

Tri-Clover SP328 Centrifugal Pump

Mfg: Tri Clover

Model: SP328ME-00B-S

Stock No. OIP025.

Serial No. E3152

Tri-Clover SP328 Centrifugal Pump. Model SP328ME-00B-S. S/N E3151. Capacity: up to 380 gpm. Impeller: 7-1/4 in. dia. Seal option: water flush double mechanical seals. Ajax Motor, 7.5 hp, 1,800 rpm, 220/440 V, 20/10 amps, 60 Hz, 3-phase. SP-series centrifugal pumps are engineered to deliver dependable performance in virtually any low-viscosity application. Industries served: pharmaceutical, biotechnology, fine chemical, food, beverage and dairy processing. In addition, the SP-series is able to accept different types of aftermarket seals. Inlets: (1) 3 in. dia. S-line fitting. Outlets (1) 2 in. dia. S-line fitting. Overall dimensions: 44 in. L x 19 in. W x 16 in. H.





The Cleanest Design

C/SP Series Centrifugal Pump

PD 66367 US1 2001-10

Application

The Tri-Clover® C series and SP series of centrifugal pumps have been designed for a wide range of applications where stainless steel product wetted components are essential to maintain hygienic processing standards. The C and SP pumps (finish option version: Sanitary) are designed for CIP applications and are accepted as meeting the 3A standards by the appropriate committees of the International Association of Milk, Food and Environmental Sanitarians, the US. Public Health Service and the Dairy Industry Committee. For applications involving a product containing a large volume of entrained vapor or where the supply pump could run dry, a circular style of casing is recommended. (Not available for size 4410).

Both the C and SP pumps are ideally suited to applications in the pharmaceutical, biotechnology, fine chemical, food, beverage and dairy processing industries, where full cleanability and corrosion resistance are paramount.

Standard design

The C Series pump consists of a standard NEMA C-flange motor, a cast iron adapter and stainless steel pump shaft, casing, rotating impeller and backplate. A variety of shaft seals (with and without flush) are available to meet specific application needs. The standard design is based on a volute style pump casing. The C Series centrifugal pump is direct coupled to a C face motor.

The SP Series pump consists of a cast iron bearing frame with a stainless steel pump shaft. The casing, impeller and backplate are the same as the C Series pump. The pump then mounts to a fabricated base with a drive motor. Likewise a variety of shaft seals (with and without flush) are available to meet specific application needs.

Materials

- Fabricated Base (SP only)-
 - carbon steel standard
 - stainless steel optional
- Bearing Frame (SP only)-
 - cast iron

(Adapter, Fabricated Base and Bearing Frame also protected by FDA-compliant epoxy paint system)

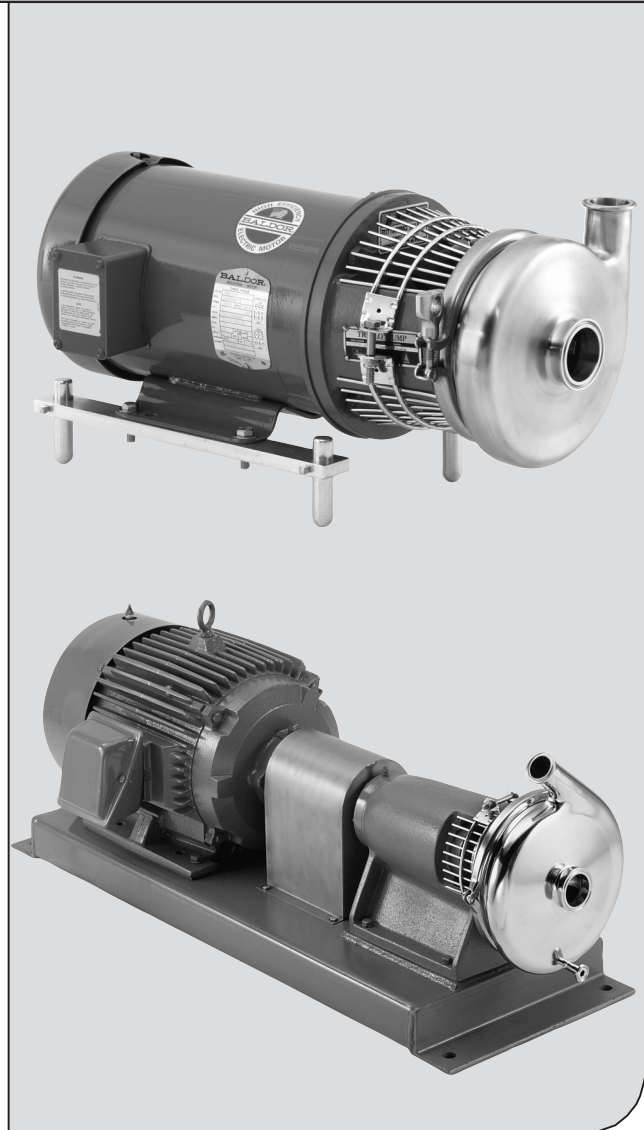


Fig. 1. C Series (top) and SP Series (bottom) Centrifugal Pump

Pump Casing, backplate, shaft and impeller: stainless steel, 316 L

Materials (Continued)

Connections:

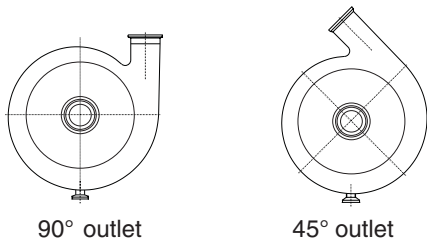
- Tri-Clamp standard
- Bevel seat option
- NPT option
- Flanged option
- Weld option

Note! Leg kits are available as a standard option.

Casing Drain Option

- Standard: 90° outlet configuration standard
- 45° outlet configuration option

Drain connection comprising a ferrule welded to the low point of the casing connected to an elbow with Tri-Clamp® connection capable of 360° rotation. Available in 1/2", 3/4" and 1" size.



Finish

- Industrial: glass bead ID & OD
- Standard Sanitary: 32 Ra ID & OD
- Special: up to 10 Ra

Elastomers

- Buna N: standard
- EPDM: optional
- Fluoroelastomer: optional
- PTFE: contact pump applications

Technical Data

Motor

Standard supply for C series is NEMA C-face, totally enclosed, fan cooled, locked bearing, close-coupled motors. Standard supply for SP series is NEMA, totally enclosed, fan cooled. Options are available for drip-proof, explosion proof, energy efficient and chemical enclosures.

Voltage and Frequency

- 3 phase —
- 50 Hz, 220/380 VAC 1500/3000 RPM
- 60 Hz, 208-230/460 VAC 1750/3500 RPM
- 60 Hz, 575 VAC 1750/3500 RPM

Shaft Seal

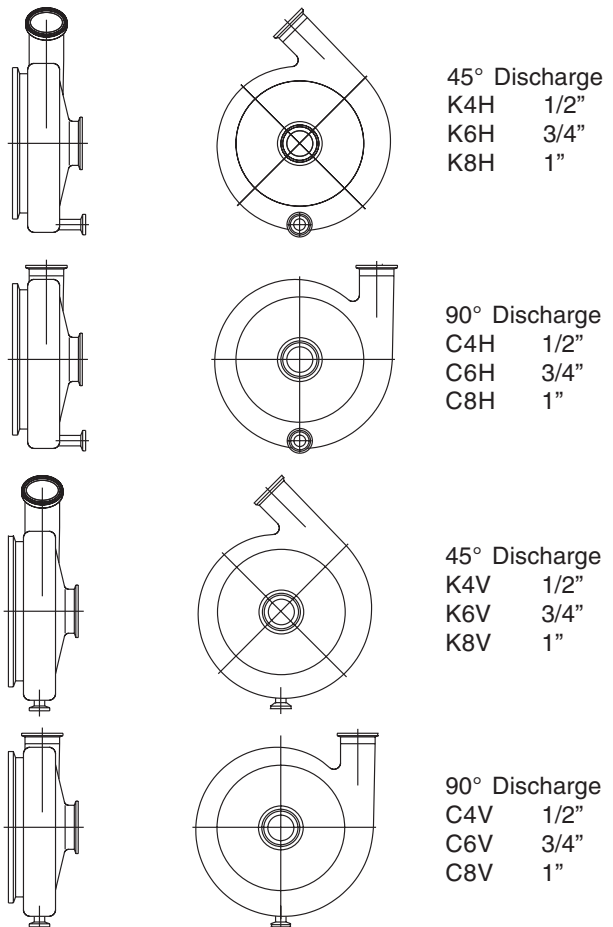
Type D - External Balanced Seal — Well-suited for multipurpose use, this seal is designed to give long service life. Seal consists of a single mechanical seal, carbon rotary vs. stainless steel backplate. Typical applications include: dairy products, beverages and water-like products, etc. Also applicable for CIP cleaning solutions and detergents.

Type DG - Clamped-In Seal/Seat — This long lasting seal assembly utilizes standard Type D rotating seal components, plus choice of silicon carbide, tungsten carbide or ceramic stationary clamped in seal seat. Designed for longer seal life in applications like pure water or other applications with abrasive or non-lubricating products. The stationary seat is reversible, for quick change-over if one side is damaged.

Type E - Water Cooled Balanced Double Seal — Seal chamber can be pressurized to contain coolants or sealants which can be piped directly to drain. Seal consists of a double mechanical seal, carbon rotary vs. stainless steel backplate and follower. Ideal for slurries, heavy duty vacuum applications (to 28" Hg), tacky products at temperature up to and exceeding 212 F.

Type F - External Balanced Seal with Water Cascade — External balanced seal with water cascading attachment. Seal consists of a single mechanical seal with water flush, carbon rotary vs. stainless steel backplate. Recommended for pumping applications to 14" Hg (Seal is identical to type D, but equipped with water cascade).

Type A - Packing Gland Seal (non sanitary, SP Series only) — Recommended for chemical processing applications or nonabrasive and non-congealing products. Also available with water flush (Type B). Seal consists of multiple layers of Teflon packing contained in a stainless steel stuffing box. A wide range of commercial packings are available.



- 45° Discharge
- K4H 1/2"
- K6H 3/4"
- K8H 1"

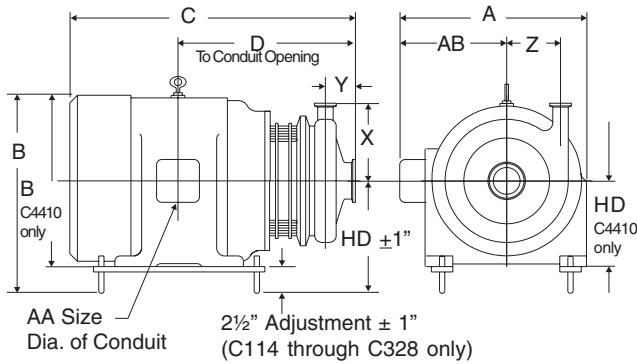
- 90° Discharge
- C4H 1/2"
- C6H 3/4"
- C8H 1"

- 45° Discharge
- K4V 1/2"
- K6V 3/4"
- K8V 1"

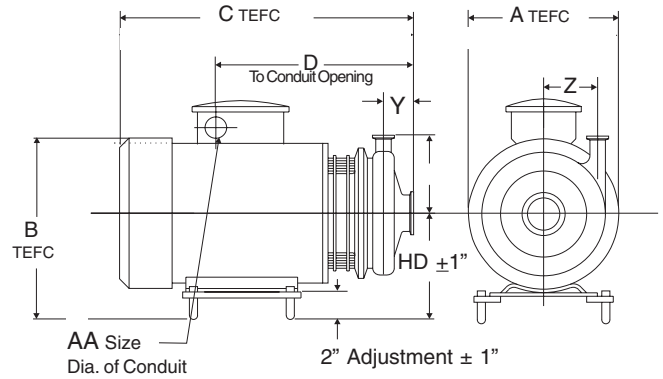
- 90° Discharge
- C4V 1/2"
- C6V 3/4"
- C8V 1"

C = 90° Discharge H=Horizontal V=Vertical

C Series Close-Coupled Centrifugal Pump
Dimensions in inches



180 to 360 Frame Motors



56 to 140 Frame Motors

Pump and Motor Dimensions with “Easy-Clean” Totally Enclosed Motors

Pump Model	Frame	A	B	C*	C**	D*	D**	HD	AA	AB
C114	FF56C	7.28	9.12	21.23	21.48	17.16	17.41	5.48	0.50	-
	FF140TC	7.28	9.12	21.23	21.48	17.16	17.41	5.48		
	182/184TC	12.50	11.19	21.81	22.06	14.44	14.69	7.00	0.75	7.19
C216	FF56C	7.28	9.12	21.39	21.64	17.31	17.56	5.48	0.50	-
	FF140TC	7.28	9.12	21.38	21.63	17.31	17.56	5.48		
	182/184TC	12.50	11.69	22.03	22.28	14.66	14.91	7.00	0.75	7.19
	213/215TC	14.13	13.69	26.28	26.53	16.91	17.16	7.75	1.00	9.06
	254/256TC	17.38	15.38	31.34	31.59	20.03	20.28	8.75	1.25	10.00
C218	FF140TC	7.28	9.12	21.66	21.91	17.59	17.84	5.48	0.50	-
	182/184TC	12.5	11.69	22.31	22.56	14.94	15.19	7.00	0.75	7.19
	213/215TC	14.13	13.19	25.81	26.06	16.44	16.69	7.75	1.00	9.06
	254/256TC	17.38	15.38	31.13	31.38	19.81	20.06	8.75	1.25	10.00
	284/286TC	20.19	16.94	33.47	33.72	20.91	21.16	9.50	1.50	12.06
	324TC	23.69	19.00	36.41	36.66	22.47	22.79	10.50		
C328	FF140TC	7.28	9.12	22.91	23.41	18.84	19.34	5.48	0.50	-
	182/184TC	12.50	11.69	22.94	23.44	15.56	16.06	7.00	0.75	7.19
	213/215TC	14.13	13.79	26.44	26.94	17.06	17.56	7.75	1.00	9.06
	254/256TC	17.38	15.38	31.75	32.25	20.44	20.94	8.75	1.25	10.00
	284/286TC	20.19	16.94	34.13	34.63	21.56	22.06	9.50	1.50	12.06
	324/326TC	23.69	19.00	37.06	37.56	23.13	23.63	10.50		
C4410	213/215TC	14.13	10.69	29.63	30.13	20.25	20.75	5.25	1.00	8.69
	254/256TC	17.38	12.88	34.06	34.56	22.75	23.25	6.25	1.25	10.06
	284/286TC	20.19	14.44	36.44	36.94	23.88	24.38	7.00	1.50	12.06
	324/326TC	23.69	16.50	40.63	41.13	26.69	27.19	8.00	2.00	13.06

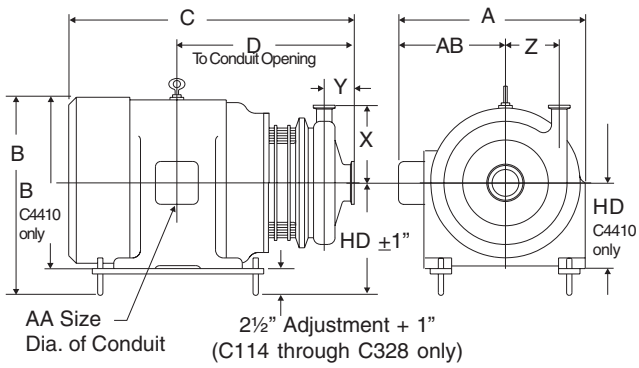
* With Tri-Clamp® connections.

** With threaded bevel seat connections.

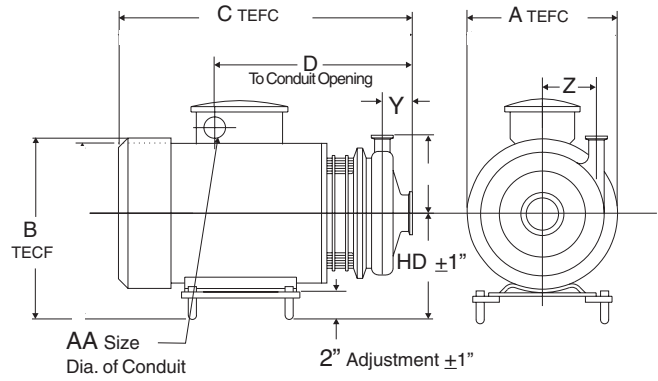
Dimensions are approximate and for guidance only. On application where exact dimensions are required, contact Alfa Laval.

Note! 1- Dimensions for single phase #140 frame motors 1 M/cx longer.

C Series Close-Coupled Centrifugal Pump
Dimensions in inches



180 to 360 Frame Motors



56 to 140 Frame Motors

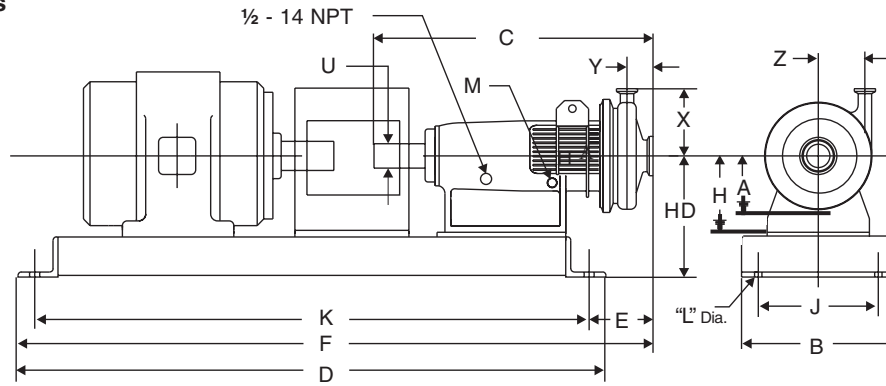
Pump Dimensions with "Easy-Clean" Totally Enclosed Motors

Pump Model	Suction (inches)	Discharge (inches)	X*	X**	Y*	Y**	Z
C114	1.50	1.50	3.63	3.88	1.59	1.84	2.63
C216	2.00	1.50	4.50	4.75	1.91	2.16	3.69
C218	2.00	1.50	5.50	5.75	1.72	1.97	4.75
C328	3.00	2.00	5.50	5.75	2.22	2.72	4.75
C4410	4.00	4.00	7.00	7.50	3.28	3.78	6.00

* With Tri-Clamp connections.

** With threaded bevel seat connections.

SP Series Base-Mounted Centrifugal Pumps
Dimensions in inches



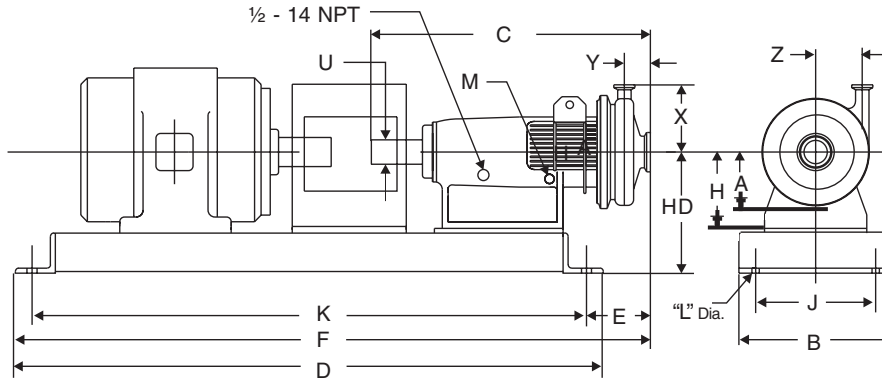
Base Dimensions

Pump Model	Frame	*E	**E	*F	**F	HD	J	K	L	B	D
SP114	56	3.81	4.06	29.06	29.31	6.05	5.00	24.50	0.63	7.75	26
	143T			29.06	29.31						
	145T	3.56	3.81	36.31	36.56	7.55	8.00	31.50	0.75	10.75	34
	182T			36.31	36.56						
SP216	56	4.44	4.69	29.69	29.94	7.05	5.00	24.50	0.63	7.75	26
	143T			29.69	29.94						
	145T	3.94	4.19	36.69	36.94	8.05	8.00	31.50	0.75	10.75	34
	182T			36.69	36.94						
	213T	4.19	4.44	42.94	43.19	8.30	10.00	37.50	0.75	12.75	40
	215T			42.94	43.19						
254T	4.19	4.44	41.94	42.19	9.30	12.50	36.50	0.75	15.25	39	
SP218	143T	3.59	3.84	33.34	33.59	9.05	8.00	28.50	0.75	10.75	31
	145T			33.34	33.59						
	182T	3.59	3.84	35.84	36.09	9.05	8.00	31.00	0.75	10.75	33½
	184T			35.84	36.09						
	213T	3.59	3.84	42.34	42.59	9.05	10.00	37.50	0.75	12.75	40
	215T			42.34	42.59						
254T	3.97	4.22	46.72	46.97	9.30	12.50	41.50	0.75	15.25	44	
256T	3.97	4.22	46.72	46.97	9.30	12.50	41.50	0.75	15.25	44	
SP328	284TS	3.97	4.22	52.72	52.97	11.05	14.00	47.50	0.75	16.75	50
	286TS			52.72	52.97						
	145T	4.22	4.72	33.97	34.47	9.05	8.00	28.50	0.75	10.75	31
	182T			33.97	34.47						
	184T	4.22	4.72	36.47	36.97	9.05	8.00	31.00	0.75	10.75	33½
	213T			36.47	36.97						
	215T	4.22	4.72	42.97	43.47	9.05	10.00	37.50	0.75	12.75	40
254T	4.59	5.09	47.34	47.84	9.30	12.50	41.50	0.75	15.25	44	
256T			47.34	47.84							
284TS	4.59	5.09	53.34	53.84	11.05	14.00	47.50	0.75	16.75	50	
286TS			53.34	53.84							
324TS	4.41	4.91	52.34	52.84	12.05	15.00	46.88	0.88	17.75	49	
326TS	4.41	4.91	52.34	52.84	12.05	15.00	46.88	0.88	17.75	49	
SP4410	184T	5.53	6.03	37.78	38.28	9.05	8.00	31.00	0.75	10.75	33½
	213T	5.53	6.03	44.28	44.78	9.05	10.00	37.50	0.75	12.75	40
	215T			44.28	44.78						
	254T	5.91	6.41	48.66	49.16	9.30	12.50	41.50	0.75	15.25	44
	256T			48.66	49.16						
	284T	5.91	6.41	54.66	55.16	11.05	14.00	47.50	0.75	16.75	50
	284TS										
286T											
286TS											
324TS	5.72	6.22	53.66	54.16	12.05	15.00	46.88	0.88	17.75	49	

* With Tri-Clamp® connections. ** With threaded bevel seat connections.

Dimensions are approximate and for guidance only. On application where exact dimensions are required, contact Alfa Laval.

SP Series Base-Mounted Centrifugal Pumps
Dimensions in inches



Pump Dimensions

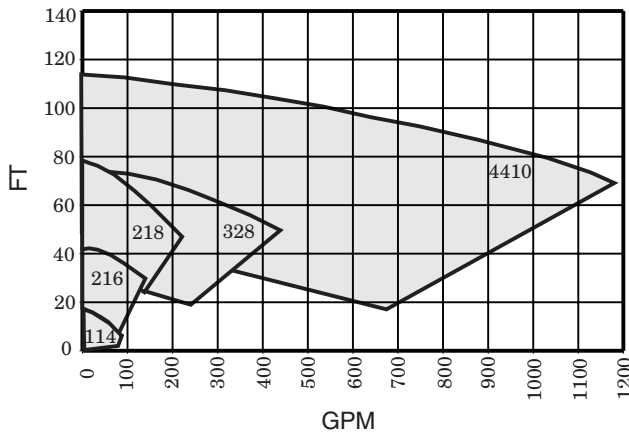
Pump Model	Suction (inches)	Discharge (inches)	X*	XX*	Y*	Y**	Z	C*	C**	H	A	NPT M	Dia. U
SP114	1.50	1.50	3.63	3.88	1.59	1.85	2.63	14.34	14.59	4.05	3.19	¼ - 18	0.63
SP216	2.00	1.50	4.50	4.75	1.91	2.16	3.69	17.03	17.59	5.05	4.22	⅜ - 18	1.00
SP218	2.00	1.50	5.50	5.75	1.72	1.97	4.75	19.19	19.44	6.05	5.50	½ - 14	1.38
SP328	3.00	2.00	5.50	5.75	2.22	2.72	19.19	20.31	6.05	6.05	5.50	½ - 14	1.38
SP4410	4.00	4.00	7.00	7.50	4.28	3.78	6.00	21.13	21.63	6.05	7.22	½ - 14	1.38

* With Tri-Clamp connections.

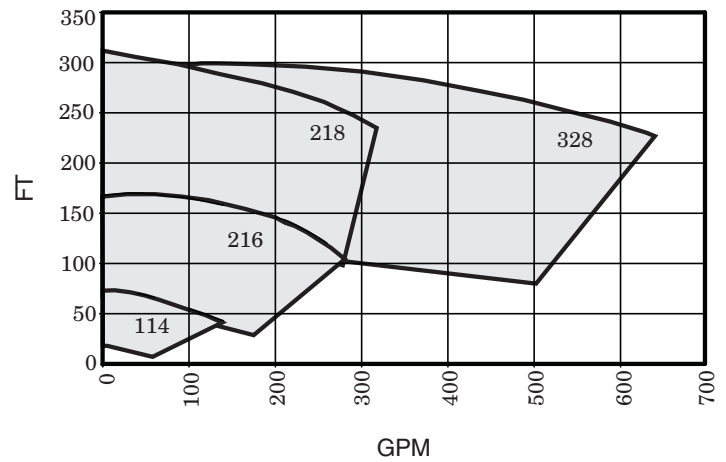
** With threaded bevel seat connections.

Performance Envelopes

C/SP Series Pump 1750RPM



C/SP Series Pump 3500RPM



Note! Alfa Laval does not recommend using the C/SP 4410 pump with 3500RPM motors

Performance envelopes displayed above indicate performance ranges only and are not intended for the purpose of specifying pumps. See Performance Curves for pump selection information.

Impeller Sizes

C/SP Series - Impeller Sizes Per Model Type						
Order Code	Impeller Dia. (in.)	Model Number				
		114	216	218	328	4410
01	10					•
02	9¾					•
03	9½					•
04	9¼					•
05	9					•
06	8¾					•
07	8½					•
08	8¼					•
09	8			•	•	•
10	7¾			•	•	•
11	7½			•	•	•
12	7¼			•	•	•
13	7			•	•	•
14	6¾			•	•	
15	6½			•	•	
16	6¼			•	•	
17	6		•	•	•	
18	5¾		•		•	
19	5½		•		•	
20	5¼		•			
21	5		•			
22	4¾		•			
23	4½		•			
24	4¼		•			
25	4	•	•			
26	3¾	•				
27	3½	•				
28	3¼	•				
29	3	•				
30	2¾	•				
31	2½	•				

Port Sizes

C/SP Series - Port Sizes Per Model Type						
Order Code	Inlet Size v. Outlet Size (in.)	Model Number				
		114	216	218	328	4410
10	1½ x 1½	•				
20	2 x 1½	•	•	•		
30	2½ x 1½		•			
40	3 x 1½			•		
50	3 x 2				•	
60	4 x 2				•	
70	4 x 4					•
80	6 x 4					•

Options

Equipment

- Bevel seat, flanged, NPT or weld connections
- Enlarged inlet port size
- Grit blasted (industrial), 32Ra (sanitary), or higher finishes
- Casing Drain (216 and 218 only)
- John Crane double 9 seal (SP only)
- Mounting Base for SP Pump

Material grades

- Flourelastomer (SFY) or EPDM (E) elastomers
- Seal materials in Carbon or Silicon Carbide

Ordering

Please state the following when ordering:

- Product to be pumped
- Density of product
- Viscosity of product
- Required flow rate (minimum, normal and maximum)
- Discharge pressure (closest to the pump outlet)
- System suction conditions
- Pumping temperature of product (minimum, normal and maximum)
- Cleaning temperature(s) (minimum, normal and maximum)
- Port connection requirements if other than Tri-Clamp®
- Voltage and frequency of drive if required
- Seal types
- Any other options required