# 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)

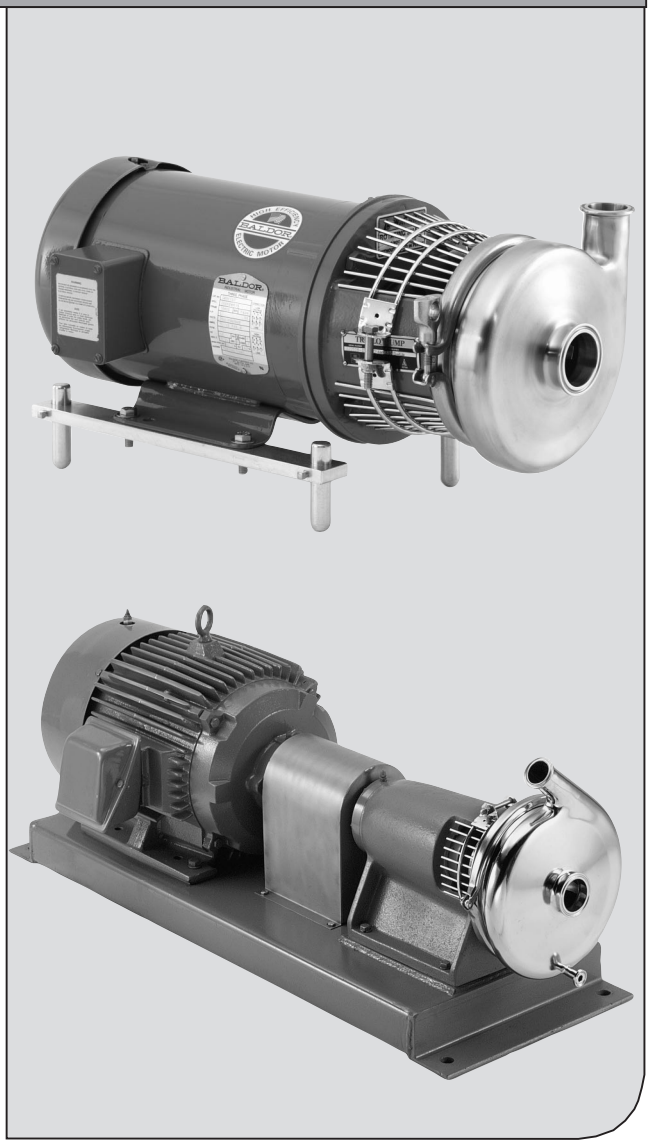


Fig. 1. C Series (top) and SP Series (bottom) Centrifugal Pump

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

Tri-Clover®

**Materials (Continued)**

***Connections:***

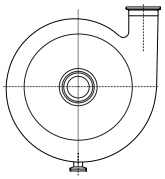
Tri-Clamp ..... standard
Bevel seat ..... option
NPT ..... option
Flanged ..... option
Weld ..... option

Note! Leg kits are available as a standard option.

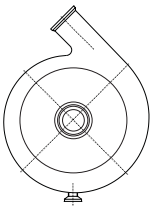
Casing Drain Option

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.



90° outlet



45° outlet

***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***

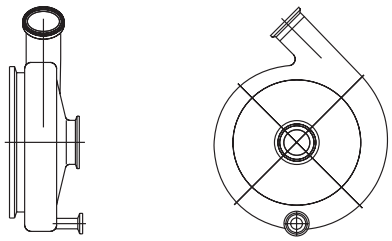
Type D - External Balanced Seal — Well-suited for multipurpose use, this seal is designed to give long service life. Seal consists of a single mechanical seal, carbon rotary vs. stainless steel backplate. Typical applications include: dairy products, beverages and water-like products, etc. Also applicable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

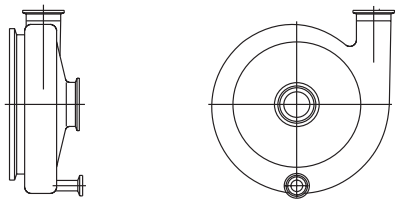
Type E - Water Cooled Balanced Double Seal — Seal chamber can be pressurized to contain coolants or sealants which can be piped directly to drain. Seal consists of a double mechanical seal, carbon rotary vs. stainless steel backplate and follower. Ideal for slurries, heavy duty vacuum applications (to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

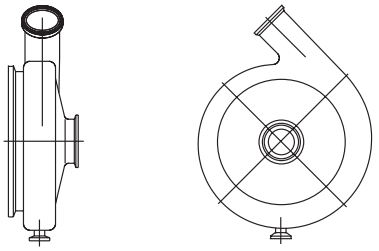
Type A - Packing Gland Seal (non sanitary, SP Series only) — Recommended for chemical processing applications or nonabrasive and non-congealing products. Also available with water flush (Type B). Seal consists of multiple layers of Teflon packing contained in a stainless steel stuffing box. A wide range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



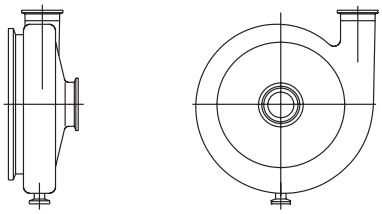
45° Discharge
K4H 1/2"
K6H 3/4"
K8H 1"



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



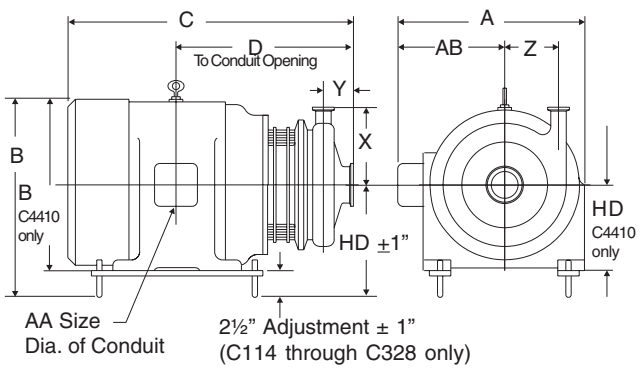
45° Discharge
K4V 1/2"
K6V 3/4"
K8V 1"



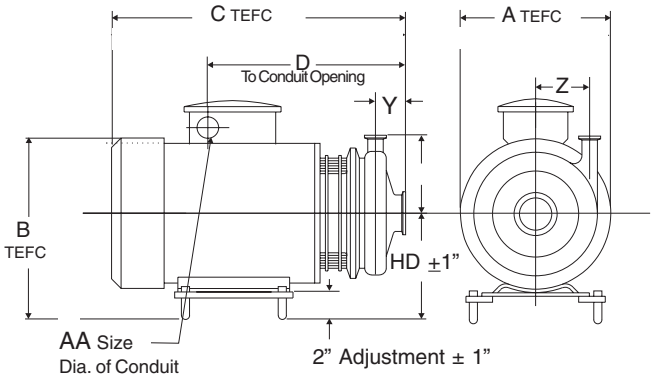
90° Discharge
C4V 1/2"
C6V 3/4"
C8V 1"

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**

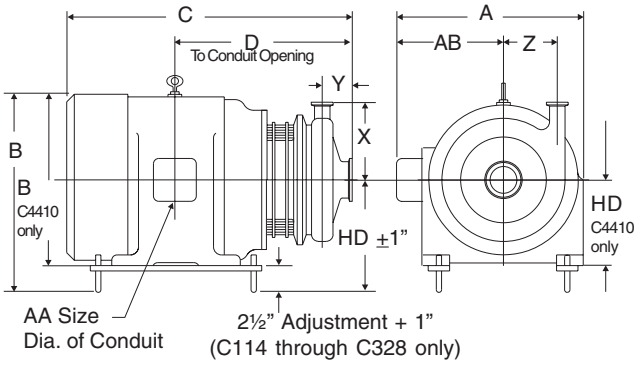
| Pump Model | Frame | A | B | C* | C** | D* | D** | HD | AA | AB |
|---|---|---|---|---|---|---|---|---|---|---|
| C114 | FF56C | 7.28 | 9.12 | 21.23 | 21.48 | 17.16 | 17.41 | 5.48 | 0.50 | - |
| | FF140TC | 7.28 | 9.12 | 21.23 | 21.48 | 17.16 | 17.41 | 5.48 | | |
| | 182/184TC | 12.50 | 11.19 | 21.81 | 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.

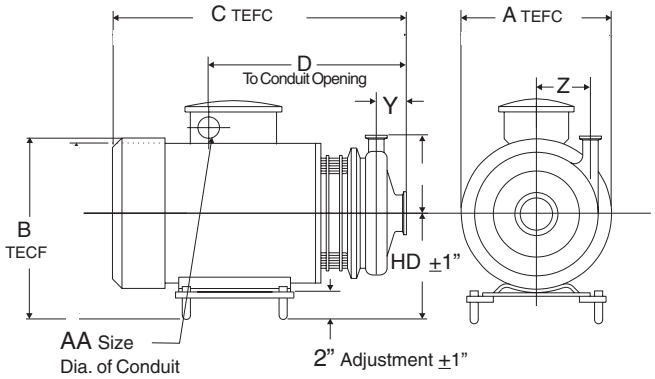
Dimensions are approximate and for guidance only. On application where exact dimensions are required, contact Alfa Laval.

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***



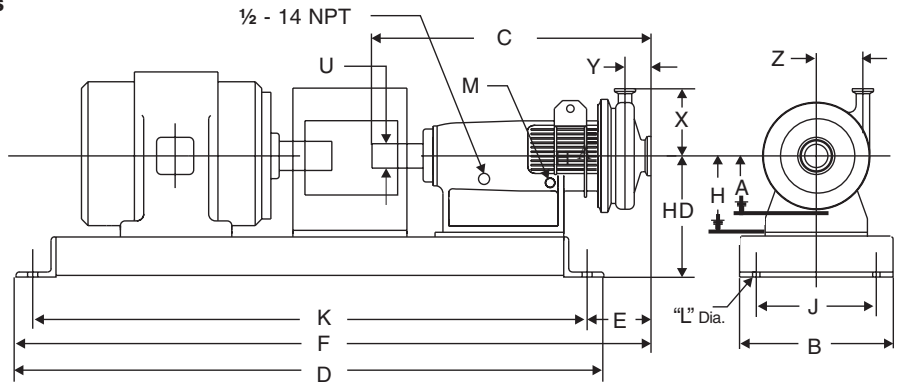

***56 to 140 Frame Motors***

**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**



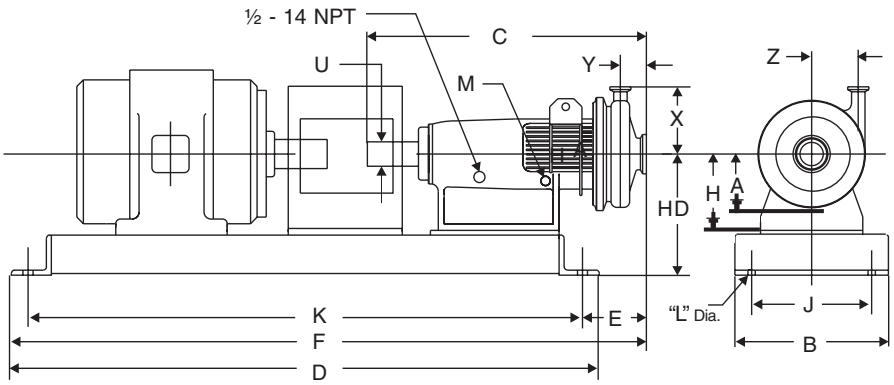

**Base Dimensions**

| Pump Model | Frame | *E | **E | *F | **F | HD | J | K | L | B | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SP114 | 56<br>143T<br>145T | 3.81 | 4.06 | 29.06 | 29.31 | 6.05 | 5.00 | 24.50 | 0.63 | 7.75 | 26 |
| | 182T<br>184T | 3.56 | 3.81 | 36.31 | 36.56 | 7.55 | 8.00 | 31.50 | 0.75 | 10.75 | 34 |
| SP216 | 56 | 4.44 | 4.69 | 29.69 | 29.94 | 7.05 | 5.00 | 24.50 | 0.63 | 7.75 | 26 |
| | 143T<br>145T | 4.44 | 4.69 | 32.69 | 32.94 | 7.05 | 5.00 | 27.50 | 0.63 | 7.75 | 29 |
| | 182T<br>184T | 3.94 | 4.19 | 36.69 | 36.94 | 8.05 | 8.00 | 31.50 | 0.75 | 10.75 | 34 |
| | 213T<br>215T | 4.19 | 4.44 | 42.94 | 43.19 | 8.30 | 10.00 | 37.50 | 0.75 | 12.75 | 40 |
| | 254T | 4.19 | 4.44 | 41.94 | 42.19 | 9.30 | 12.50 | 36.50 | 0.75 | 15.25 | 39 |
| SP218 | 143T<br>145T | 3.59 | 3.84 | 33.34 | 33.59 | 9.05 | 8.00 | 28.50 | 0.75 | 10.75 | 31 |
| | 182T<br>184T | 3.59 | 3.84 | 35.84 | 36.09 | 9.05 | 8.00 | 31.00 | 0.75 | 10.75 | 33½ |
| | 213T<br>215T | 3.59 | 3.84 | 42.34 | 42.59 | 9.05 | 10.00 | 37.50 | 0.75 | 12.75 | 40 |
| | 254T<br>256T | 3.97 | 4.22 | 46.72 | 46.97 | 9.30 | 12.50 | 41.50 | 0.75 | 15.25 | 44 |
| | 284TS<br>286TS | 3.97 | 4.22 | 52.72 | 52.97 | 11.05 | 14.00 | 47.50 | 0.75 | 16.75 | 50 |
| SP328 | 145T | 4.22 | 4.72 | 33.97 | 34.47 | 9.05 | 8.00 | 28.50 | 0.75 | 10.75 | 31 |
| | 182T<br>184T | 4.22 | 4.72 | 36.47 | 36.97 | 9.05 | 8.00 | 31.00 | 0.75 | 10.75 | 33½ |
| | 213T<br>215T | 4.22 | 4.72 | 42.97 | 43.47 | 9.05 | 10.00 | 37.50 | 0.75 | 12.75 | 40 |
| | 254T<br>256T | 4.59 | 5.09 | 47.34 | 47.84 | 9.30 | 12.50 | 41.50 | 0.75 | 15.25 | 44 |
| | 284TS<br>286TS | 4.59 | 5.09 | 53.34 | 53.84 | 11.05 | 14.00 | 47.50 | 0.75 | 16.75 | 50 |
| | 324TS<br>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<br>215T | 5.53 | 6.03 | 44.28 | 44.78 | 9.05 | 10.00 | 37.50 | 0.75 | 12.75 | 40 |
| | 254T<br>256T | 5.91 | 6.41 | 48.66 | 49.16 | 9.30 | 12.50 | 41.50 | 0.75 | 15.25 | 44 |
| | 284T<br>284TS<br>286T<br>286TS | 5.91 | 6.41 | 54.66 | 55.16 | 11.05 | 14.00 | 47.50 | 0.75 | 16.75 | 50 |
| | 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**



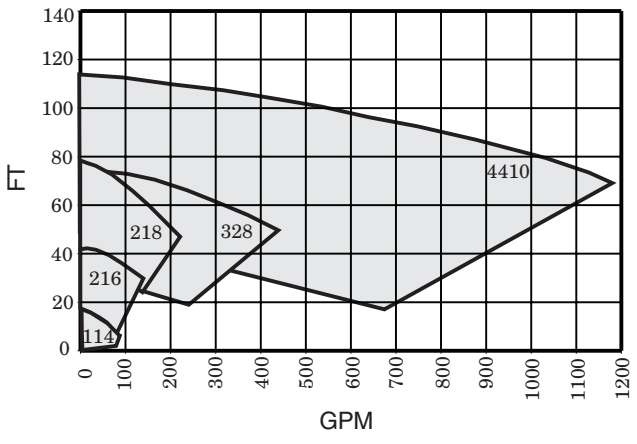

**Pump Dimensions**

| 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 | 3/8 - 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 | 1/2 - 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 | 1/2 - 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 | 1/2 - 14 | 1.38 |

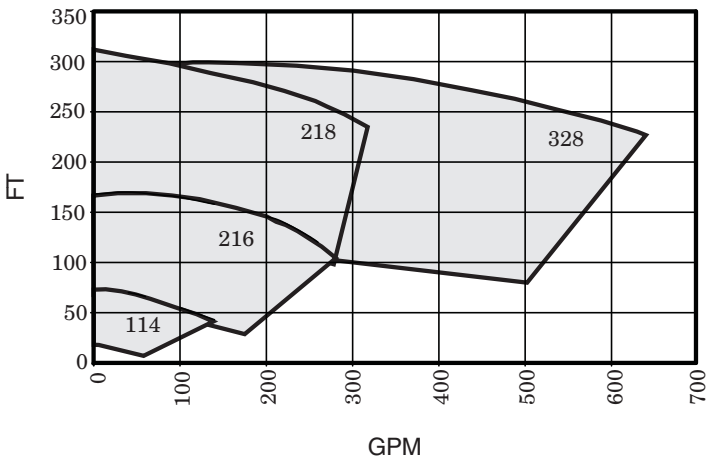
* With Tri-Clamp connections.
** With threaded bevel seat connections.

**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

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