating assembly. Coupling will be provided with a steel coupling guard surrounding the shaft 360 degrees.

### Pump Shaft

Shall be 416 stainless steel construction mounted within the casing and connected through the split coupling to the electric motor.

### Electric Motor

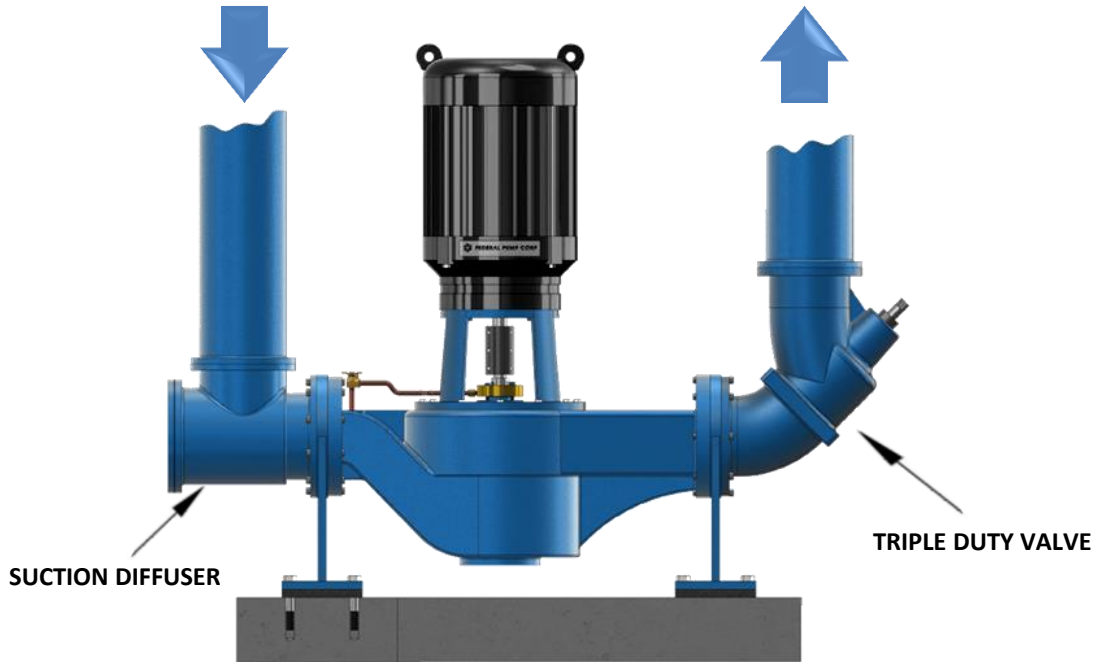
Pump manufacturer will provide Premium Efficient Vertically mounted motor suitable for variable speed operation. Motor shall be ODP (TEFC) enclosure Class B insulation and provided with 1.15 service factor. Motor shall be mounted at the factory and shipped with the pump as a complete unit.

### Start-Up Supervision

Pump manufacturer shall provide equipment start up and supervision and witness run test from 0-100% pump design flow. Pump manufacture will align the coupling, check for excessive vibration and ensure pumps are supported properly minimizing any pipe strain.

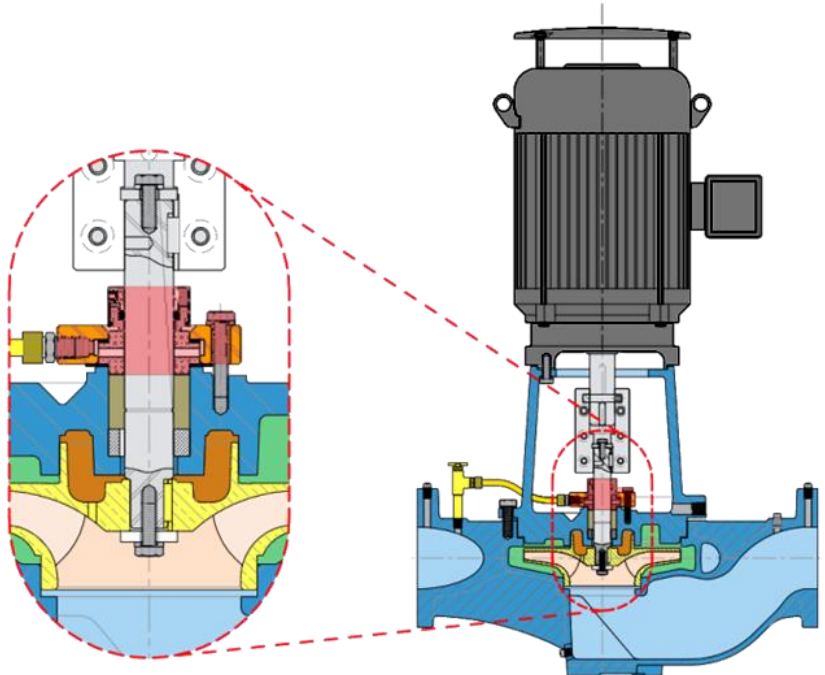
## SYSTEM SCHEMATIC

Vertical in-line design with pipe and/or fitting support to allow for pipe strain relief.



### Mechanical seal schematic

- Stainless steel multi-spring outside balanced type that allows for easy access and intuitive maintenance
- Materials: Viton secondary seal, carbon rotating face and silicon carbide stationary seat



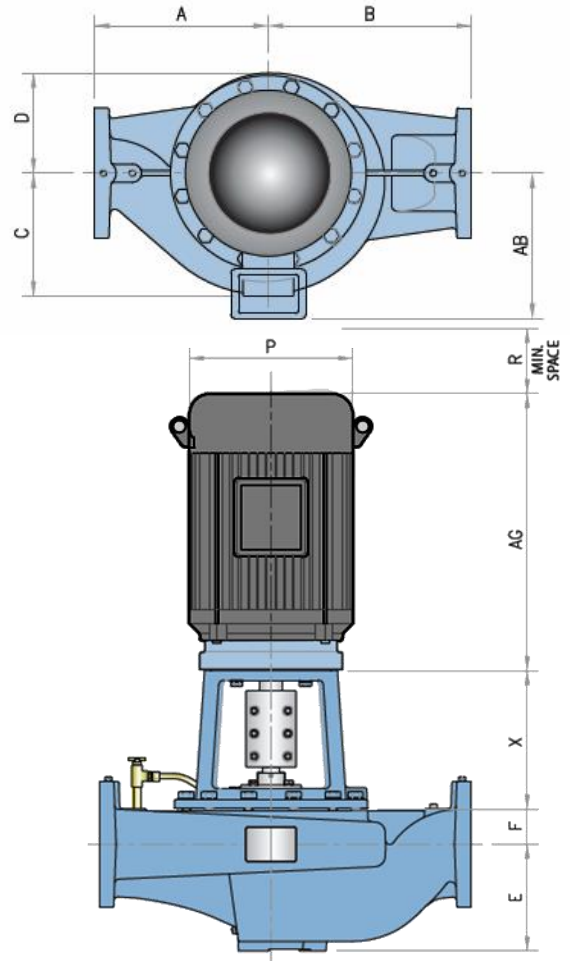
## PERFORMANCE DATA (MOTOR FRAME REFERENCE)

| PUMP SIZE | ODP MOTORS |                  |            |            |              |             |             |             |             |              |               |               |               |               |               |               |                     |                     |
|-----------|------------|------------------|------------|------------|--------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------------|---------------------|
|           | 143 TC     | 145 TC           | 182 TC     | 184 TC     | 213 TC       | 215 TC      | 254 TC      | 256 TC      | 284 TC      | 286 TC       | 324 TC        | 326 TC        | 364 TC        | 365 TC        | 404 TC        | 405 TC        | 444 TC              | 445 TC              |
| 1½X1½X6   | 1<br>(162) | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 2X2X6     | 1<br>(175) | 1.5 & 2<br>(192) | -          | GROUP "V"  |              |             |             | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 3X3X6     | 1<br>(187) | 1.5 & 2<br>(199) | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 4X4X6     | 1<br>(227) | 1.5 & 2<br>(239) | 3<br>(237) | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 6X6X6     | -          | -                | 3<br>(388) | 5<br>(400) | 7.5<br>(435) | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 1½X1½X8   | 1<br>(177) | 1.5 & 2<br>(189) | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 2X2X8     | -          | 1.5 & 2<br>(198) | 3<br>(218) | 5<br>(219) | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 3X3X8     | -          | 2<br>(232)       | 3<br>(248) | 5<br>(260) | 7.5<br>(295) | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 4X4X8     | -          | -                | 3<br>(298) | 5<br>(310) | 7.5<br>(345) | 10<br>(360) | 15<br>(487) | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 5X5X8     | -          | 2<br>(330)       | 3<br>(348) | 5<br>(360) | 7.5<br>(395) | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 6X6X8     | -          | -                | -          | -          | 7.5<br>(445) | 10<br>(460) | 15<br>(587) | 20<br>(630) | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 8X8X8     | -          | -                | -          | -          | -            | 10<br>(710) | 15<br>(837) | 20<br>(880) | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 2X2X10    | -          | -                | 3<br>(268) | 5<br>(280) | 7.5<br>(315) | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 3X3X10    | -          | -                | 3<br>(308) | 5<br>(320) | 7.5<br>(355) | 10<br>(370) | 15<br>(497) | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 4X4X10    | -          | -                | -          | 5<br>(380) | 7.5<br>(415) | 10<br>(430) | 15<br>(557) | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 6X6X10    | -          | -                | -          | -          | 7.5<br>(505) | 10<br>(520) | 15<br>(647) | 20<br>(690) | 25<br>(788) | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 8X8X10    | -          | -                | -          | -          | -            | -           | -           | 20<br>(820) | 25<br>(918) | 30<br>(970)  | 40*<br>(1115) | 50*<br>(1135) | *TSC<br>Frame |               | -             | -             | -                   | -                   |
| 4X4X11½   | -          | -                | -          | -          | 7.5<br>(465) | 10<br>(480) | 15<br>(607) | 20<br>(650) | 25<br>(738) | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 5X5X11½   | -          | -                | -          | -          | -            | 10<br>(530) | 15<br>(657) | 20<br>(700) | 25<br>(788) | 30<br>(840)  | -             | -             | -             | -             | GROUP "I"     |               | -                   | -                   |
| 6X6X11½   | -          | -                | -          | -          | -            | -           | 15<br>(722) | 20<br>(765) | 25<br>(853) | 30<br>(905)  | 40<br>(1050)  | -             | -             | -             | -             | -             | -                   | -                   |
| 8X8X11½   | -          | -                | -          | -          | -            | -           | -           | -           | 25<br>(968) | 30<br>(1020) | 40<br>(1165)  | 50<br>(1185)  | 60<br>(1450)  | 75<br>(1320)  | -             | -             | -                   | -                   |
| 3X3X13    | -          | -                | -          | -          | 7.5<br>(445) | 10<br>(460) | 15<br>(587) | 20<br>(630) | 25<br>(718) | -            | -             | -             | -             | -             | -             | -             | -                   | -                   |
| 4X4X13L   | -          | -                | -          | -          | -            | 10<br>(537) | 15<br>(657) | 20<br>(700) | 25<br>(788) | 30<br>(840)  | 40<br>(985)   | -             | -             | -             | -             | -             | -                   | -                   |
| 4X4X13    | -          | -                | -          | -          | -            | -           | 15<br>(657) | 20<br>(700) | 25<br>(788) | 30<br>(840)  | 40<br>(985)   | 50<br>(1005)  | -             | -             | -             | -             | -                   | -                   |
| 6X6X13    | -          | -                | -          | -          | -            | -           | -           | 20<br>(723) | 25<br>(803) | 30<br>(855)  | 40<br>(1000)  | 50<br>(1020)  | 60<br>(1285)  | -             | -             | -             | -                   | -                   |
| 8X8X13    | -          | -                | -          | -          | -            | -           | -           | -           | -           | 30<br>(1080) | 40<br>(1225)  | 50<br>(1245)  | 60<br>(1510)  | 75<br>(1320)  | -             | -             | -                   | -                   |
| 10X10X13  | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | 40<br>(1400)  | 50<br>(1420)  | 60<br>(1785)  | 75<br>(1595)  | 100<br>(1903) | 125<br>(2572) | 150<br>(2444)       | -                   |
| 12X12X13  | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | 60<br>(2460)  | 75<br>(2270)  | 100<br>(2578) | 125<br>(3247) | 150<br>(3119)       | 200 & 250<br>(3390) |
| 14X14X14  | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | 125<br>(RTF)  | 150<br>(RTF)  | 200 & 250<br>(RTF)  | -                   |
| 8X8X15    | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | 60<br>(1705)  | 75<br>(1515)  | 100<br>(1823) | 125<br>(2492) | 150<br>(2364)       | 200<br>(RTF)        |
| 10X10X15  | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | 75<br>(1870)  | 100<br>(2178) | 125<br>(2847) | 150<br>(2719) | 200 & 250<br>(2990) | -                   |
| 14X14X15  | -          | -                | -          | -          | -            | -           | -           | -           | -           | -            | -             | -             | -             | -             | -             | -             | -                   | 200<br>(RTF)        |

## DIMENSIONAL DATA

| PUMP SIZE | DIMENSIONS (ODP & TEFC) |       |       |      |       |       |
|-----------|-------------------------|-------|-------|------|-------|-------|
|           | A                       | B     | C     | D    | E     | F     |
| 1½X1½X6   | 7                       | 7.25  | 4.5   | 4.5  | 4.5   | 1.75  |
| 2X2X6     | 8                       | 7     | 5.25  | 4.5  | 4.88  | 1.88  |
| 3X3X6     | 9.75                    | 8.25  | 5.88  | 4.75 | 6     | 1.88  |
| 4X4X6     | 12                      | 10    | 5.88  | 4.75 | 7.75  | 2.25  |
| 6X6X6     | 17.5                    | 12    | 8.5   | 6.35 | 9.68  | 4     |
| 1½X1½X8   | 8                       | 8     | 5.75  | 5.75 | 4.63  | 2.5   |
| 2X2X8     | 9.5                     | 8.5   | 5.75  | 5.75 | 5.13  | 2.5   |
| 3X3X8     | 12                      | 10    | 6.75  | 5.75 | 6.38  | 2.5   |
| 4X4X8     | 14                      | 11    | 8     | 6.25 | 8     | 2.5   |
| 5X5X8     | 13                      | 12    | 7.5   | 6.25 | 8     | 2.5   |
| 6X6X8     | 19.5                    | 13.5  | 9.75  | 7.5  | 10.38 | 3.25  |
| 8X8X8     | 22                      | 16    | 11    | 8.5  | 11.5  | 5.5   |
| 2X2X10    | 10                      | 9     | 6.75  | 6.75 | 5.38  | 2.5   |
| 3X3X10    | 11.5                    | 9.5   | 7.25  | 6.75 | 5.5   | 2.5   |
| 4X4X10    | 14                      | 12    | 7.75  | 6.88 | 7.63  | 2.5   |
| 6X6X10    | 17                      | 15    | 10.63 | 8.25 | 8.13  | 2.5   |
| 8X8X10    | 22                      | 17    | 11.5  | 9    | 9.75  | 3     |
| 4X4X11½   | 15.25                   | 12.75 | 8.16  | 7.38 | 7.69  | 2.5   |
| 5X5X11½   | 17.25                   | 13.75 | 9.03  | 8.03 | 8.88  | 2.75  |
| 6X6X11½   | 18.5                    | 16.5  | 9.88  | 8.56 | 9.75  | 2.75  |
| 8X8X11½   | 22                      | 17.5  | 12    | 9.63 | 10    | 3.25  |
| 3X3X13    | 13.5                    | 12    | 8.75  | 8.25 | 6.63  | 2.5   |
| 4X4X13    | 15.5                    | 13.5  | 9.25  | 8.25 | 8.13  | 2.38  |
| 4X4X13L   | 15.5                    | 13.5  | 9.25  | 8.25 | 10.25 | 2.38  |
| 6X6X13    | 19                      | 17    | 11    | 9    | 10    | 2.75  |
| 8X8X13    | 23                      | 19    | 12    | 9.75 | 16    | 2.94  |
| 10X10X13  | 26                      | 21.38 | 14    | 11   | 12.5  | 3.25  |
| 12X12X13  | 22                      | 24.25 | 17    | 12   | 12.38 | 12    |
| 8X8X15    | 25.88                   | 22.88 | 13.88 | 11.5 | 12.38 | 3.25  |
| 10X10X15  | 26                      | 22.5  | 14.5  | 11.5 | 13.44 | 3.25  |
| 14X14X15  | 25                      | 27    | 20.1  | 13.5 | 13.75 | 13.88 |

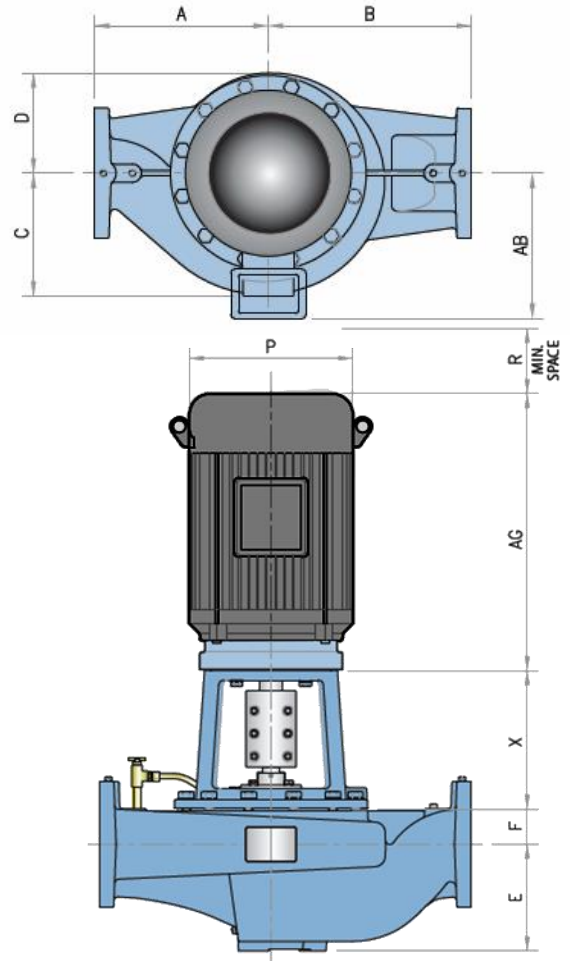
| PEDESTAL SIZE            |            |       |                          |           |       |
|--------------------------|------------|-------|--------------------------|-----------|-------|
| IMP. MAX<br>NOMINAL DIA. | DIMENSION  |       | IMP. MAX<br>NOMINAL DIA. | DIMENSION |       |
|                          | FRAME      | X     |                          | FRAME     | X     |
| 6"                       | 143-145TC  | 8.75  | 13"                      | 182-256TC | 12.5  |
|                          | 182-256TC  | 10.5  |                          | 284-286TC | 13.25 |
| 8"                       | 143-145TC  | 8.25  |                          | 324-326TC | 14    |
|                          | 182-256TC  | 10    |                          | 444-445TC | 14.75 |
|                          | 284-286TSC | 13    |                          | 364-365TC | 15.25 |
| 10"                      | 324-326TSC | 13.75 | 14"                      | 404-405TC | 16    |
|                          | 143-145TC  | 8.25  |                          | 444-449TC | 16.75 |
|                          | 182-256TC  | 10    |                          | 364-365TC | 15.26 |
|                          | 284-286TC  | 10    |                          | 404-405TC | 16    |
| 11½"                     | 324-326TC  | 13.5  | 15"                      | 444-446TC | 16.5  |
|                          | 182-256TC  | 9.88  |                          | 447-449TC | 17    |
|                          | 284-286TC  | 12.88 |                          | 364-365TC | 16.75 |
|                          | 324-326TC  | 14.12 |                          | 404-405TC | 18.38 |
|                          |            |       |                          | 444-449TC | 18.38 |



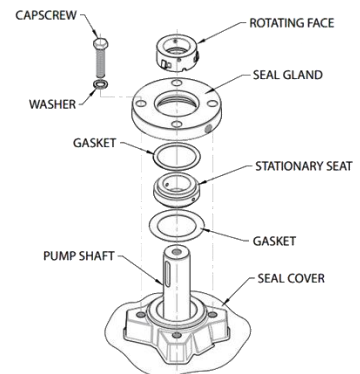
## DIMENSIONAL DATA

| MOTOR FRAME | DIMENSIONS |       |       |    |         |
|-------------|------------|-------|-------|----|---------|
|             | AG         | AB    | P     | R  | SHAFT Ø |
| 143TC       | 9.88       | 6.5   | 6.9   | 5  | 0.875   |
| 145TC       | 11.1       | 6.5   | 6.9   | 5  | 0.875   |
| 182TC       | 11.62      | 7.38  | 8.9   | 5  | 1.125   |
| 184TC       | 12.62      | 7.38  | 8.9   | 5  | 1.125   |
| 213TC       | 14.88      | 9     | 10.62 | 5  | 1.375   |
| 215TC       | 14.88      | 9     | 10.62 | 5  | 1.375   |
| 254TC       | 15.88      | 9.9   | 12.62 | 6  | 1.625   |
| 256TC       | 18.5       | 9.9   | 12.62 | 6  | 1.625   |
| 284TC       | 20.25      | 12.94 | 14.19 | 8  | 1.875   |
| 284TSC      | 23         | 12.94 | 14.19 | 8  | 1.625   |
| 286TC       | 24.5       | 12.94 | 14.19 | 8  | 1.875   |
| 286TSC      | 27         | 12.94 | 14.19 | 8  | 1.625   |
| 324TC       | 26.5       | 15.75 | 15.94 | 10 | 2.125   |
| 324TSC      | 27         | 15.75 | 15.94 | 10 | 1.875   |
| 326TC       | 26.5       | 15.75 | 15.94 | 10 | 2.125   |
| 326TSC      | 27         | 15.75 | 15.94 | 10 | 1.875   |
| 364TC       | 26.5       | 15.75 | 17.81 | 12 | 2.125   |
| 364TSC      | 28.5       | 17.69 | 17.81 | 12 | 1.875   |
| 365TC       | 28.63      | 17.69 | 17.81 | 12 | 2.125   |
| 365TSC      | 28.63      | 17.69 | 17.81 | 12 | 1.875   |
| 404TC       | 32.5       | 17.5  | 19.9  | 14 | 2.375   |
| 404TSC      | 32.5       | 17.5  | 19.9  | 14 | 1.875   |
| 405TC       | 32.5       | 17.5  | 19.9  | 14 | 2.375   |
| 405TSC      | 32.5       | 17.5  | 19.9  | 14 | 1.875   |
| 444TC       | 37.31      | 19.94 | 21.9  | 16 | 3.375   |
| 444TSC      | 37.31      | 19.94 | 21.9  | 16 | 2.375   |
| 445TC       | 37.31      | 19.94 | 21.9  | 16 | 3.375   |
| 445TSC      | 37.31      | 19.94 | 21.9  | 16 | 2.375   |
| 447TC       | 40.88      | 19.94 | 21.9  | 20 | 3.375   |
| 447TSC      | 40.88      | 19.94 | 21.9  | 20 | 2.375   |
| 449TC       | 45.85      | 19.94 | 21.9  | 20 | 3.375   |
| 449TSC      | 45.85      | 19.94 | 21.9  | 20 | 2.375   |

| GROUP | PUMP SHAFT Ø | FRAME   | FLANGE | SHAFT MOTOR Ø | SPACE BTWN SHAFTS | SEAL Ø |
|-------|--------------|---------|--------|---------------|-------------------|--------|
| V     | 1"           | 143-145 | TC     | 7/8"          | 1 1/8"            | 1"     |
|       |              | 182-184 |        | 1 1/8"        | 2 1/2"            |        |
|       |              | 213-215 |        | 1 3/8"        | 2"                |        |
|       |              | 254-256 |        | 1 3/8"        | 1 3/8"            |        |
| I     | 1"           | 284-286 | TSC    | 1 3/8"        | 2 3/4"            | 1"     |
|       |              | 324-326 |        | 1 3/8"        | 2 3/8"            |        |
|       |              | 364-365 |        | 1 3/8"        | 2 3/8"            |        |
|       |              | 404-405 |        | 2 3/8"        | 2 3/8"            |        |
|       |              | 284-286 | TC     | 1 3/8"        | 1 3/8"            |        |
|       |              | 324-326 |        | 2 3/8"        | 1 3/8"            |        |
|       |              | 364-365 |        | 2 3/8"        | 1 3/8"            |        |
|       |              | 445-446 |        | 2 3/8"        | 1 3/8"            |        |
| L     | 2"           | 182-184 | TC     | 1 3/8"        | 2 1/2"            | 2"     |
|       |              | 213-215 |        | 1 3/8"        | 2"                |        |
|       |              | 254-256 |        | 1 3/8"        | 1 3/8"            |        |
|       |              | 324-326 |        | 2 3/8"        | 1 3/8"            |        |
|       |              | 364-368 | TC     | 2 3/8"        | 1 3/8"            |        |
|       |              | 404-405 |        | 2 3/8"        | 2 3/8"            |        |
|       |              | 444-445 |        | 3 3/8"        | 1 3/8"            |        |
|       |              | 447-449 |        | 3 3/8"        | 1 3/8"            |        |



Mechanical seal exploded view.

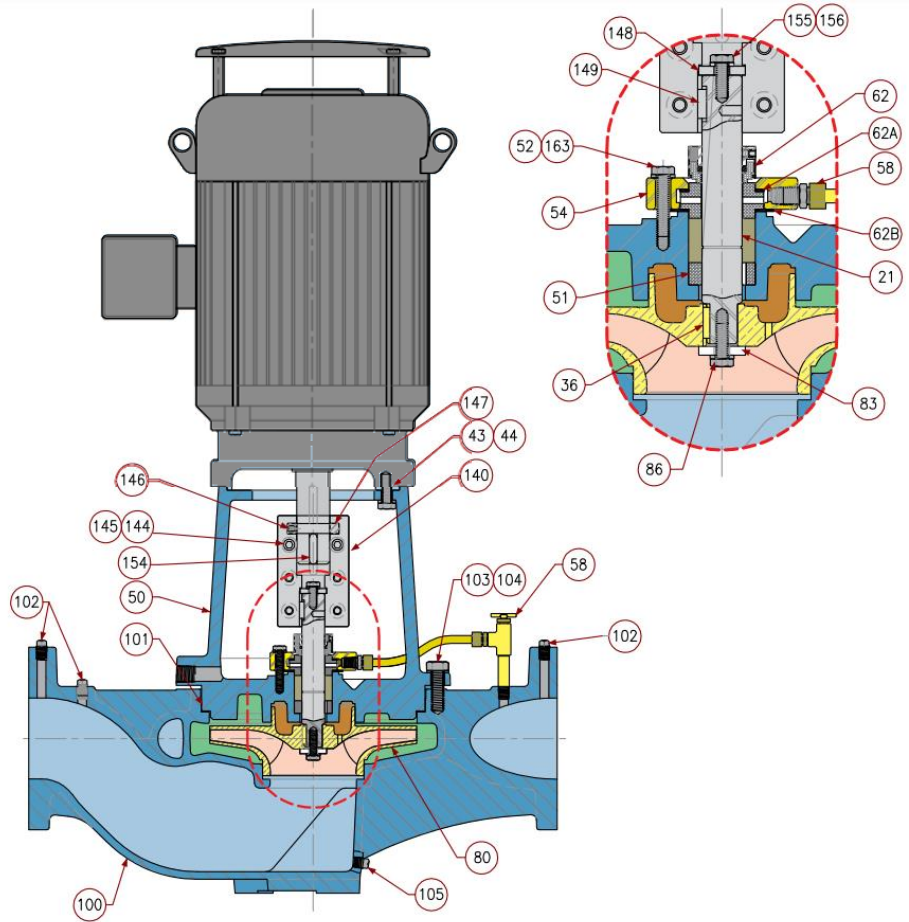




## SECTIONAL VIEW

### FOR MODELS:

1½X1½X6  
 1½X1½X8  
 2X2X6  
 2X2X8  
 2X2X10  
 3X3X6  
 3X3X8  
 3X3X10  
 3X3X13  
 4X4X6  
 4X4X8  
 4X4X10  
 4X4X11½  
 4X4X13  
 4X4X13L  
 5X5X8  
 5X5X11½  
 6X6X6  
 6X6X8  
 6X6X10  
 6X6X11½  
 6X6X13  
 8X8X8  
 8X8X10  
 8X8X11½  
 8X8X13  
 10X10X13



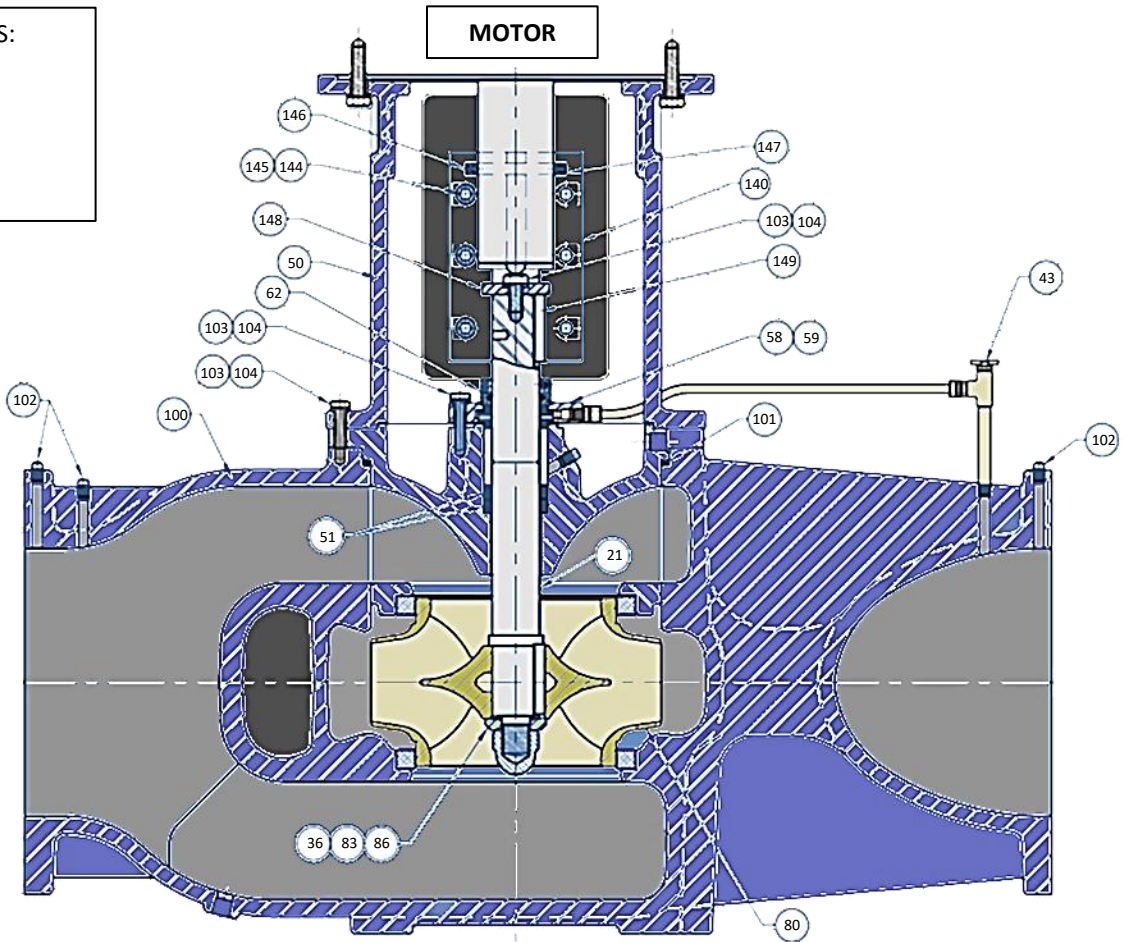
| PART NO. | DESCRIPTION                    | MATERIAL OF CONSTRUCTION       |
|----------|--------------------------------|--------------------------------|
| 21       | SHAFT                          | STAINLESS STEEL                |
| 36       | IMPELLER KEY                   | CARBON STEEL                   |
| 50       | PUMP PEDESTAL                  | CAST IRON                      |
| 51       | BUSHING                        | GRAPHITE                       |
| 52       | SEAL COVER CAPSCREW            | STAINLESS STEEL                |
| 58       | MALE STRAIGHT TUBING CONNECTOR | BRONZE                         |
| 59       | TUBING                         | COPPER                         |
| 62       | MECHANICAL SEAL                | CARON/SILICON BARBIDE-VITON-SS |
| 62A      | UPPER GASKET                   | PTFE                           |
| 62B      | LOWER GASKET                   | PTFE                           |
| 63       | TEE                            | BRONZE                         |
| 67       | NIPPLE                         | BRONZE                         |
| 68       | AIR VENT                       | BRONZE                         |
| 80       | IMPELLER                       | CAST IRON OR BRONZE            |
| 83       | IMPELLER WASHER                | STAINLESS STEEL                |
| 86       | IMPELLER SCREW                 | STAINLESS STEEL                |
| 100      | PUMP CASING                    | CAST IRON                      |

| PART NO. | DESCRIPTION              | MATERIAL OF CONSTRUCTION      |
|----------|--------------------------|-------------------------------|
| 101      | CASING GASKET            | PTFE                          |
| 102      | GAUGE PLUG               | GALVANIZED STEEL              |
| 103      | CASING CAPSCREW          | CARBON STEEL                  |
| 104      | WASHER                   | CARBON STEEL                  |
| 105      | CASING DRAIN PLUG        | GALVANIZED STEEL OR CAST IRON |
| 140      | SPLIT COUPLING           | ALUMINIUM                     |
| 144      | SOCKET SCREW             | CARBON STEEL                  |
| 145      | WASHER                   | CARBON STEEL                  |
| 147      | MOTOR COUPLING COLLAR    | STEEL                         |
| 148      | SHAFT COUPLING COLLAR    | STEEL                         |
| 149      | COUPLING KEY             | STEEL                         |
| 150      | COUPLING GUARD           | STEEL                         |
| 154      | MOTOR KEY                | STEEL                         |
| 155      | CAPSCREW LACKWASHER      | CARBON STEEL                  |
| 156      | COUPLING COLLAR CAPSCREW | CARBON STEEL                  |
| 163      | WASHER                   | STAINLESS STEEL               |
| 999      | NAMEPLATE                | VARIOUS                       |
| 800      | MOTOR                    | VARIOUS                       |

## SECTIONAL VIEW

FOR MODELS:

8X8X15  
10X10X15  
12X12X13  
14X14X14  
14X14X15

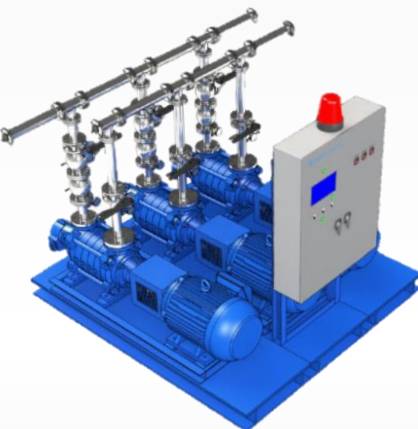


| PART NO. | DESCRIPTION                    | MATERIAL OF CONSTRUCTION       |
|----------|--------------------------------|--------------------------------|
| 21       | SHAFT                          | STAINLESS STEEL                |
| 36       | IMPELLER KEY                   | CARBON STEEL                   |
| 50       | PUMP PEDESTAL                  | CAST IRON                      |
| 51       | BUSHING                        | GRAPHITE                       |
| 52       | SEAL COVER CAPSCREW            | STAINLESS STEEL                |
| 58       | MALE STRAIGHT TUBING CONNECTOR | BRONZE                         |
| 59       | TUBING                         | COPPER                         |
| 62       | MECHANICAL SEAL                | CARON/SILICON BARBIDE-VITON-SS |
| 62A      | UPPER GASKET                   | PTFE                           |
| 62B      | LOWER GASKET                   | PTFE                           |
| 63       | TEE                            | BRONZE                         |
| 67       | NIPPLE                         | BRONZE                         |
| 68       | AIR VENT                       | BRONZE                         |
| 80       | IMPELLER                       | CAST IRON OR BRONZE            |
| 83       | IMPELLER WASHER                | STAINLESS STEEL                |
| 86       | IMPELLER SCREW                 | STAINLESS STEEL                |
| 100      | PUMP CASING                    | CAST IRON                      |

| PART NO. | DESCRIPTION              | MATERIAL OF CONSTRUCTION      |
|----------|--------------------------|-------------------------------|
| 101      | CASING GASKET            | PTFE                          |
| 102      | GAUGE PLUG               | GALVANIZED STEEL              |
| 103      | CASING CAPSCREW          | CARBON STEEL                  |
| 104      | WASHER                   | CARBON STEEL                  |
| 105      | CASING DRAIN PLUG        | GALVANIZED STEEL OR CAST IRON |
| 140      | SPLIT COUPLING           | ALUMINIUM                     |
| 144      | SOCKET SCREW             | CARBON STEEL                  |
| 145      | WASHER                   | CARBON STEEL                  |
| 147      | MOTOR COUPLING COLLAR    | STEEL                         |
| 148      | SHAFT COUPLING COLLAR    | STEEL                         |
| 149      | COUPLING KEY             | STEEL                         |
| 150      | COUPLING GUARD           | STEEL                         |
| 154      | MOTOR KEY                | STEEL                         |
| 155      | CAPSCREW LACKWASHER      | CARBON STEEL                  |
| 156      | COUPLING COLLAR CAPSCREW | CARBON STEEL                  |
| 163      | WASHER                   | STAINLESS STEEL               |
| 999      | NAMEPLATE                | VARIOUS                       |
| 800      | MOTOR                    | VARIOUS                       |



**Variable Speed Booster  
Model VSPV(up to 300PSI)**



**Variable Speed Booster  
Model VSPM(up to 600PSI)**



**Oil Shield Elevator Sump System  
Model SOSP(up to 125GPM)**

Since 1927 Federal Pump has been a leading provider of reliable and innovative fluid handling solutions for supply water management and dewatering pump services.

Its recent introduction of the VSPV & VSPM variable speed domestic water supply system combines innovative technological advancements in premium efficient motors and variable speed drive support programs that reduce energy demand, lower operating costs, and provide more finely tuned supply controls.

Its VSA/VSP vertical pump rated to 210F provides solutions in dewatering applications where condensate or boiler feed water are collected and then cooled and pumped to city sewer connections providing continuous service where submersible pumps do not provide a sustainable solution.

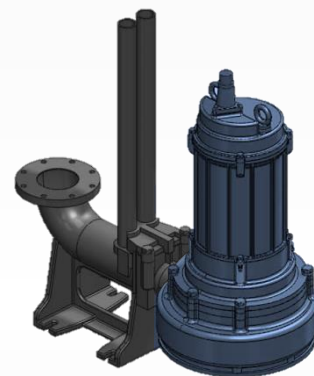
The SOSP Oil Shield sump pumps alerting building management to potential oil leaks in the elevator areas provide additional building support.

High rise roof fill applications, water make-up systems for mechanical equipment utilizing rain water systems and energy efficient condensate, boiler feed, and vacuum condensate units continue in the focus of energy efficiency and building support.

In the tradition of leadership through product innovation, quality designs, and reliable customer service, Federal Pump continues to be a supplier to those water management and dewatering markets where it first started that tradition of leadership in Brooklyn, N.Y.



**Vertical Sewage/Sump Pump  
Model VSA/VSP(up to 1400GPM)**



**Submersible Sewage/Sump Pump  
Model MSC(QD)/VSS(QD) (up to 500GPM)**



**Condensate/Boiler Feed System  
Model CCV/BFC(up to 100,000EDR)**