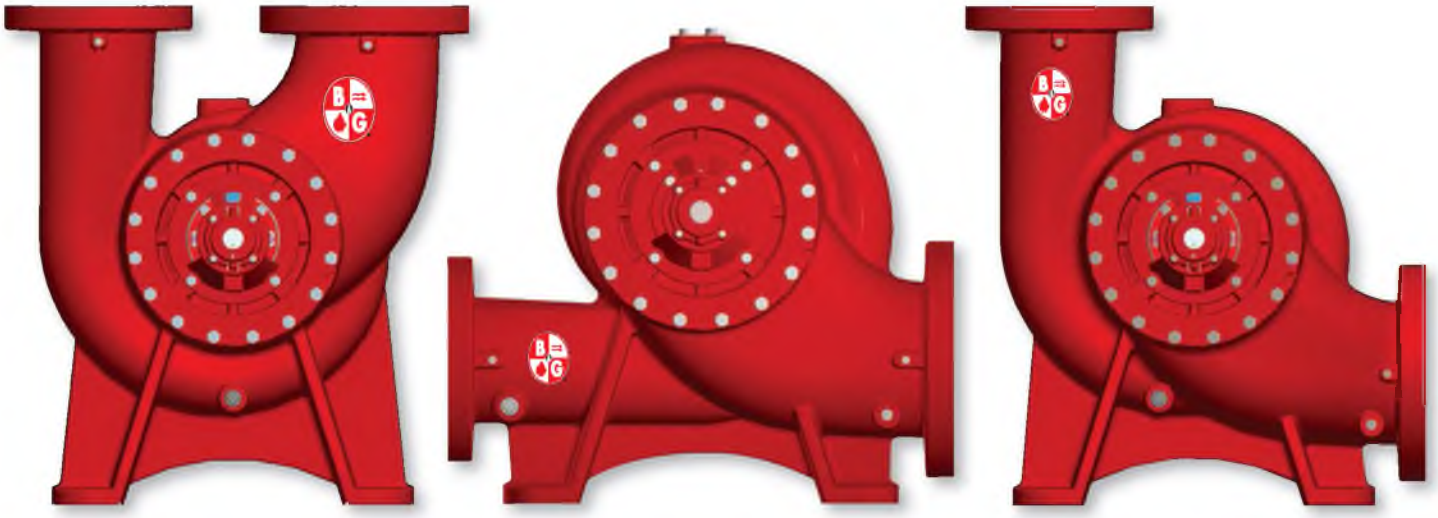
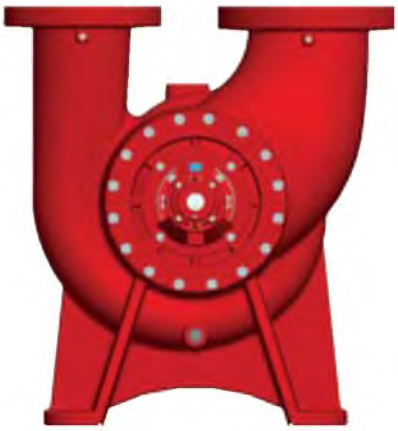
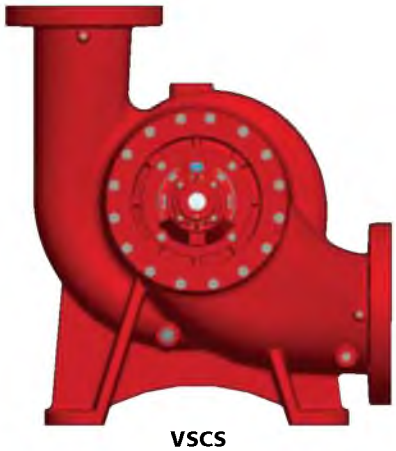


VSX®
Technical Brochure

You said you needed one pump that does it all.



VSC



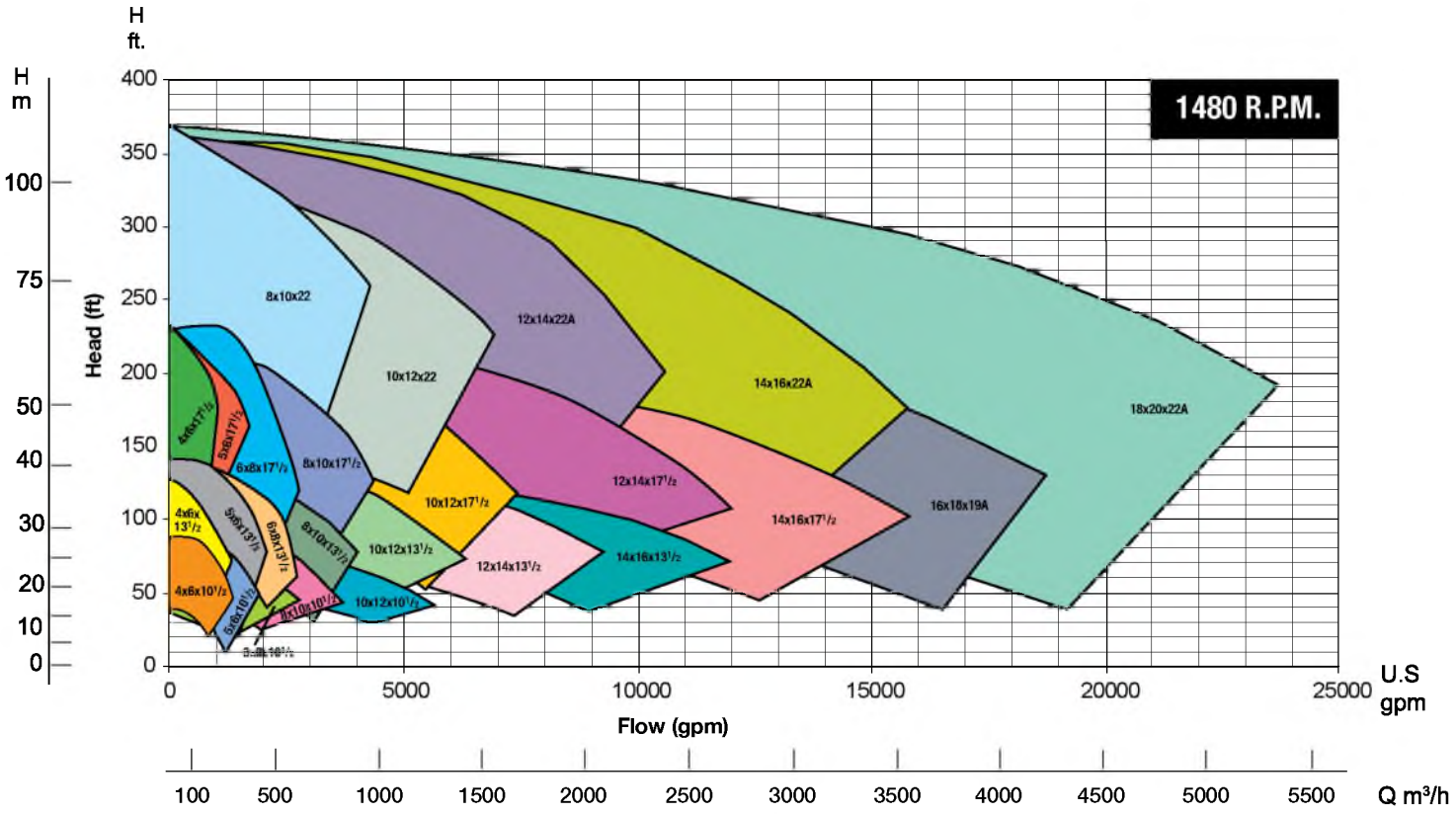
VSCS

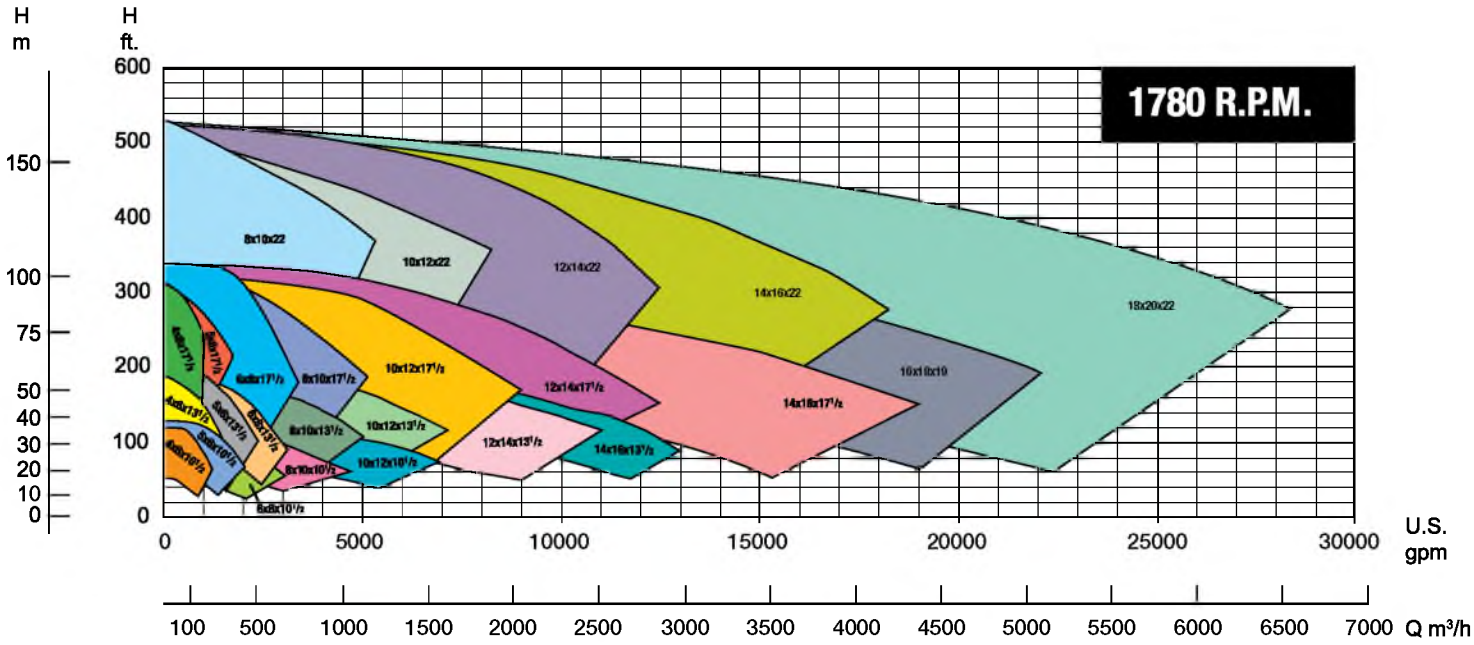
Only the VSX platform offers so many piping installation configurations, thanks to its revolutionary design. Utilizing CFD technology, we can deliver identical hydraulic performance in any flange configuration: VSC (top-top), VSCS (top-side) and VSH (side-side). In addition, every model and size is available in either right or left hand rotation providing up to six possible installation configurations. See below for availability of exact sizes and models.

The VSH®, VSC™ and VSCS® are all available in the following pump sizes:

4x6x10.5	8x10x10.5	12x14x13.5
4x6x13.5	8x10x13.5	12x14x17.5
4x6x17.5	8x10x17.5	12x14x22
5x6x10.5	8x10x22	14x16x13.5
5x6x13.5	10x12x10.5	14x16x17.5
5x6x17.5	10x12x13.5	14x16x22
6x8x10.5	10x12x17.5	16x18x19*
6x8x13.5	10x12x22	18x20x22†
6x8x17.5		

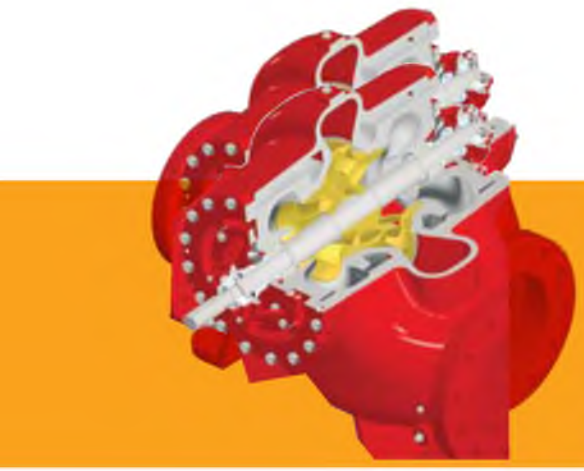
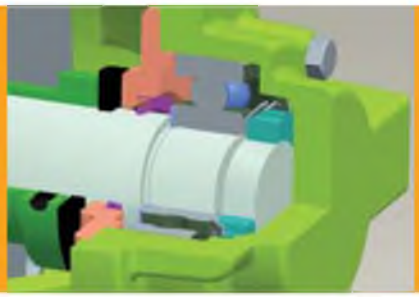
VSX Performance Range





VSX Operational Data

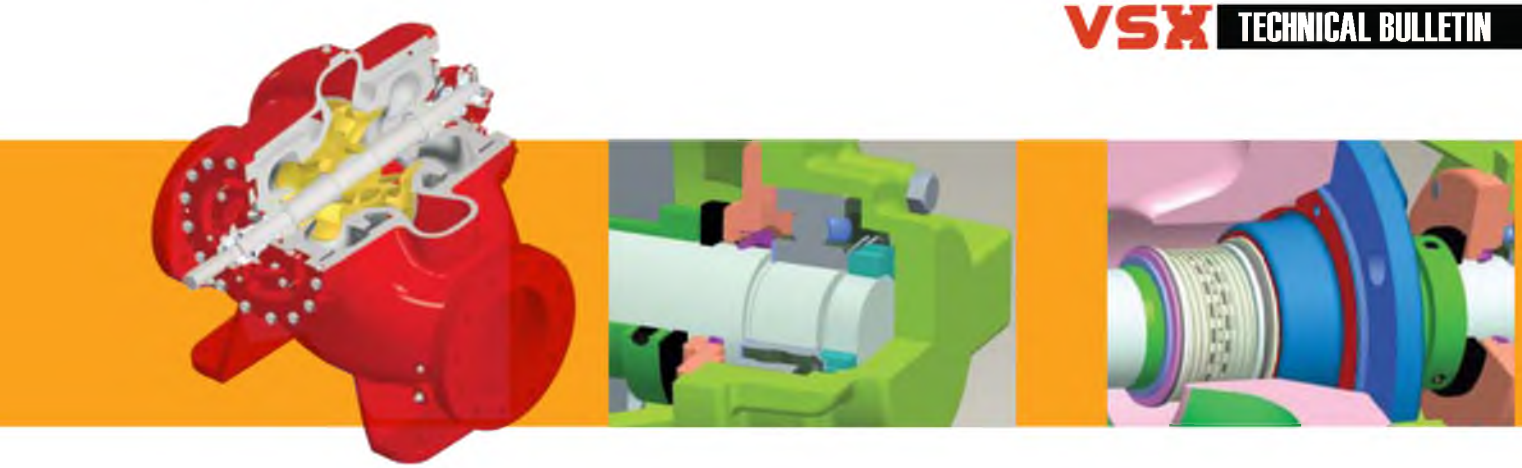
[Pump Size]	4x6x10.5	4x6x13.5	4x6x17.5	5x6x10.5	5x6x13.5
CASING DATA					
125# FF, ANSI Flanges Maximum 175 PSI Working Pressure Supplied with Unitized Seal					
Max. Suction pressure	175	175	175	175	175
Max. Working pressure	175	175	175	175	175
Max. hydrostatic test pressure	262	262	262	262	262
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
250# FF, ANSI Flanges Maximum 300 PSI Working Pressure Supplied with Unitized Seal*					
*Max. Suction pressure	200	200	200	200	200
Max. Working pressure	300	300	300	300	300
Max. hydrostatic test pressure	450	450	450	450	450
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
250# FF, ANSI Flanges Maximum 300 PSI Working Pressure Supplied with Balanced Seal					
Max. Suction pressure	300	300	300	300	300
Max. Working pressure	300	300	300	300	300
Max. hydrostatic test pressure	450	450	450	450	450
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
MECHANICAL SEAL DATA					
Mechanical Seal on sleeve for 175 and 300 psi working pressure*					
Type	Unitized	Unitized	Unitized	Unitized	Unitized
Material	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC
Min Temp - 0 deg. F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
Max Temp - 300 deg. F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
** Refer to max. suction pressure limitation for 300psi working pressure rating.*					
Mechanical Seal on sleeve for max. 300 psi working pressure					
Type	Balanced	Balanced	Balanced	Balanced	Balanced
Material	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC
Min Temp	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
Max Temp	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
IMPELLER DESIGN DATA					
Number of vanes	7	6	5	6	5
Maximum Impeller Diameter	10.5"	13.5"	17.5"	10.5"	13.5"
Minimum Impeller Diameter	7"	9.5"	12.5"	7"	9"
Maximum Sphere	.63"	.82"	.845"	.55"	1.00"


5x6x17.5	6x8x10.5	6x8x13.5	6x8x17.5	8x10x10.5	8x10x13.5	8x10x17.5	8x10x22
175	175	175	175	175	175	160	125
175	175	175	175	175	175	175	175**
262	262	262	262	262	262	262	262
Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
200	200	200	200	200	200	160	125
300	300	300	300	300	300	300	300
450	450	450	450	450	450	450	450
Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
300	300	300	300	300	300	300	300
300	300	300	300	300	300	300	300
450	450	450	450	450	450	450	450
Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Unitized	Unitized	Unitized	Unitized	Unitized	Unitized	Unitized	Unitized
EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC
0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC
0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
6	7	6	5	7	7	7	6
17.5"	10.5"	13.5"	17.5"	10.5"	13.5"	17.5"	22"
12.5"	6.5"	10"	12.5"	7"	9.5"	12.5"	16.5"
.82"	.70"	1.08"	.80"	.57"	1.00"	1.25"	1.35"

VSX Operational Data

[Pump Size]	10x12x10.5	10x12x13.5	10x12x17.5	10x12x22	12x14x13.5
CASING DATA					
125# FF, ANSI Flanges Maximum 175 PSI Working Pressure Supplied with Unitized Seal (Balanced Seal where noted) †					
Max. Suction pressure	175	160	160	125	160
Max. Working pressure	175	175	175	175**	175
Max. hydrostatic test pressure	262	262	262	262	262
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
250# FF, ANSI Flanges Maximum 300 PSI Working Pressure Supplied with Unitized Seal* (Balanced Seal where noted) †					
*Max. Suction pressure	200	160	160	125	160
Max. Working pressure	300	300	300	300	300
Max. hydrostatic test pressure	450	450	450	450	450
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
250# FF, ANSI Flanges Maximum 300 PSI Working Pressure Supplied with Balanced Seal					
Max. Suction pressure	300	300	300	300	300
Max. Working pressure	300	300	300	300	300
Max. hydrostatic test pressure	450	450	450	450	450
Casing material	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
MECHANICAL SEAL DATA					
Mechanical Seal on sleeve for 175 and 300 psi working pressure*					
Type	Unitized	Unitized	Unitized	Unitized	Unitized
Material	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Car/SiC
Min Temp - 0 deg. F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
Max Temp - 300 deg. F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
** Refer to max. suction pressure limitation for 300psi working pressure rating.*					
Mechanical Seal on sleeve for max. 300 psi working pressure					
Type	Balanced	Balanced	Balanced	Balanced	Balanced
Material	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC
Min Temp	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
Max Temp	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
IMPELLER DESIGN DATA					
Number of vanes	7	7	7	6	7
Maximum Impeller Diameter	10.75"	13.5"	17.5"	22"	13.5"
Minimum Impeller Diameter	8.75"	10"	12.5"	16.5"	10.6"
Maximum Sphere	.60"	.91"	1.35"	1.5"	.88"



12x14x17.5	12x14x22	14x16x13.5	14x16x17.5	14x16x22	16x18x19	18x20x22
Balanced Seal				Balanced Seal	Balanced Seal	Balanced Seal
125	175	160	125	175	175	175
175	175	175	175	175	175	175
262	262	262	262	262	262	262
Cast Iron	Ductile Iron	Cast Iron	Cast Iron	Ductile Iron	Ductile Iron	Ductile Iron
Balanced Seal				Balanced Seal	Balanced Seal	Balanced Seal
125	300	160	125	300	300	300
300	300	300	300	300	300	300
450	450	450	450	450	450	450
Cast Iron	Ductile Iron	Cast Iron	Cast Iron	Ductile Iron	Ductile Iron	Ductile Iron
300	300	300	300	300	300	300
300	300	300	300	300	300	300
450	450	450	450	450	450	450
Cast Iron	Ductile Iron	Cast Iron	Cast Iron	Ductile Iron	Ductile Iron	Ductile Iron
Unitized	Balanced	Unitized	Unitized	Balanced	Balanced	Balanced
EPR/Car/SiC	EPR/Graphite Loaded SiC	EPR/Car/SiC	EPR/Car/SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC
0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC	EPR/Graphite Loaded SiC
0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F	0 deg F
300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F	300 deg F
7	7	7	7	6	7	6
17.5"	22"	13.5"	17.5"	22"	19"	22"
13"	16"	11"	12.5"	16"	13.85"	14.85"
1.12"	1.25"	.83"	1.46"	1.72"	1.47"	1.74"

** Applicable for 1480 RPM and slower speeds.

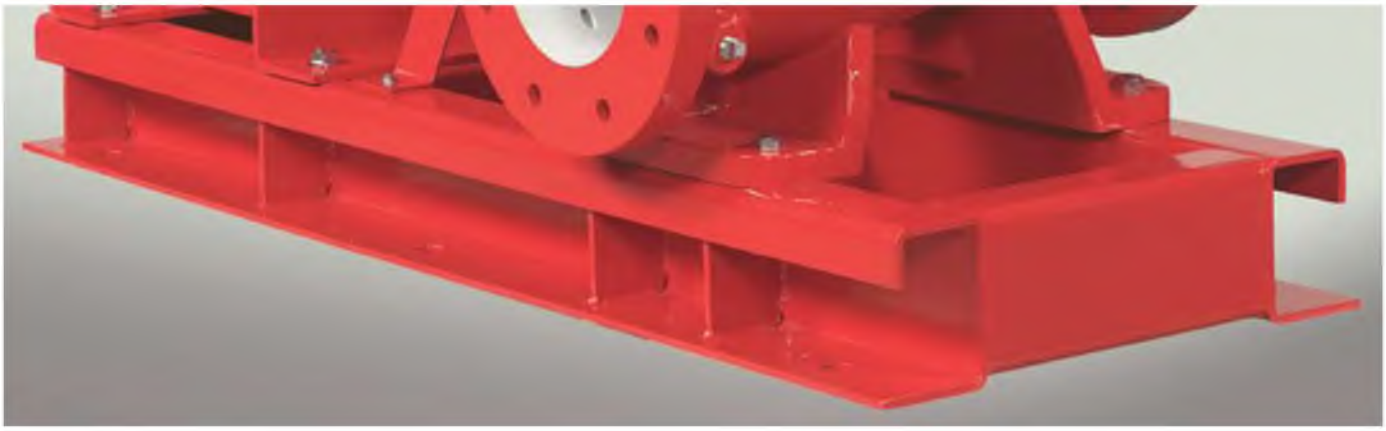
† *12x14x22, 14x16x22, 16x18x19 and 18x20x22 have balanced seals and ductile iron volutes, standard*

Groutless Structural-Steel Base Plate

Base plates must be designed with sufficient rigidity to allow the pump and motor shafts to accept the loads without resulting in undue stress, deflection or vibration. This avoids premature wear on the coupling, bearings and mechanical seals and avoids early failure of the equipment. By utilizing advanced Finite Element Analysis and design, a modern state of the art base plate can be provided.

When compared against other styles of base plates commonly found on the market today, the VSX welded-steel baseplate provides superior base stress and frequency capabilities, designed in accordance to ANSI/H.I. 1.3-2000.

- Typical rolled-channel base: the maximum amount of base plate stress reaches 41600 PSI.
- Typical fabricated-rail base: the maximum amount of base plate design stress reaches 28700 PSI.
- VSX structural-steel base plate: the maximum amount of base stress reaches 22900 PSI.



Stresses on a rolled-steel base plate are over 41000 PSI, or 180% worse than a VSX

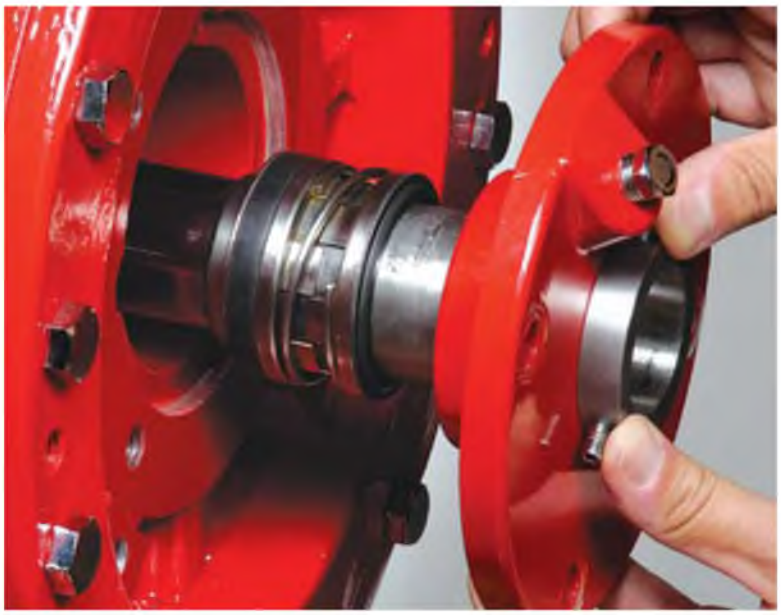
Two common base plate designs utilized on double suction pumps were evaluated against the new VSX welded-steel base plate. Utilizing Finite Element Analysis a rolled steel ("C" channel) and a fabricated-rail design base plate were analyzed against the VSX base plate.

The amount of stress exposed on the VSX base plate will be no more than 22900 PSI whereas the maximum stress reached on a rolled-steel base plate will be over 41000 PSI, or 180% worse.

Simplified Service

No rigging or heavy-duty material handling equipment is necessary to gain access to the bearing, mechanical seals or shaft sleeves. Unlike older horizontal double-suction, split-case and larger vertical inline pumps, there are no heavy top casings or motors to lift off, saving cost, reducing risk and providing easy access to the rotating assembly.

The VSX platform makes bearing, mechanical seal and shaft sleeve inspection easy. The VSX design makes these components readily accessible from both sides of the pump, so that you can service from the inboard* or outboard side without disturbing the piping or the motor. You can also replace just one bearing, mechanical seal or sleeve without disturbing the other side.



Maintenance-Free Bearings

Our maintenance-free bearings eliminate the need for regular maintenance, documentation logs, over-greasing problems and the risk of mixing greases that can cause early failure. This design not only reduces maintenance time and costs, but also helps extend pump life.

New One-Piece Unitized Seal

Bell & Gossett's new one-piece unitized seal eliminates multiple seal components and simplifies replacement. Because it uses a one-piece elastomeric bellows, it has fewer parts than competitive seals, resulting in significantly fewer installation errors.

Alignment Friendly Coupling

Elastomeric couplings are specifically designed to accommodate angular shaft misalignment, as well as parallel offset of the pump and motor shafts. However, the amount of the offset and/or misalignment is dependent on the type and style of flexible coupling applied. Left unchecked, coupling misalignment has a significant impact on the overall life of the mechanical seals and bearings of the pump. Laser and even infrared thermal imaging is sometimes necessary on couplings with very tight operating tolerances to insure that the proper alignment has been locked down. This process can be both time consuming as well as expensive.

Compared to the VSX coupling, typical elastomeric inserts consist of either an EPDM, Polyurethane or Hytrel material and are available in dropout or jaw type configuration with the following typical tolerances:

Coupling Type	VSX Non-Spacer Coupling up to 1500 HP	Jaw Type	EPDM	Hytrel
Angular Misalignment	1 - 4 Degrees	.9 - 1.3 Degrees	1 Degree	.25 Degrees
Parallel Misalignment	1/16" - 1/8"	.008" - .027"	.01" - .062"	.01" - .035"

A Robust Pump Starts with Heavy Duty Flanges

Other split-case pumps are provided with flat face, 125# ANSI drilled flanges for 175# working pressure design. When 300# working pressure becomes necessary, a heavier casing becomes necessary - at a heavy price.

VSX pumps provide as standard a higher level of capability. Every VSX pump is available as standard with 125# ANSI flange drilling coupled with the same heavy duty 300# volute that is provided in applications requiring 175# working pressure.

Table 2, to the right, demonstrates this difference. A typical flange on a six-inch diameter pump is 1" thick. The six-inch flange on a VSX pump is 1.69" thick – 69% thicker than older traditional pump flanges found in the market today.

Flange	Typical Split-Case	VSX Split-Case
Diameter	Flange Thickness (in)	Flange Thickness (in)
	125#ANSI	125 & 250# ANSI
4"	0.938"	1.50"
5"	0.938"	1.62"
6"	1.000"	1.69"
8"	1.125"	1.88"
10"	1.188"	2.12"
12"	1.250"	2.25"
14"	1.375"	2.38"
16"	1.438"	2.50"
18"	1.562"	2.57"
20"	1.687"	2.69"

Table 2

Typical Split-Case 125# Flange Thickness

Standard VSX 125# Flange Thickness

Allowable Static Flange Loading for VSX Pumps

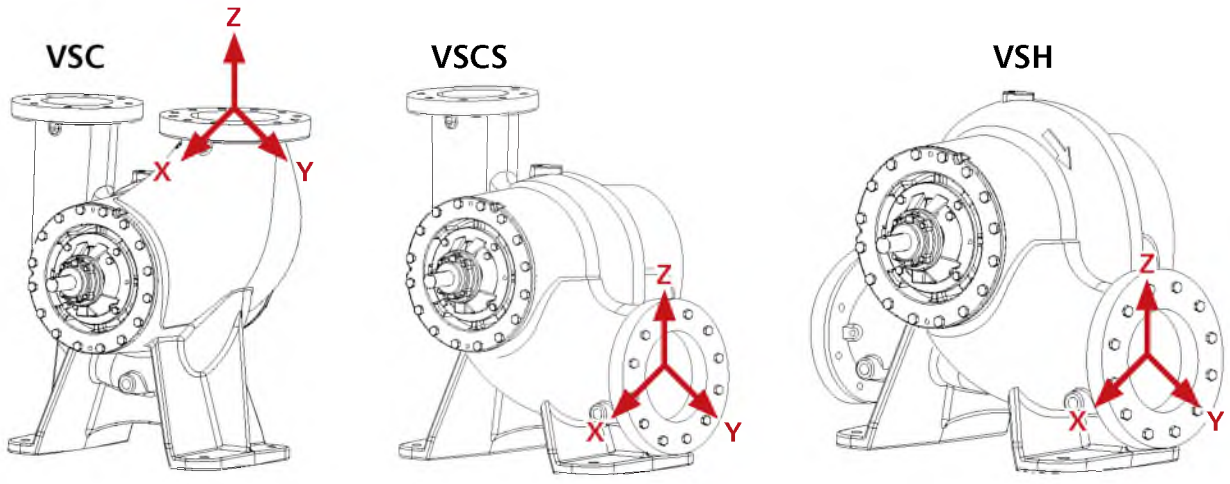
The vertical split case volute design of the VSX provides optimum nozzle loading capability that others just can't match. VSX pump flanges easily support the weight of heavy piping directly on its nozzles.

The unique design of the VSX allows for a significantly higher load level of combined forces versus traditional split case pumps that can only accept singular forces acting upon the pump.

Flg Dia (in)	Fx Max (lb)	Fy Max (lb)	Fz Max (lb)	Mx Max (ft-lb)	My Max (ft-lb)	Mz Max (ft-lb)
4	1615	1215	1615	716	532	716
5	2016	1322	2016	1024	578	1024
6	2417	1428	2417	1332	625	1332
8	3219	1642	3219	1948	718	1948
10	4021	1856	4021	2564	812	2564
12	4824	2069	4824	3180	905	3180
14	5626	2283	5626	3796	998	3796
16	6428	2497	6428	4412	1091	4412
18	7230	2711	7230	5028	1185	5028
20	8032	2924	8032	5645	1278	5645

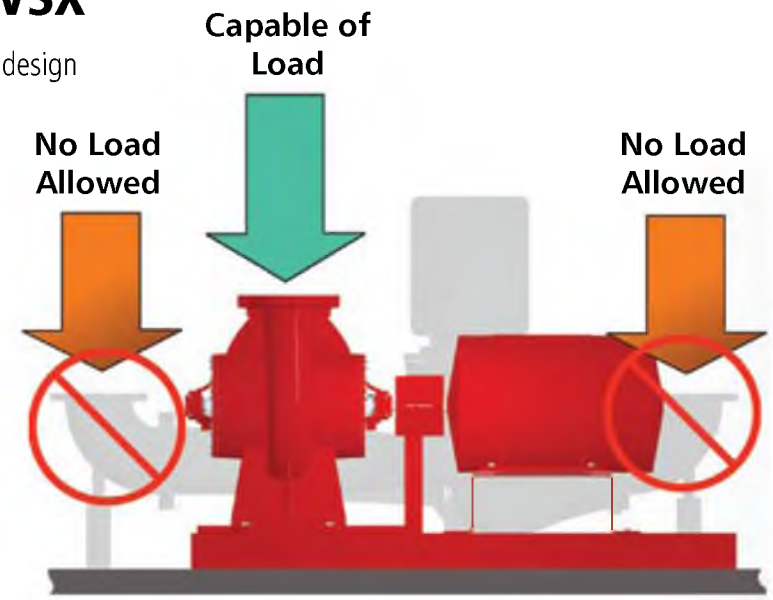
Table 3

System piping can place both forces (Fx, Fy, Fz) and twisting (Mx, My, Mz) moments on a pump casing as seen in Table 3. Only pump casings and base plates of sufficient robustness can endure these types of forces.



Reduce Space and Cost with VSX

Only the VSX offers you so many configurations for piping design flexibility. And only the top suction and discharge flange offering of the VSC offers exceptional space savings. Utilizing a VSC model can reduce your equipment footprint by up to 40 percent over traditional double-suction and large vertical inline pumps. The VSC optimizes the advantages of vertical suction and discharge piping applications by eliminating the added costs of space robbing elbows, protruding accessories and pipe supports.



VSC/VSCS Series

Floor space savings for a VSC pump as compared to a vertical in-line pump as seen in Table 4.

Series VSC

Floor Space – 13 sq. ft.

- Up to 40% smaller footprint than VIL
- Static vertical load on flanges allowed
- Pipe spool not required
- Fewer components for installation

Vertical In-Line

Floor Space – 21 sq. ft.

- Installed floor space is as much as 40% larger
- Discharge spool required to prevent hydraulic noise
- Static vertical load not allowed on valve or diffuser
- Additional components to purchase and install

ESTIMATED ADDITIONAL INSTALLED COSTS FOR VERTICAL IN-LINE PUMPS

ITEM	DESCRIPTION	4" PIPE	5" PIPE	6" PIPE	8" PIPE	10" PIPE
1	Suction Diffuser	$ 277.00	$ 380.00	$ 409.00	$ 777.00	$1,030.00
2	Triple Duty Valve	404.00	504.00	602.00	1,073.00	1,534.00
3	Spool Piece	111.00	156.00	172.00	204.00	406.00
4	Materials for fabricating two pipe supports	14.00	16.00	17.00	24.00	38.00
5	Time for locating and welding two pipe supports; positioning and bolting two pump accessories.	1.9 hrs.	2.0 hrs.	2.1 hrs.	2.6 hrs.	2.8 hrs.
6	Labor @ $45.00 per hr	85.00	90.00	95.00	117.00	126.00
7	Additional floor space cost	131.00	72.00	286.00	976.00	774.00
8	Total estimated additional installed cost over B&G VSC Pump	$1,008.00	$1,202.00	$1,564.00	$3,147.00	$3,840.00

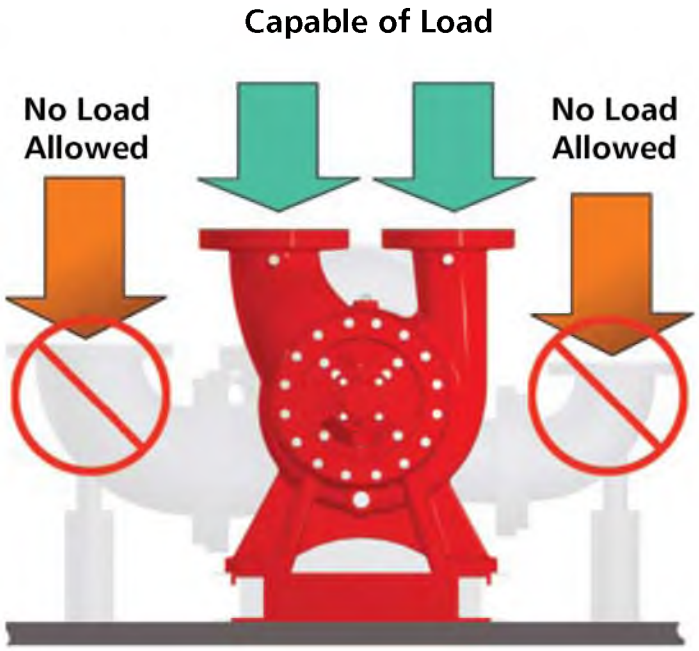
PUMP SIZE	AREA FOR VERTICAL IN-LINE PUMP	AREA FOR VSC PUMP	PERCENT AREA SAVED WITH VSC PUMPS	FLOOR SPACE COST SAVINGS WITH VSC PUMPS $119 PER SQ. FT.
4"	8.1 sq. ft.	7.0 sq. ft.	14%	$ 131.00
5"	10.2 sq. ft.	9.6 sq. ft.	6%	$ 72.00
6"	13.8 sq. ft.	11.4 sq. ft.	17%	$ 286.00
8"	20.7 sq. ft.	12.5 sq. ft.	40%	$ 976.00
10"	26.2 sq. ft.	19.7 sq. ft.	25%	$ 774.00

* Based on average construction costs per sq. ft. of various buildings as supplied by Dodge Construction Statistic for 2005.
The above estimated additional installed costs for vertical in-line pumps are conservative. Actual cost differentials will depend upon locale and piping practices employed.

Table 4

VSC/VSCS Series

Floor space savings for a VSC/VSCS pump as compared to a horizontal split case pump. See Table 5.



ESTIMATED ADDITIONAL INSTALLED COSTS FOR HORIZONTAL SPLIT CASE SINGLE-STAGE DOUBLE-SUCTION PUMPS

ITEM	DESCRIPTION	4" PIPE	6" PIPE	8" PIPE	10" PIPE
1	Two 90° long radius butt weld elbows	$ 24.00	$ 62.00	$ 115.00	$ 207.00
2	Four welding neck flanges	71.00	107.00	199.00	311.00
3	Materials for fabricating two pipe supports	14.00	17.00	24.00	38.00
4	Time for welding four flanges to elbows, gapping and setting flange	8 hrs	9.6 hrs	12.6 hrs	15.8 hrs
5	Time for locating and welding two pipe supports; positioning and bolting two elbow assemblies	1.9 hrs	2.1 hrs	2.6 hrs	2.8 hrs
6	Four welding neck flanges	10 hrs	11.7 hrs	15.2 hrs	18.6 hrs
7	Labor @ $45.00 per hr	450.00	527.00	684.00	837.00
8	Total estimated additional installed cost over B&G VSC Pump	$ 559.00	$ 713.00	$1,022.00	$1,393.00

FLOOR SPACE SAVED WITH B&G VSC PUMPS

PIPE SIZE	AREA FOR CONVEN-TIONAL PUMPS	AREA FOR VSC PUMPS	AREA SAVED WITH VSC PUMPS
4"	16 sq. ft.	10 sq. ft.	6 sq. ft.
6"	19 sq. ft.	12 sq. ft.	7 sq. ft.
8"	24 sq. ft.	15 sq. ft.	9 sq. ft.
10"	32 sq. ft.	20 sq. ft.	12 sq. ft.

COST SAVINGS IN FLOOR SPACE WITH B&G VSC PUMPS

PIPE SIZE	AVERAGE FLOOR SPACE SAVED WITH VSC PUMPS	SAVINGS WITH VSC PUMPS $119 PER SQ. FT.
4"	6 sq. ft.	$ 714.00
6"	7 sq. ft.	$ 833.00
8"	9 sq. ft.	$1,071.00
10"	12 sq. ft.	$1,428.00

The above estimated additional installed costs for conventional single-stage, double-suction pumps are conservative. Actual cost differentials will depend upon locale and piping practices employed.

2005 Price of Labor Estimated

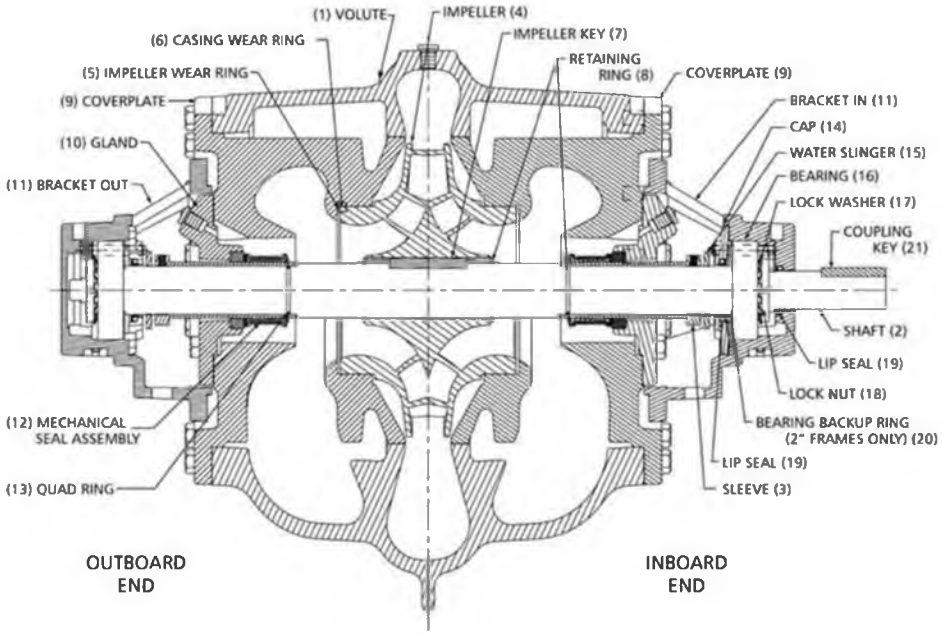
* Based on average construction costs per sq. ft. of various buildings as supplied by Dodge Construction Statistic for 2005.

Table 5

Material of Construction

No.	Description	Standard Offering	Optional Offering
1	Volute	Cast Iron ASTM A159	–
	Working Pressure	175 psig (12 Bar)	300 psig (20 Bar)
	Flange Rating	175 # Max.WP ANSI Flange Drilling FF Flange 125#	300 # Max.WP ANSI Flange Drilling FF Flange 250#
2	Shaft	1045	416 SS
3	Shaft Sleeve	304 SS	–
4	Impeller	Low Zinc Silicon Bronze (ASTM B584 Alloy C87600)	–
5	Impeller Wear Ring	–	Aluminum Bronze
6	Casing Wear Ring	–	Aluminum Bronze
7	Impeller Key	Stainless Steel	–
8	Retaining Ring	Stainless Steel	–
9	Coverplate	Gray Cast Iron	–
10	Gland	Gray Cast Iron	–
11	Bracket (In & Out)	Gray Cast Iron	–
12	Mechanical Seal*	Unitized, EPR-Car/SiC (175 psig)	Balanced, EPR/Graphite Loaded SiC (300 psig)
	Packing	–	Graphite TFE-Std
	Temperature Rating	Min. 0 deg.F (- 18 deg. C), Max. 300 deg. F (149 deg. C)	–
13	Quad Ring	EPDM Rubber	–
14	Cap	Gray Cast Iron	–
15	Water Slinger	Neoprene Rubber	–
16	Bearing	Single Row, Ball Bearing with Shield	–
17	Lock Washer	Carbon Steel	–
18	Lock Nut	Carbon Steel	–
19	Lip Seal	Steel with Nitrile Rubber Jacket	–
20	Bearing Backup Ring	Stainless Steel	–
21	Coupling Key	Stainless Steel	–
	Alignment Friendly Coupling Standard - suitable for VFD up to 1500 HP	Split Non-Spacer	–
	Standard - suitable for VFD 1500 HP and above	Gear Type, Non-Spacer	Non-Spacer, Split Polymer
	Option	–	Drop-out Spacer
	Coupling Guard with View Port	ANSI / OSHA	–
	Baseplate - Groutless	Structural Steel	–
	Drip Pan	–	Galvanized Steel
	Jacking Screws	–	Steel

* Refer to the individual pump submittals for specific limitations



Specifications

2.02 COMPONENTS

A. The pumps shall be long coupled, base mounted, single stage, double suction, vertical split case design, in cast iron bronze fitted construction specifically designed for quiet operation. Suitable for standard operations at 300° F and 175 PSIG working pressure or optional operation up to 300 PSIG working pressure. Working pressures shall not be de-rated at temperatures up to 300F

B. The bearing housing shall supply support for heavy-duty single row permanently lubricated ball bearings, with provision for purging or flushing if desired. Polyurea grease, capable of handling both high and low temperatures and that is resistant to washout and condensation shall be provided. The bearings shall be capable of absorbing both radial and thrust loads and maintaining the rotating element in proper axial alignment. Bearings shall be capable of being inspected and repaired by removal of only a bearing bracket.

C. The impeller shaft shall be of solid 416 stainless steel material; heat-treated to 80 KSI yield strength.

D. Pump shall be equipped with internally flushed unitized mechanical seal assemblies, mounted on 304SS sleeves, installed in enlarged tapered seal chambers. Application of an internally flushed mechanical seal shall be adequate for seal flushing without requiring external flushing lines. As an option, pump may include a packing gland type seal arrangement.

E. Mechanical seal assemblies shall be unitized, single spring, EPR elastomer bellows with drive ring, Carbon face rotating against a stationary Silicon Carbide face allowing for fast and easy installation and replacement. Seals shall be capable of being inspected and easily repaired.

F. Impeller shall be of the enclosed double suction type made of low zinc silicon bronze, both hydraulically and dynamically balanced to ISO 1940-1:2003 balance grade G6.3 and keyed to the shaft.

G. A coupling, capable of absorbing torsional vibration and of operating in variable speed applications, shall be employed between the pump and motor. An optional Spacer Coupler shall allow for removal of pump's wetted end without disturbing pump volute or movement of the pump's motor and electrical connections.

H. An ANSI B15.1 and OSHA 1910.219 compliant coupling guard shall shield the coupler during operation. Coupler guard shall be dual designed and contain viewing windows for inspection of the coupling. No more than .25 inch opening in the guard around the rotating assembly shall be visible.

I. Pump volute shall be of a cast iron ASTM A159 material (35,000 psi) design with an integrally cast pump discharge and an integrally cast pump suction. Flanges shall be extra heavy-duty design and will be of 250# thickness while capable of being drilled for 125# ANSI flat face use.

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