



**TECHNICAL BROCHURE**

BeSV60 R3

# e-SV™ 60 Hz Technical Manual

E-SV SERIES VERTICAL MULTI-STAGE PUMPS

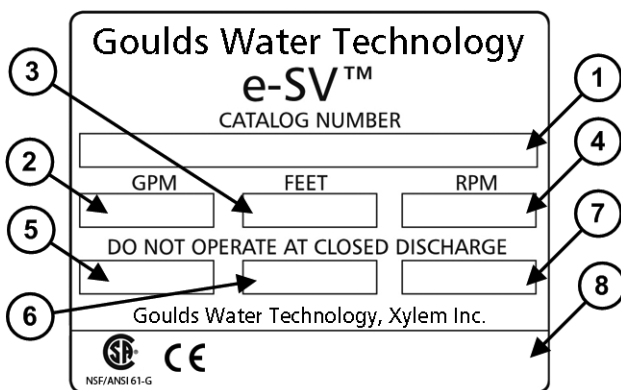
 **GOULDS**  
WATER TECHNOLOGY  
a xylem brand

## Commercial Water

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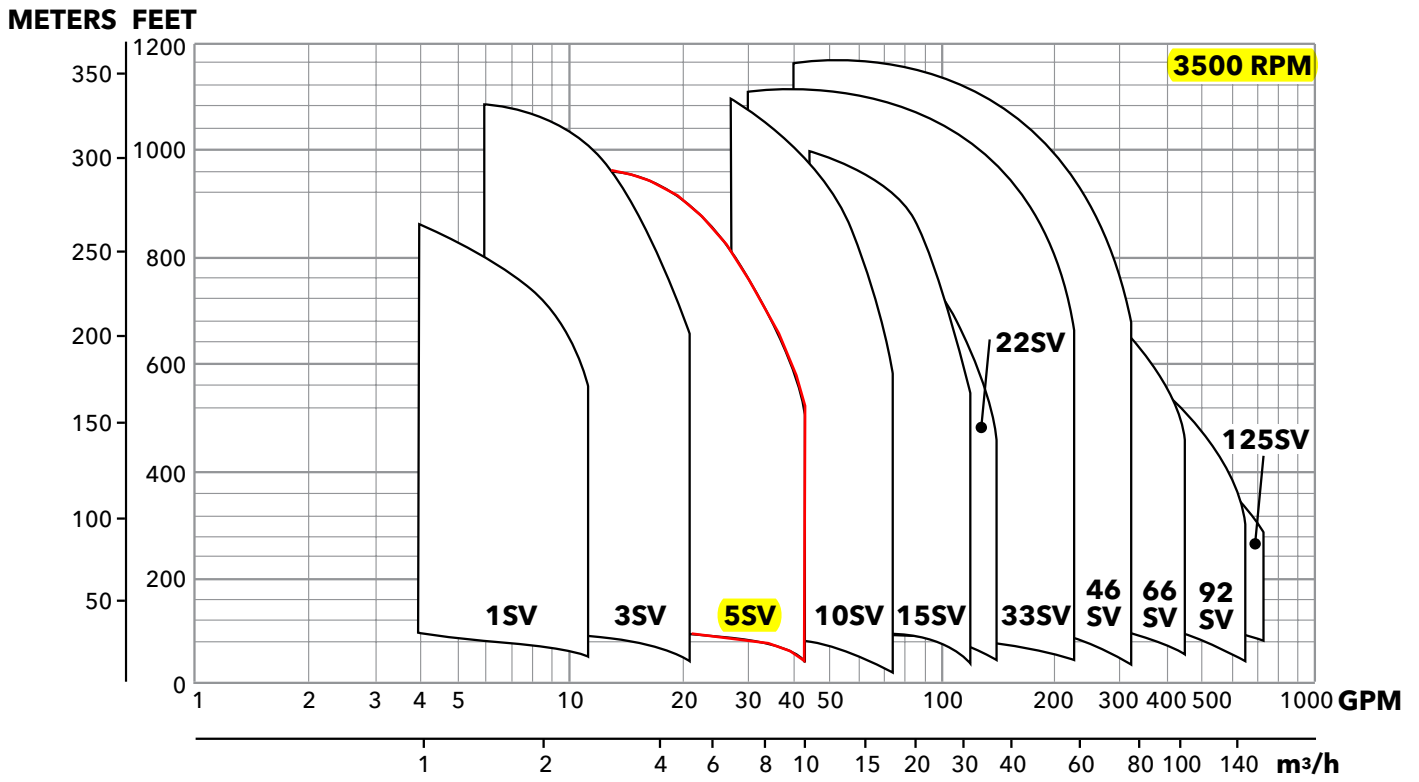
### e-SV Rating Plate



1	Goulds Water Technology Catalog Number
2	Capacity Range
3	TDH Range
4	Rated Speed
5	Rated Horsepower
6	Maximum Operating Pressure
7	Maximum Operating Temperature
8	Pump Serial Number

## Commercial Water

### e-SV Coverage Curve



### e-SV General Market Specifications

MUNICIPAL, AGRICULTURAL, LIGHT INDUSTRY,  
WATER TREATMENT, HEATING AND AIR CONDITIONING

#### Applications

- Handling of water, free of suspended solids, in the municipal, industrial and agricultural markets
- Pressure boosting and water supply systems
- Fire fighting jockey pumps
- Irrigation systems
- Wash systems
- Water treatment plants: reverse osmosis
- Handling of moderately aggressive liquids, demineralized water, water and glycol, etc.
- Circulation of hot and cold water for heating, cooling and conditioning systems
- Boiler feed

#### Specifications

##### PUMP

The e-SV pump is a non-self priming vertical multistage pump coupled to a standard motor.

The liquid end, located between the upper cover and the pump casing, is held in place by tie rods. The pump casing is available with different configurations and connection types.

- Delivery: up to 725 GPM
- Head: up to 1200 feet
- Temperature of pumped liquid:
  - 20°F to 250°F (-30°C to 120°C) standard version
- Optional temperature range up to 300°F (149°C) high temperature version
- Maximum operating pressure
  - SV1-22 with oval flanges: 230 PSI (16 bar)
  - SV1-22 with round flanges or Victaulic: 360 or 575 PSI (25 or 40 bar)
  - SV33, 46: 360 or 580 PSI (25 or 40 bar)\*
  - SV 66, 92: 360 or 580 PSI (25 or 40 bar)\*
  - SV 125: 360 or 580 PSI (25 or 40 bar)
- Direction of rotation: clockwise looking at the pump from the top down (marked with an arrow on the adapter and on the coupling).

##### MOTOR

- Standard NEMA TC Frame motors in open drip proof or totally enclosed fan cooled.
- 3500 RPM nominal
- Standard voltage:
  - Single phase version: 115-208/230 V, 60 Hz up to 3 HP or 208-230 V for 5 HP
  - Three phase version, 2 pole: 208-230/460 V, 60 Hz up 75 HP

\* Based on pump staging

### e-SV Characteristics

#### 1SV, 3SV, 5SV, 10SV, 15SV, 22SV Series

- Vertical multistage centrifugal pump. All metal parts in contact with the pumped liquid are made of stainless steel.
- The following versions are available:
  - F - ANSI flanges, in-line delivery and suction ports, AISI 304
  - T - Oval flanges (NPT), in-line delivery and suction ports, AISI 304
  - R - ANSI flanges, delivery port above the suction port, with four adjustable positions, AISI 304
  - N - ANSI flanges, in-line delivery and suction ports, AISI 316
  - P - Victaulic couplings, in-line delivery and suction ports, AISI 316
  - G - ANSI flange, in-line delivery and suction ports, Class 35/40B cast iron.
  - C - ISO clamp, AISI 316
- Innovative axial load compensation system on pumps with higher head. This ensures reduced axial thrusts and enables the use of standard NEMA TC motors that are easily found in the market.
- Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal
- Mechanical seal according to EN 12756 (ex DIN 24960) and ISO 3069
- Versions with ANSI flanges that can be coupled to ANSI raised face counter-flanges
- Threaded oval counter-flanges made of stainless steel are standard supply for the T versions
- Easy maintenance. No special tools required for assembly or disassembly
- Standard version for temperatures ranging from: -20°F to 250°F (30°C to 120°C)

#### Optional Features

- Horizontal version
- Special voltages, 50 Hz frequency
- Special materials for the mechanical seal, gaskets and elastomers
- Tropicalized motors
- Premium E and explosion proof motors
- 1750 RPM, 4 pole motors
- Passivation

## Commercial Water

### Typical Applications of e-SV Series Multi-Stage Pumps

#### Water Supply and Pressure Boosting

- Pressure boosting in buildings, hotels, residential complexes
- Pressure booster stations, supply of water networks
- Booster packages

#### Water Treatment

- Ultra filtration systems
- Reverse osmosis systems
- Water softeners and de-mineralization
- Distillation systems
- Filtration

#### Light Industry

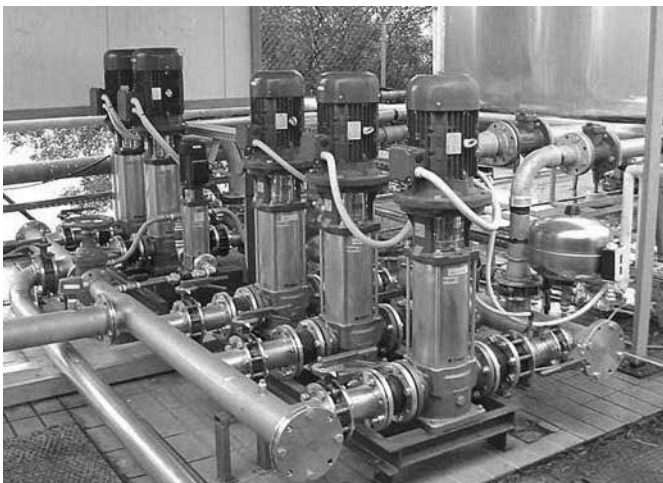
- Washing and cleaning plants (washing and degreasing of mechanical parts, car and truck wash tunnels, washing of electronic industry circuits)
- Commercial washers
- Fire fighting system pumps

#### Irrigation and Agriculture

- Greenhouses
- Humidifiers
- Sprinkler irrigation

#### Heating, Ventilation and Air Conditioning (HVAC)

- Cooling towers and systems
- Temperature control systems
- Refrigerators
- Induction heating
- Heat exchangers
- Boilers
- Water recirculation and heating



## Commercial Water

### e-SV Product Line Numbering System for 1 - 22SV Pump & Motor Combination

The various versions of the e-SV line are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown below.

Note: Not all combinations are possible.

#### Example Product Code

2 SV 2 2 F A 2 F 5 1 A H

#### Special Configurations (1 or 2 Characters) None

- |                                    |  |
|------------------------------------|--|
| A = Cooling Chamber only           | K = Horizontal mount + Low NPSH                    |
| B = Cooling Chamber + Passivation  | L = Horizontal mount + High Pressure               |
| C = Cooling Chamber + Low NPSH     | M = i-Alert (standard for 10 HP units and greater) |
| F = Destaged - 1 stage             | N = Low NPSH only                                  |
| G = Destaged - 2 stage             | P = Passivation only                               |
| H = Horizontal mount only          | Z = High Press (250/300# pump body)                |
| J = Horizontal mount + Passivation |  |

#### Seal Material

- |                                  |                       |
|----------------------------------|-----------------------|
| 0 = Carb-SilCar-Viton            | 4 = SilCar-SilCar-EPR |
| 1 = Carb-SilCar-AFLAS (HighTemp) | 6 = Carb-SilCar-EPR   |
| 2 = SilCar-SilCar-Viton          |                       |

#### Motor Enclosure

- |                   |               |
|-------------------|---------------|
| 1 = ODP           | 7 = Prem-XP   |
| 2 = TEFC          | 8 = Prem-WD   |
| 3 = X-Proof       | 9 = Marine    |
| 4 = WD - Tropical | A = Chem      |
| 5 = Prem-ODP      | B = Prem-Chem |
| 6 = Prem-TEFC     |               |

#### Voltage

- |                 |                 |                     |
|-----------------|-----------------|---------------------|
| A = 115-230     | H = 190/380     | R = 220             |
| B = 230         | J = 115/208-230 | S = 415             |
| C = 230-460     | K = 208         | T = 220/380 WYE     |
| D = 460         | L = 208-230     | U = 380-660 WYE     |
| E = 575         | M = 190/380/415 | V = 208-230/460 WYE |
| F = 208-230/460 | N = 380         | W = 220/380/440     |
| G = 200         | P = 110/220     |                     |

#### Pole-Hz-Phase

- |            |            |
|------------|------------|
| 1 = 2-50-1 | 5 = 4-50-1 |
| 2 = 2-50-3 | 6 = 4-50-3 |
| 3 = 2-60-1 | 7 = 4-60-1 |
| 4 = 2-60-3 | 8 = 4-60-3 |

#### HP Rating

- |          |         |
|----------|---------|
| A = 0.50 | H = 7.5 |
| B = 0.75 | J = 10  |
| C = 1.00 | K = 15  |
| D = 1.50 | L = 20  |
| E = 2    | M = 25  |
| F = 3    | N = 30  |
| G = 5    | P = 40  |

#### Configuration OPTION

- |                     |
|---------------------|
| C = Clamp-316       |
| F = Round-304 (SVB) |
| G = Cl-304          |
| N = Round-316 (SVD) |
| P = Victaulic-316   |
| T = Oval-304 (SVA)  |

- |     |                      |                                  |
|-----|----------------------|----------------------------------|
|     | Top / Bottom         |                                  |
| R = | (SVC) 12Suct-12Disch | Suction<br>discharge<br>location |
| W = | (SVC) 12Suct-03Disch |                                  |
| X = | (SVC) 12Suct-06Disch |                                  |
| Y = | (SVC) 12Suct-09Disch |                                  |

**Total Number of Impeller Stages (may be 1 or 2 characters) 15**

#### Product Line:

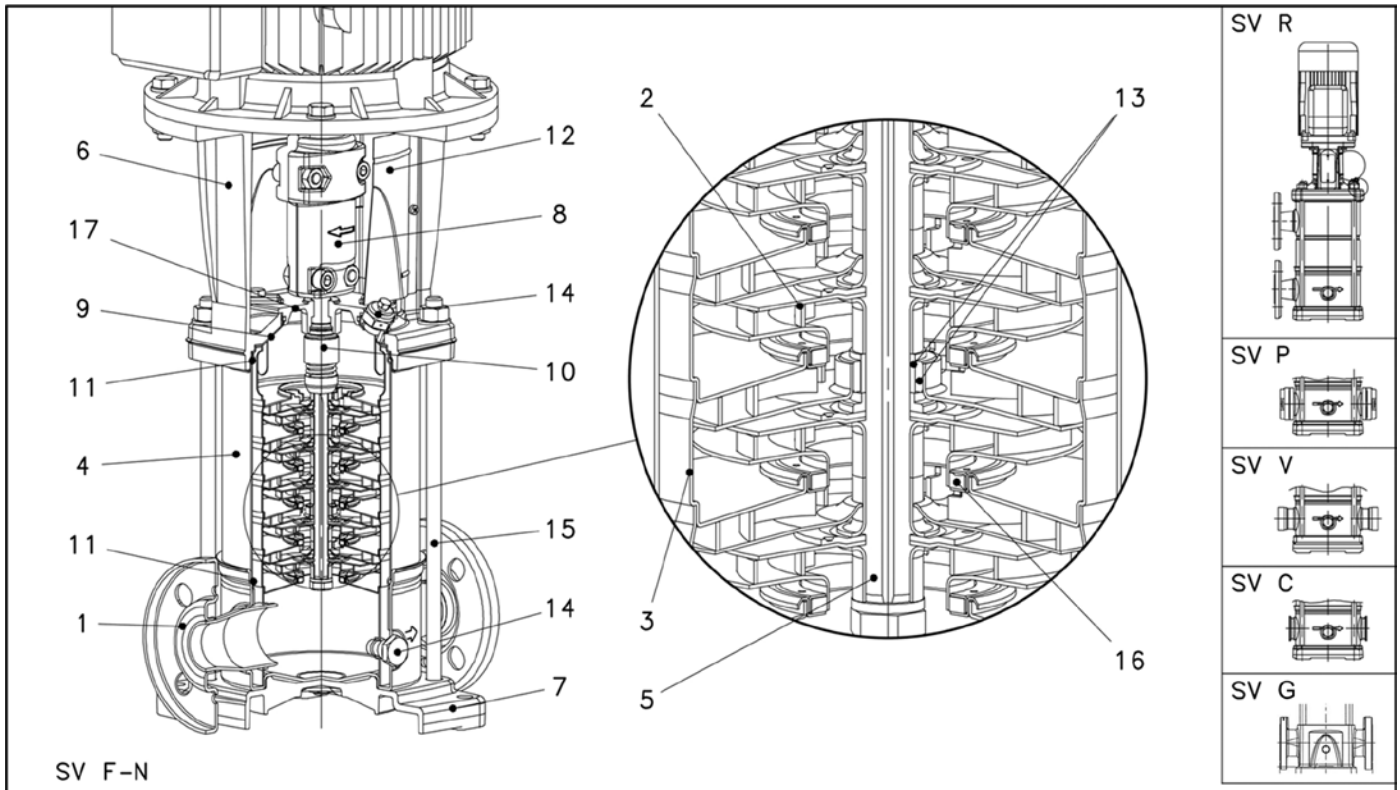
SV - Stainless Vertical

#### Nominal Flow:

- |            |              |
|------------|--------------|
| 1 = 5 GPM  | 10 = 53 GPM  |
| 3 = 16 GPM | 15 = 80 GPM  |
| 5 = 26 GPM | 22 = 116 GPM |

## Commercial Water

### Base Models: 1-22SV – Major Components



### Base Models: 1-22SV – Major Components

#### F, G, P, R VERSIONS

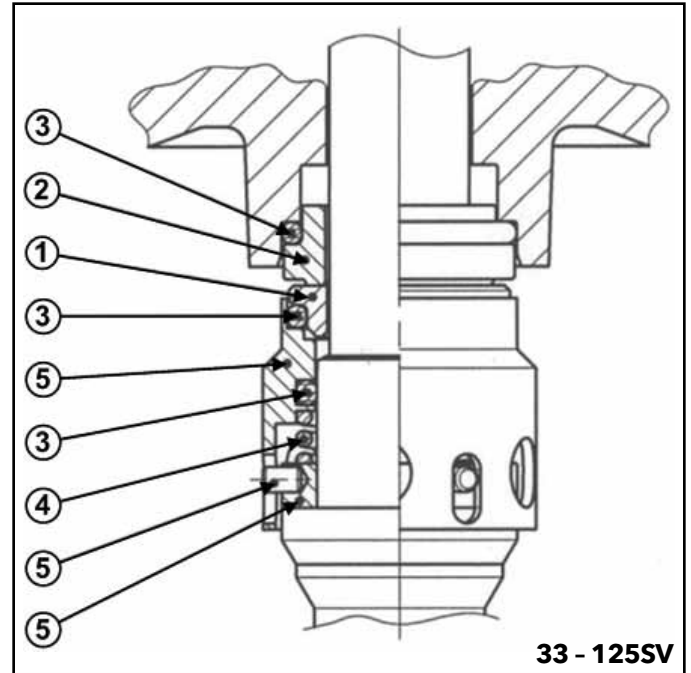
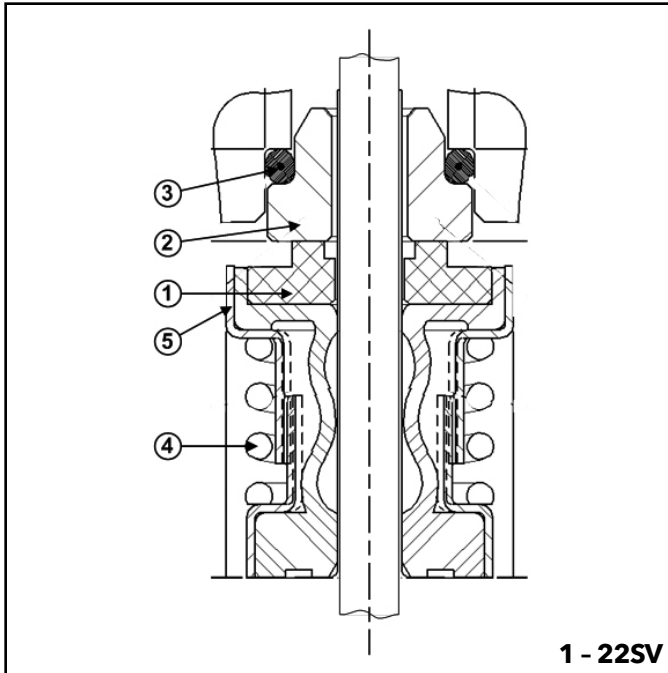
Ref. No.	Name	Material	Reference Standards	
			USA	Europe
1	Pump Body	Stainless Steel (F, P, R)	AISI 304	EN 10088-1-X5-CrNi18-10 (1.4301)
		Cast Iron (G)	ASTM Class 35/40B	EN 1561 GJL 250 (JL1040)
2	Impeller	Stainless Steel	AISI 304	EN 10088-1-X5-CrNi18-10 (1.4301)
3	Diffuser	Stainless Steel	AISI 304	EN 10088-1-X5-CrNi18-10 (1.4301)
4	Casing	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNiMo17-12-2 (1.4404)
5	Shaft	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)
6	Adapter	Cast Iron	ASTM Class 35/40B	EN 1561-GJL-250 (JL1040)
7	Base	Aluminum (F, P, R)	A384.0-F	EN 1706-AC-AISI11Cu2(Fe) (AC46100)
		N/A (G)	N/A	N/A
8	Coupling	Aluminum	A384.0-F	EN 1706-AC-AISI11Cu2(Fe) (AC46100)
9	Seal Plate	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNi17-12-2 (1.4404)
10	Mechanical Seal	Silicon Carbide / Carbon / Viton (opt. EPDM)		
11	Elastomers	Viton (opt. EPDM)		
12	Coupling Guard	Stainless Steel	AISI 304	EN 10088-1-X5-CrNi18-10 (1.4301)
13	Shaft Sleeve and Bushing	Tungsten Carbide		
14	Fill/Drain Plugs	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)
15	Tie Rods	Carbon Steel / Zinc Plated	A29 Gr. 1045	EN 10277
16	Wear Ring	PPS		
17	Seal Gland	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)

#### N, P, C VERSIONS

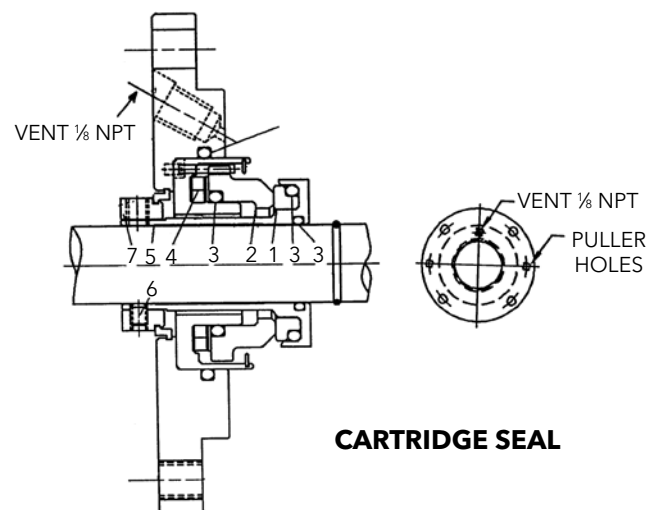
Ref. No.	Name	Material	Reference Standards	
			USA	Europe
1	Pump Body	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNiMo17-12-2 (1.4404)
2	Impeller	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNiMo17-12-2 (1.4404)
3	Diffuser	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNiMo17-12-2 (1.4404)
4	Casing	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNiMo17-12-2 (1.4404)
5	Shaft	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)
6	Adapter	Cast Iron	ASTM Class 35/40B	EN 1561-GJL-250 (JL1040)
7	Base	Aluminum	A384.0-F	EN 1706-AC-AISI11Cu2(Fe) (AC46100)
8	Coupling	Aluminum	A384.0-F	EN 1706-AC-AISI11Cu2(Fe) (AC46100)
9	Seal Plate	Stainless Steel	AISI 316L	EN 10088-1-X2-CrNi17-12-2 (1.4404)
10	Mechanical Seal	Silicon Carbide / Carbon / Viton (opt. EPDM)		
11	Elastomers	Viton (opt. EPDM)		
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14	Fill/Drain Plugs	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)
15	Tie Rods	Carbon Steel / Zinc Plated	A29 Gr. 1045	EN 10277
16	Wear Ring	PPS		
17	Seal Gland	Stainless Steel	AISI 316	EN 10088-1-X2-CrNiMo17-12-2 (1.4401)

## Commercial Water

### e-SV Mechanical Seals



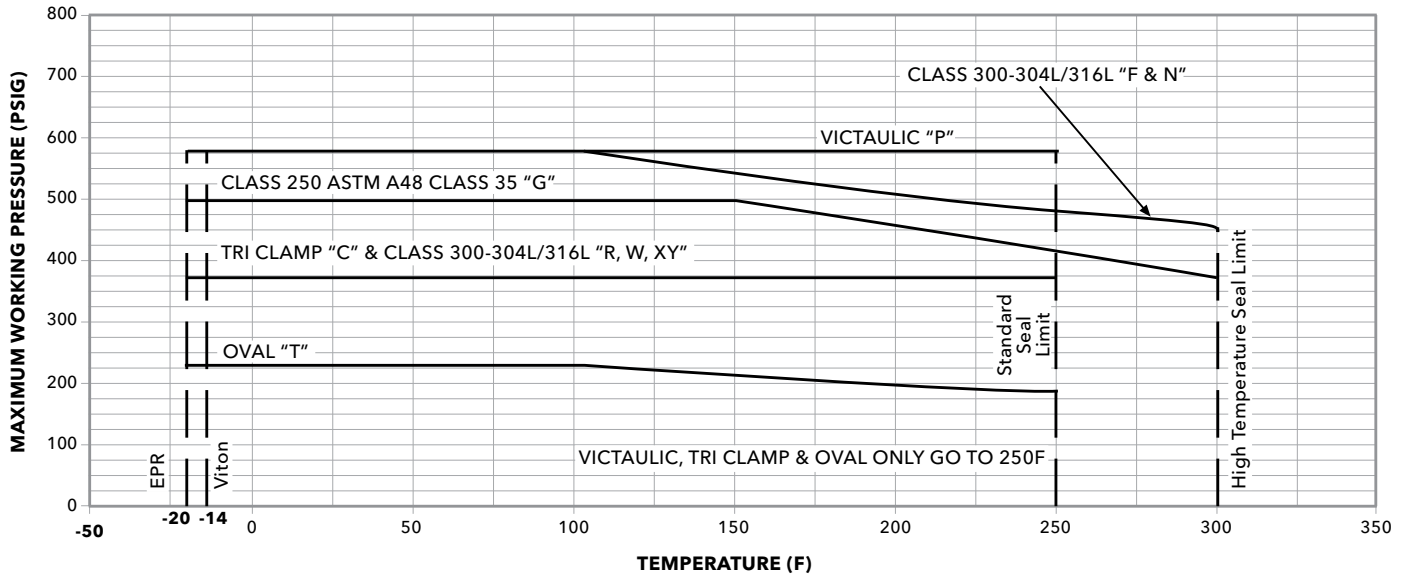
Pump	Code	Rotating Face 1	Stationary Face 2	Elastomers 3	Spring 4	Metal Components 5	Elastomer Temp Limits °F (°C)	Seal Temp Limits °F (°C)	Max. Working Pressure	Application
1SV thru 22SV	0	Carbon	Silicon Carbide Graphite Filled	Viton	316SS	316SS	-14 - 392°F (-10 - 200°C)	-22 - 250°F	580 psi (40 bar)	General Service
	2	Silicon Carbide Graphite Filled		EPR			-30 - 300°F (-34 - 150°C)			Severe Duty
	4									Severe Duty Boiler Feed
	6	Carbon		AFLAS			-14 - 392°F (-10 - 200°C)			up to 340°F (171°C)
	1	FDA Grade Carbon						Boiler Feed		



**CARTRIDGE SEAL**

### Maximum Allowable Working Pressure Charts

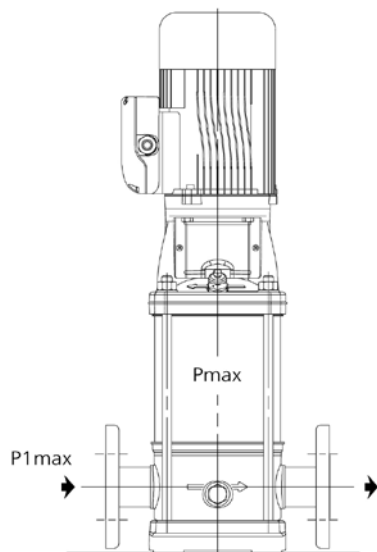
#### 1SV-22SV



## Commercial Water

### Maximum Inlet Pressure

The following table shows the maximum permissible inlet pressure. However, the actual inlet pressure + pressure against a closed valve must always be lower than the maximum permissible operating pressure.



$$p_{1\max} \leq PN - p_{\max}$$

Having the following meaning of the symbols:

$p_{\max}$  = Maximum pressure delivered by the pump

$p_{1\max}$  = Maximum inlet pressure

PN = Maximum operating pressure

### Motor Data - Starts per Hour / Minimum Run Time

HP	Maximum Starts per Hour*	Minimum run time between starts (seconds)
0.5	24	120
0.75	24	120
1	15	75
1.5	13	76
2	12	77
3	9	30
5	8	83
7.5	7	88
10	6	92
15	5	100
20	5	110
25	5	115
30	4	120
40	4	130
50	3	145
60	3	170
75	3	180

#### NOTE(S)

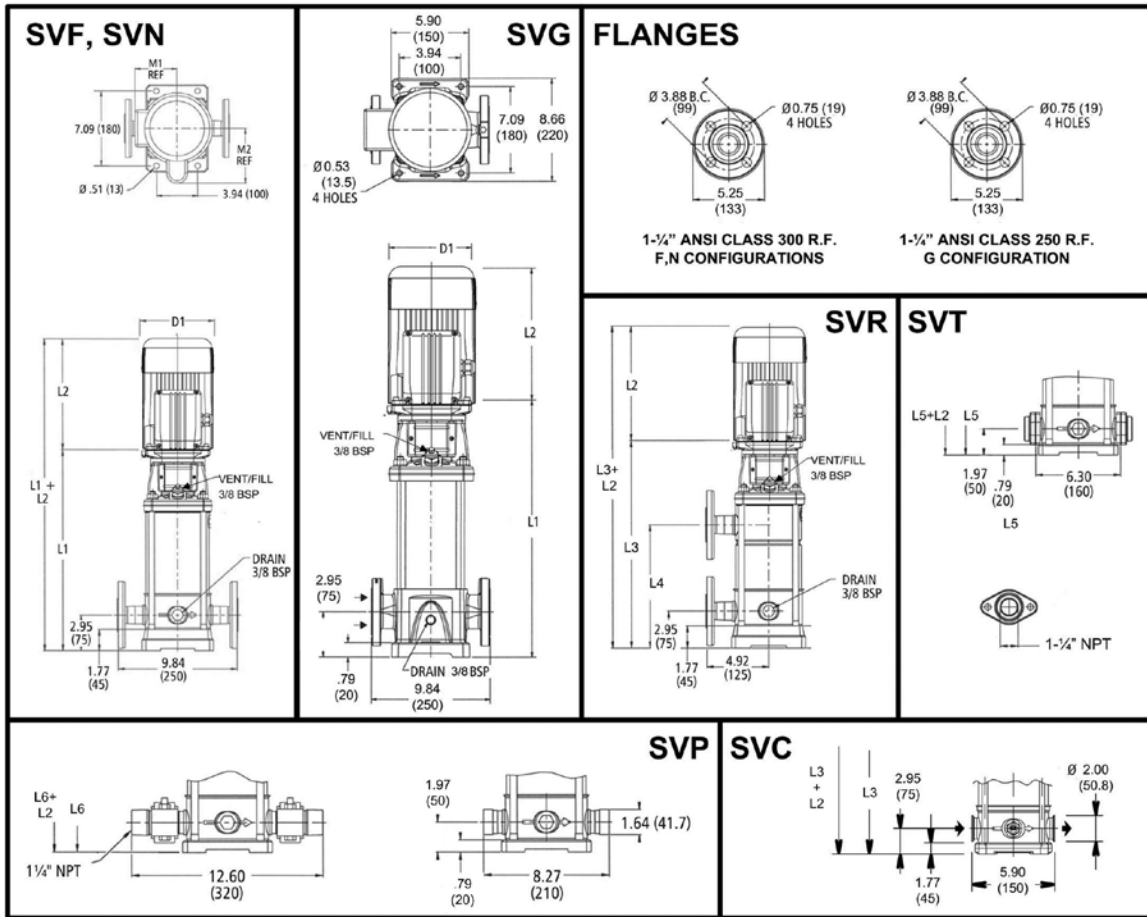
- 1) Recommended motor starts per hour and minimum run time calculated based on NEMA standards MG1-12.44 in accordance to manufacturers allowable tolerance for heat rise and insulation breakdown.
- 2) Applied voltage and frequency in accordance with NEMA MG1-12.44
- 3) Starts based on NEMA three phase design A and design B AC induction motors.
- 4) External load WK2 is equal to or less than the values listed in NEMA MG1-12.54
- 5) Applicable to all NEMA (JM, JP, T and TC frame) motors used for Goulds Water Technology products.
- 6) Applicable to three phase motors only.

## Commercial Water

### Motor Data

#### 3500 RPM, 60Hz

HP	Phase	Enclosure	Voltage	SF	NEMA Frame	Speed / Pole	
						3500 / 2	1750 / 4
2	1	ODP	115/208-230	1.15	56C	V08721	V08A14A1BB2S
		TEFC	115/208-230	1.15	56C	V08722	V08A14A2BB2S
	3	ODP	208-230/460	1.15	56C	V08741	V08A34E1BB2S
			575			V08779	V08A34H1BB2S
		TEFC	208-230/460	1.15	56C	V08742	V08A34E2BB2S
			575			V08A32H2BB2S	V08749
		XP	208-230/460	1.00	56C	V08743	V08A34E3BB1S
			575			V08A32H3BB1S	V08A34H3BB1S
	DPPE	208-230/460	1.15	56C	V08741PE	V08A34E4BB2S	
		575			V08A32H4BB2S	V08A34H4BB2S	
	TEPE	208-230/460	1.15	56C	V08742PE	V08A34E5BB2S	
		575			V08A32H5BB2S	V08A34H5BB2S	
3	1	ODP	115/208-230	1.15	56C	V09721	V09711
		TEFC	115/208-230	1.15	56C	V09722	V09A14B2BD1S
	3	ODP	208-230/460	1.15	56C	V09741	V09A34E1BD2S
			575			V09779	V09739
		TEFC	208-230/460	1.15	56C	V09742	V09732
			575			V09789	V09749
		XP	208-230/460	1.00	56C	V09743	V09A34E3BB1S
			575			V09A32H3BB1S	V09A34H3BB1S
	DPPE	208-230/460	1.15	56C	V09741PE	V09A34E4BB2S	
		575			V09A32H4BB2S	V09A34H4BB2S	
	TEPE	208-230/460	1.15	184TC	V09742PE	V09A34E5HD2S	
		575			V09A32H5BD2S	V09A34H5BD2S	
5	1	ODP	115/208-230	1.15	182TC	V10721A	V10A14C1BD2S
		TEFC	115/208-230	1.15	184TC	V10722A	V10A14C2BD2S
	3	ODP	208-230/460	1.15	182TC	V10741A	V10731
			575			V10779	V10A34H1BD2S
		TEFC	208-230/460	1.15	184TC	V10742A	V10A34H2BD2S
			575			V10789	V10749
		XP	208-230/460	1.00	184TC	V10743A	V10A34E3BD1S
			575			V10A32H3BD1S	V10A34H3BD1S
	DPPE	208-230/460	1.15	182TC	V10741APE	V10A34E4BD2S	
		575			V10A32H4BD2S	V10A34H4BD2S	
	TEPE	208-230/460	1.15	184TC	V10742APE	V10A34E5BD2S	
		575			V10A32H5BB2S	V10A34H5BD2S	
7½	1	ODP	115/208-230	1.15	213TC	V11721	V11A14A1BE2S
		TEFC	115/208-230	1.15	213TC	V11722	V11A14A2BE2S
	3	ODP	208-230/460	1.15	182TC	V11741A	V11731
			575			V11779	V11A34H1BD2S
		TEFC	208-230/460	1.15	184TC	V11742A	V11732
			575			V11789	V11A34H2BE2S
		XP	208-230/460	1.00	184TC   213TC	V11743A	V11A34E3BE1S
			575		213TC	V11A32H3BE1S	V11A34H3BE1S
	DPPE	208-230/460	1.15	184TC	V11741APE	V11A34F4BE2S	
		575			V11A32H4BD2S	V11A34H4BD2S	
	TEPE	208-230/460	1.15	213TC	V11742APE	V11A34F5BE2S	
		575			V11A32H5BE2S	V11749PE	



All dimensions are in inches (mm).

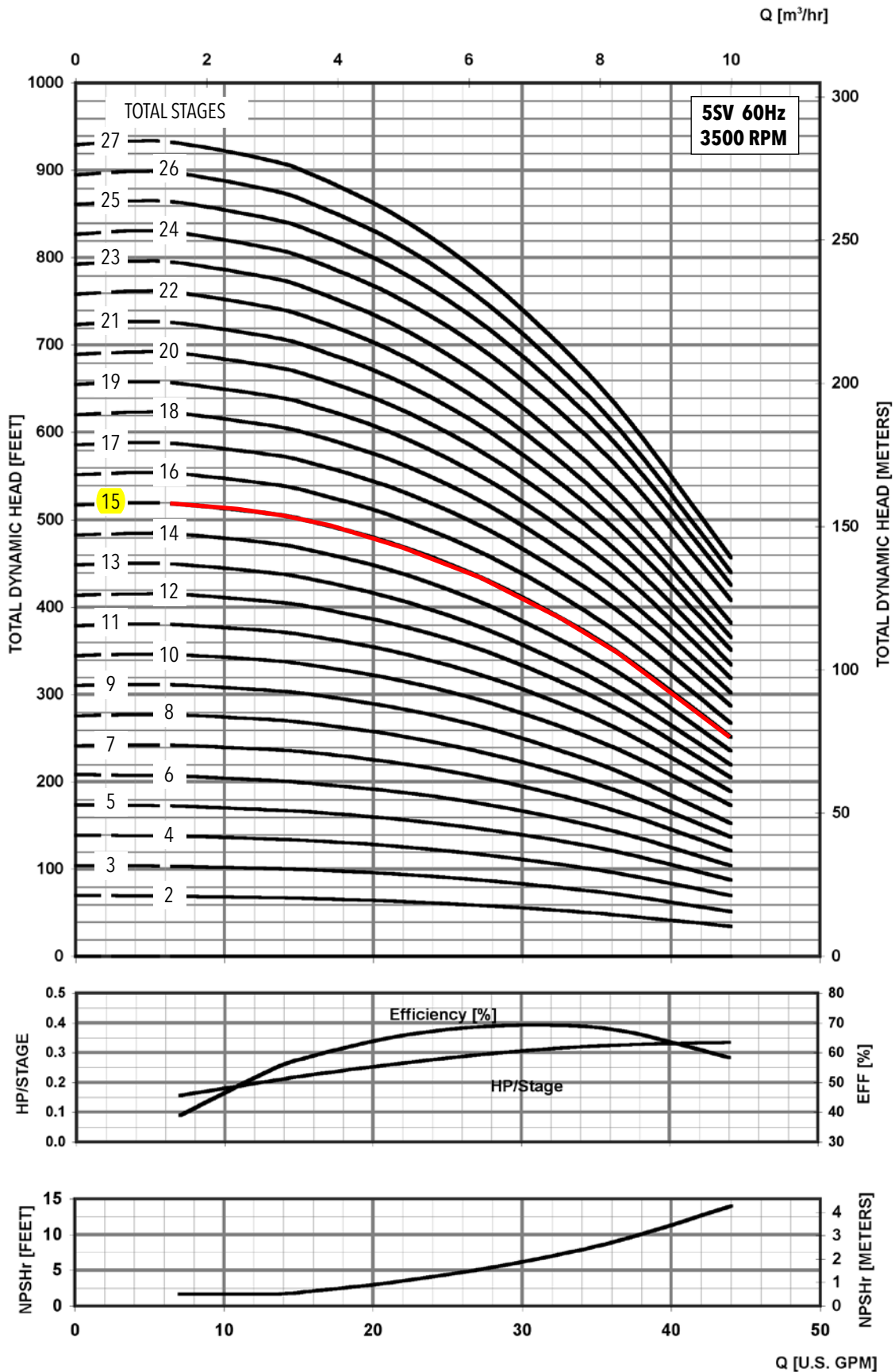
### 5SV SERIES – 60Hz, 3500 RPM ODP/TEFC Enclosures

Pump Type Stages	HP	Motor				Dimensions (in)													Weight (lbs.)											
		NEMA Frame				L1	L2				L3	L4	L5	L6	M (Ref.)	D1 (max.)				D2	Pump Only	Motor				Pump/Motor				
		ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø		ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø						ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø			ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø	ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø	
5SV-02	0.75	56C				13.86	10.79	9.91	9.16	9.29	-	-	12.88	12.88	5.19	6.19	6.19	6.19	6.19	4.13	25	27	29	21	21	52	54	46	46	
5SV-03	1					13.86	10.66	11.19	9.16	9.29	-	-	12.88	12.88	5.74	6.19	7.19	6.19	6.19	6.19	4.13	26	32	40	23	23	58	66	49	49
5SV-04	1.5					14.85	10.67	11.19	10.66	9.91	-	-	13.86	13.86	5.74	6.19	7.19	6.19	6.19	4.72	28	32	40	30	28	60	68	58	56	
5SV-05						15.83	10.67	11.19	10.66	9.91	-	-	14.85	14.85	5.74	6.19	7.19	6.19	4.72	29	32	40	30	28	61	69	59	57		
5SV-06	2					16.81	11.18	12.06	11.16	10.79	-	-	15.83	15.83	5.74	7.19	7.19	6.19	6.19	4.72	30	43	51	32	33	73	81	62	63	
5SV-07						17.80	11.18	12.06	11.16	10.79	17.80	9.53	16.81	16.81	5.74	7.19	7.19	6.19	6.19	4.72	31	43	51	32	33	74	82	63	64	
5SV-08	3					18.78	11.57	13.44	11.18	11.16	18.78	10.51	17.80	17.80	5.75	6.50	7.19	7.16	7.19	5.51	33	49	64	41	44	82	97	74	77	
5SV-09						19.77	11.57	13.44	11.18	11.16	19.77	11.50	18.78	18.78	5.75	6.50	7.19	7.16	7.19	5.51	33	49	64	41	44	82	97	74	77	
5SV-10						20.75	11.57	13.44	11.18	11.16	20.75	12.48	19.77	19.77	5.75	6.50	7.19	7.16	7.19	5.51	34	49	64	41	44	83	98	75	78	
5SV-11						22.44	13.93	15.43	12.55	13.93	22.44	13.46	21.45	21.45	6.87	8.88	8.86	9.02	8.86	5.51	37	81	92	62	69	118	129	99	106	
5SV-12	23.42	13.93	15.43	12.55	13.93	23.42	14.45	22.44	22.44	6.87	8.88	8.86	9.02	8.86	5.51	38	81	92	62	69	119	130	100	107						
5SV-13	24.40	13.93	15.43	12.55	13.93	24.40	15.43	23.42	23.42	6.87	8.88	8.86	9.02	8.86	5.51	40	81	92	62	69	121	132	102	109						
5SV-14	5	184TC	182TC	184TC	25.39	13.93	15.43	12.55	13.93	25.39	16.42	24.40	24.40	6.87	8.88	8.86	9.02	8.86	5.51	40	81	92	62	69	121	132	102	109		
5SV-15					26.37	13.93	15.43	12.55	13.93	26.37	17.40	25.39	25.39	6.87	8.88	8.86	9.02	8.86	5.51	41	81	92	62	69	122	133	103	110		
5SV-16	27.36	13.93	15.43	12.55	13.93	27.36	18.39	-	-	26.37	6.87	8.88	8.86	9.02	8.86	5.51	43	81	92	62	69	124	135	105	112					
5SV-17	28.54	13.93	15.43	12.55	13.93	28.54	19.37	-	-	27.55	6.87	8.88	8.86	9.02	8.86	5.51	45	81	92	62	69	126	137	107	114					
5SV-18	7.5	213TC	184TC	29.33	13.88	15.53	13.93	15.43	29.33	20.35	-	28.34	8.05	8.89	10.62	8.88	8.86	5.51	46	100	120	75	85	146	166	121	131			
5SV-19				30.51	13.88	15.53	13.93	15.43	30.51	21.34	-	29.52	8.05	8.89	10.62	8.88	8.86	5.51	47	100	120	75	85	147	167	122	132			
5SV-20				31.69	13.88	15.53	13.93	15.43	31.69	22.32	-	30.70	8.05	8.89	10.62	8.88	8.86	5.51	48	100	120	75	85	148	168	123	133			
5SV-21				32.28	13.88	15.53	13.93	15.43	32.28	23.31	-	31.29	8.05	8.89	10.62	8.88	8.86	5.51	49	100	120	75	85	149	169	124	134			
5SV-22				33.34	13.88	15.53	13.93	15.43	33.34	24.29	-	32.36	8.05	8.89	10.62	8.88	8.86	5.51	50	100	120	75	85	150	170	125	135			
5SV-23				34.25	13.88	15.53	13.93	15.43	34.25	25.28	-	33.26	8.05	8.89	10.62	8.88	8.86	5.51	51	100	120	75	85	151	171	126	136			
5SV-24				35.31	13.88	15.53	13.93	15.43	-	-	-	34.33	8.05	8.89	10.62	8.88	8.86	5.51	53	100	120	75	85	153	173	128	138			
5SV-25				36.21	13.88	15.53	13.93	15.43	-	-	-	35.23	8.05	8.89	10.62	8.88	8.86	5.51	53	100	120	75	85	153	173	128	138			
5SV-26				37.28	13.88	15.53	13.93	15.43	-	-	-	36.29	8.05	8.89	10.62	8.88	8.86	5.51	54	100	120	75	85	154	174	129	139			
5SV-27				10	215TC	213TC	215TC	38.84	16.63	16.68	15.55	15.51	-	-	-	37.86	8.77	10.62	10.18	10.18	10.28	5.51	62	132	145	107	122	194	207	169

### Performance Curve

### 5SV 3500 RPM

60 Hz



## Commercial Water

### TECHNICAL DATA - PUMP HYDRAULICS / MOTOR SIZING

#### 5SV 3500 RPM

No. of Impellers	Maximum HP draw	Motor Selection using SF		Motor Selection 1.0 SF		Shutoff TDH (Feet)	Shutoff TDH (psi)	Shutoff TDH (Bar)	Casing/Sleeve Pressure Rating (standard assy.)	Pump Flange Rating		
		Rated HP	NEMA Motor Frame		Rated HP						NEMA Motor Frame	
			ODP	TEFC							ODP	TEFC
27	8.80	10.00	215TC	215TC	10.00	215TC	215TC	975	422	29.1	40 Bar (580 psi)	
26	8.48	7.50	213TC	213TC		215TC	215TC	940	407	28.0		
25	8.15		213TC	213TC		215TC	215TC	900	390	26.9		
24	7.82		213TC	213TC		215TC	215TC	865	375	25.8		
23	7.50		213TC	213TC	7.50	213TC	213TC	825	357	24.6		
22	7.17	213TC	213TC	213TC		213TC	785	340	23.4			
21	6.85	213TC	213TC	213TC		213TC	745	323	22.2			
20	6.52	213TC	213TC	213TC		213TC	715	310	21.3			
19	6.19	5.00	213TC	213TC	5.00	213TC	213TC	685	297	20.4		25 Bar (362 psi)
18	5.87		213TC	213TC		213TC	213TC	650	282	19.4		
17	5.54		184TC	184TC		213TC	213TC	615	266	18.4		
16	5.22		184TC	184TC		213TC	213TC	575	249	17.2		
15	4.89	184TC	184TC	5.00	184TC	184TC	540	234	16.1	Class 250 / 300		
14	4.56	184TC	184TC		184TC	184TC	505	219	15.1			
13	4.24	184TC	184TC		184TC	184TC	470	204	14.0			
12	3.91	184TC	184TC		184TC	184TC	430	186	12.8			
11	3.59	184TC	184TC	3.00	184TC	184TC	395	171	11.8			
10	3.26	56C	56C		56C	56C	360	156	10.7			
9	2.93	56C	56C		56C	56C	320	139	9.5			
8	2.61	56C	56C		56C	56C	285	123	8.5			
7	2.28	2.00	56C	56C	2.00	56C	56C	250	108		7.5	
6	1.96		56C	56C		56C	56C	220	95		6.6	
5	1.63	1.50	56C	56C	1.50	56C	56C	180	78		5.4	
4	1.30		56C	56C		56C	56C	145	63		4.3	
3	0.98	1.00	56C	56C	1.00	56C	56C	110	48	3.3		
2	0.65	0.75	56C	56C	0.75	56C	56C	70	30	2.1		

### TECHNICAL DATA - WATER PROPERTY CHART

Temp °F	Temp °C	Specific Volume (Cubic ft/lb)	Specific Gravity			Weight (lb/cubic ft)	Vapor Pressure (psi Abs)
			@ 39.2°F	@ 60°F	@ 68°F		
32	0.0	0.01602	1.000	1.001	1.002	62.42	0.088
35	1.7	0.01602	1.000	1.001	1.002	62.42	0.100
40	4.4	0.01602	1.000	1.001	1.002	62.42	0.122
50	10.0	0.01603	0.999	1.001	1.002	62.38	0.178
60	15.6	0.01604	0.999	1.000	1.001	62.34	0.256
70	21.1	0.01606	0.998	0.999	1.000	62.27	0.363
80	26.7	0.01608	0.996	0.998	0.999	62.19	0.507
90	32.2	0.0161	0.995	0.996	0.997	62.11	0.698
100	37.8	0.01613	0.993	0.994	0.995	62.00	0.949
120	48.9	0.0162	0.989	0.990	0.991	61.73	1.692
140	60.0	0.01629	0.983	0.985	0.986	61.39	2.889
160	71.1	0.01639	0.977	0.979	0.979	61.01	4.741
180	82.2	0.01651	0.970	0.972	0.973	60.57	7.510
200	93.3	0.01663	0.963	0.964	0.966	60.13	11.526
212	100.0	0.01672	0.958	0.959	0.960	59.81	14.696
220	104.4	0.01677	0.955	0.956	0.957	59.63	17.186
240	115.6	0.01692	0.947	0.948	0.949	59.10	24.97
260	126.7	0.01709	0.938	0.939	0.940	58.51	35.43
280	137.8	0.01726	0.928	0.929	0.930	58.00	49.20
300	148.9	0.01745	0.918	0.919	0.920	57.31	67.01
320	160.0	0.01756	0.908	0.909	0.910	56.66	89.66
340	171.1	0.01787	0.896	0.898	0.899	55.96	118.01
360	182.2	0.01811	0.885	0.886	0.887	55.22	153.04
380	193.3	0.01836	0.873	0.874	0.875	54.47	195.77
400	204.4	0.01864	0.859	0.860	0.862	53.65	247.31
420	215.6	0.01894	0.846	0.847	0.848	52.80	308.83
440	226.7	0.01926	0.832	0.833	0.834	51.92	381.59
460	237.8	0.0196	0.817	0.818	0.819	51.02	466.9
480	248.9	0.02	0.801	0.802	0.803	50.00	566.1
500	260.0	0.0204	0.785	0.786	0.787	49.02	680.8
520	271.1	0.0209	0.765	0.766	0.767	47.85	812.4
540	282.2	0.0215	0.746	0.747	0.748	46.51	962.5
560	293.3	0.0221	0.726	0.727	0.728	45.30	1133.1
580	304.4	0.0228	0.703	0.704	0.704	43.90	1325.8
600	315.6	0.0236	0.678	0.679	0.680	42.30	1542.9
620	326.7	0.0247	0.649	0.650	0.650	40.50	1786.6
640	337.8	0.026	0.617	0.618	0.618	38.50	2059.7
660	348.9	0.0278	0.577	0.577	0.578	36.00	2365.4
680	360.0	0.0305	0.525	0.526	0.527	32.80	2708.1
700	371.1	0.0369	0.434	0.435	0.435	27.10	3093.7

## Commercial Water

### TECHNICAL DATA - NPSH

#### NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapor-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapor pressure of the liquid.

The vapor-filled cavities flow with the current and when they reach a higher pressure are the vapor contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in feet) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapor pressure (expressed in feet) that the liquid has at the pump inlet.

To find the static height ( $h_z$ ) at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (\text{NPSHr} + 2 \text{ ft}) + h_f + h_{pv}$$

where:

**$h_p$**  is the absolute pressure applied to the free liquid surface in the suction tank, expressed in feet of liquid;  $h_p$  is the quotient between the barometric pressure and the specific weight of the liquid.

**$h_z$**  is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in feet;  $h_z$  is negative when the liquid level is lower than the pump axis.

**$h_f$**  is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.

**$h_{pv}$**  is the vapor pressure of the liquid at the operating temperature, expressed in feet of the liquid.  $h_{pv}$  is the quotient between the  $P_v$  vapor pressure and the liquid's specific weight.

**0.5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (40°F) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

<b>Water Temperature (°F)</b>	68	104	140	176	194	230	248
<b>Suction Loss (ft)</b>	-0.7	2.3	6.6	16.4	24.3	50.5	70.5

<b>Elevation Above Sea Level (ft)</b>	1600	3300	4900	6500	8200	9800
<b>Suction Loss (ft)</b>	1.8	3.6	5.4	7.2	9.0	10.8

To reduce it to a minimum, especially in cases of high suction head (over 13 - 16 feet) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

# TECHNICAL DATA - COMPATABILITY CHART FOR MATERIALS IN CONTACT WITH MOST COMMONLY USED LIQUIDS

Liquid	Concentration (%)	Temperature Min/Max °F	Specific Weight (lb/in <sup>3</sup> )	SV 1, 3, 5, 10, 15, 22		SV 33, 46, 66, 92		Recommended Seal	Elastomers
				304	316	CI/316	316		
Water	100	23/248		•	•	•	•	Q <sub>1</sub> BEGG	E
Deionized, demineralized or distilled water	100	-13/230		•	•	•	•	Q <sub>1</sub> BEGG	E
Water and oil emulsion	any	23/194		•	•	•	•	Q <sub>1</sub> BVGG	V
Acetic acid (•)	80	14/158	.038	•	•	•	•	Q <sub>1</sub> BEGG	E
Citric acid	5	14/158	.056	•	•	•	•	Q <sub>1</sub> BEGG	E
Hydrochloric acid	2	23/77	.043		•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Phosphoric acid	10	23/86	.048		•		•	Q <sub>1</sub> BEGG	E
Nitric acid (•)	50	23/86	.053	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Sulphuric acid (•)	2	14/77	.066		•		•	Q <sub>1</sub> BVGG	V
Tannic acid	20	32/122			•		•	Q <sub>1</sub> BEGG	E
Tartaric acid	50	14/77	.063	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Uric acid	80	14/176	.068	•	•	•	•	Q <sub>1</sub> BEGG	E
Benzoic acid	70	32/158	.047	•	•	•	•	Q <sub>1</sub> BVGG	V
Boric acid	Saturated	14/194	.052	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Formic acid (•)	5	5/77	.044	•	•	•	•	Q <sub>1</sub> BEGG	E
Ethyl alcohol (•)	100	23/104	.029	•	•	•	•	Q <sub>1</sub> BEGG	E
Methyl alcohol (•)	100	23/104	.029	•	•	•	•	Q <sub>1</sub> BEGG	E
Propyl alcohol (•)	100	23/176	.029	•	•	•	•	Q <sub>1</sub> BEGG	E
Butyl alcohol	100	23/176	.030	•	•	•	•	Q <sub>1</sub> BVGG	V
Denatured alcohol (•)	100	23/158	.030	•	•	•	•	Q <sub>1</sub> BEGG	E
Ammonia in water (•)	25	-4/122	.038	•	•	•	•	Q <sub>1</sub> BEGG	E
Chloroform		14/86	.053	•	•	•	•	Q <sub>1</sub> BVGG	V
Caustic soda	25	32/158	.077	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Water, detergents, mineral oils mixture		23/176		•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Cleaning products		23/212		•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Diesel oil (•)	100	32/176	.033	•	•	•	•	Q <sub>1</sub> BVGG	V
Kerosene (•)	100	32/176		•	•	•	•	Q <sub>1</sub> BVGG	V
Fuel oil (•)		32/194	.027	•	•	•	•	Q <sub>1</sub> BVGG	V
Glycerine	100	68/194	.046	•	•	•	•	Q <sub>1</sub> BEGG	E
Sodium Hypochlorite	1	14/77			•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Phosphates/polyphosphates		23/194			•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Sodium nitrate	Saturated	14/176	.081	•	•	•	•	Q <sub>1</sub> BEGG	E
Cutting fluid	100	23/230	.033	•	•	•	•	Q <sub>1</sub> BVGG	V
Peanut oil (•)	100	23/230	.034	•	•	•	•	Q <sub>1</sub> BEGG	E
Colza oil (•)	100	23/230	.034	•	•	•	•	Q <sub>1</sub> BEGG	E
Linseed oil (•)	100	23/230	.034	•	•	•	•	Q <sub>1</sub> BEGG	E
Coconut oil (•)	100	-4/194	.033	•	•	•	•	Q <sub>1</sub> BEGG	E
Soybean oil (•)	100	32/194		•	•	•	•	Q <sub>1</sub> BEGG	E
Diathermic oil	100	23/230	.033	•	•	•	•	Q <sub>1</sub> BVGG	V
Hydraulic oil	100	23/230		•	•	•	•	Q <sub>1</sub> BVGG	V
Mineral oil	100	23/230	.034	•	•	•	•	Q <sub>1</sub> BVGG	V
Sodium sulfate	15	14/104	.094	•	•	•	•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Aluminum sulfate	30	23/122	.097		•		•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Ammonium sulfate	10	14/140	.064		•		•	Q <sub>1</sub> Q <sub>1</sub> EGG	E
Iron sulfate	10	23/86	.076		•		•	Q <sub>1</sub> BEGG	E
Copper sulfate	20	32/86	.082		•		•	Q <sub>1</sub> Q <sub>1</sub> VGG	V
Trichloroethylene		14/104	.053	•	•	•	•	Q <sub>1</sub> BVGG	V
Perchloroethylene		14/86	.057	•	•	•	•	Q <sub>1</sub> BVGG	V

## Legend

Q<sub>1</sub> = Silicon carbide B = Impregnated carbon E = EPDM V = Viton G = AISI 316 (spring, metal components)

**(•) A special version may be necessary for this fluid. For additional information, please contact our sales network.**



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