

CL Series Product Data/Specifications

Water-For-Injection Applications

Water-for-Injection (WFI) processes require pumps that not only perform, but also maintain purity of the system.

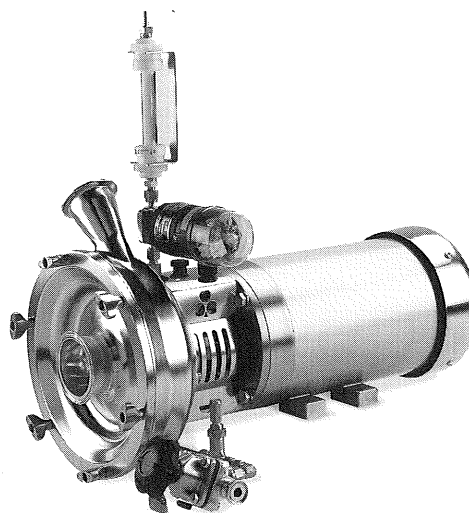
To maintain this level of hygienic integrity, the pump system has to be completely drainable, and all of its components must be capable of withstanding system passivation, as well as stringent CIP regimens.

Tri-Clover, a leader in the sanitary flow process industry, has met this challenge with the Tri-Flo® CL Series Centrifugal pump.

Superior Flush System

Tri-Clover CL Series pumps feature a fully vented, completely drainable seal flush system. This simple, reliable flush system includes:

- ✓ zero dead leg: The water flush is drawn out from the casing drain, maintaining a constant circulation rate and temperature within the drain leg to prevent bacterial growth. This also eliminates the need for an additional tap at the discharge.
- ✓ a needle valve before the stuffing box regulates the flush water flow and pressure to ensure long seal life.
- ✓ a check valve or optional air-actuated Saunders Diaphragm valve after the stuffing box to prevent air from being drawn into the system after steaming.
- ✓ a manual Saunders Diaphragm valve with an access port acts as a single drain point for both the casing and the seal.



The Tri-Flo® CL Series Water For Injection pump can be supplied with a variety of application matched options.

High Performance Seals

All Tri-Clover CL Series WFI pumps feature high purity double mechanical seals. Only silicon carbide seal faces come into contact with the sensitive process fluid. The combination of silicon carbide compounds in the seal faces eliminate particulate shedding commonly found with carbon seals.

Innovative Construction

Tri-Clover CL Series WFI pumps have a discharge port set to a 45° angle for self venting, and a drain port in the casing. All WFI pumps are constructed of 316L Stainless Steel materials with a maximum 20 Ra μ -inch (0.5 μ m) internal finish and 32 Ra μ -inch (0.8 μ m) external finish. Upgraded mechanical polishing and electropolishing are available. Standard Tri-Clamp® fittings provide quick assembly and disassembly.

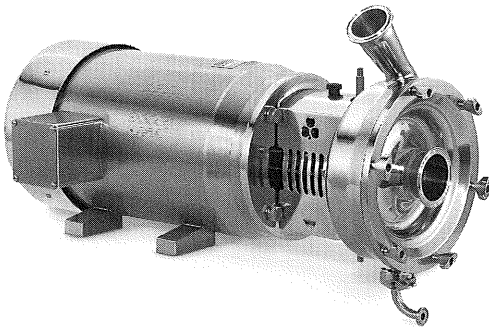


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CL Series Pumps

Standard WFI Features



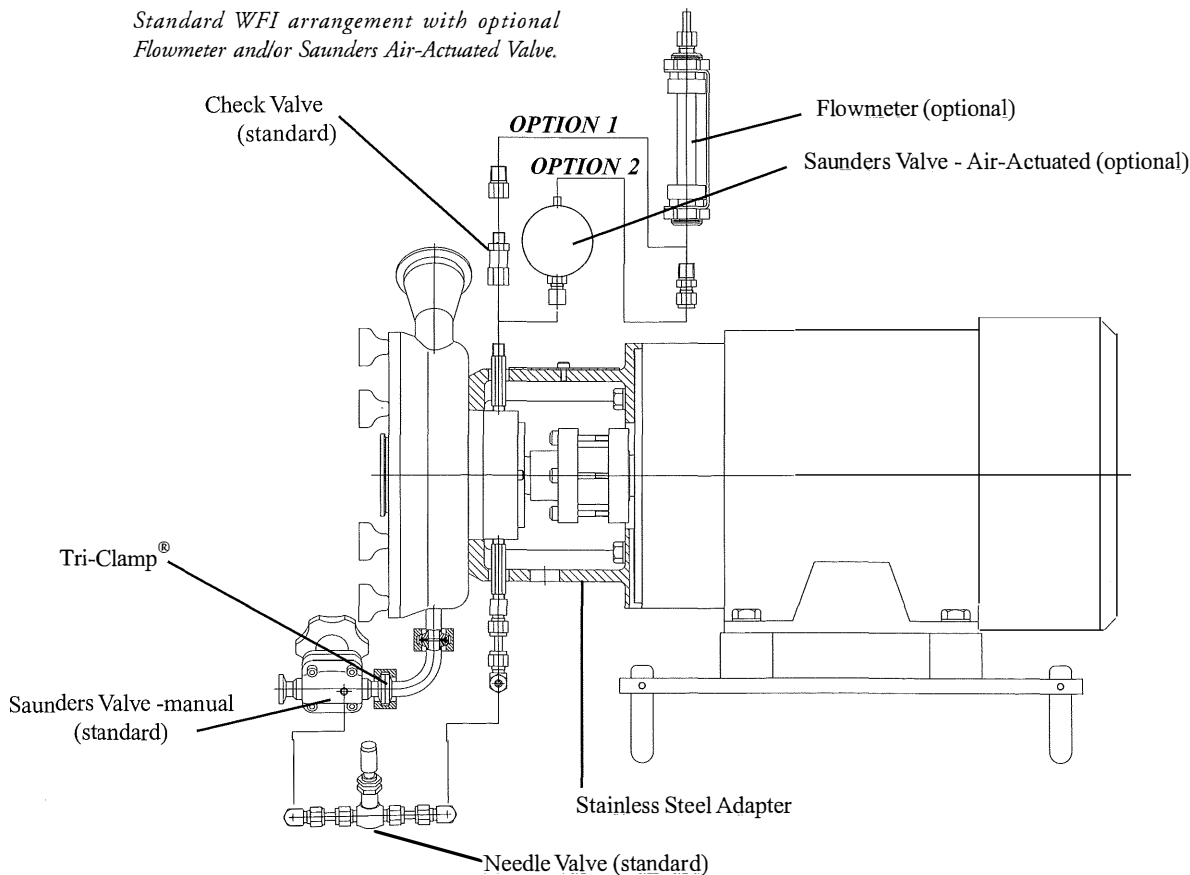
The Tri-Clover CL pump with standard 45° outlet and ½" (12.7mm) radial casing drain and an optional stainless steel motor.

Casing:	Discharge - 45° Drain - Radial, ½" (12.7mm)
Finish:	20 Ra µ-inch (0.5µm) mechanical polish (I.D.) 32 Ra µ-inch (0.8µm) mechanical polish (O.D.)
Elastomers:	SFY (Fluoroelastomer)
Shaft Seals:	EG Water Cooled Balanced Double Seal SiC (rotating) on SiC (stationary)

Flush System Components: ½" Saunders Diaphragm valve with stainless steel bonnet and access port
Needle valve before the stuffing box
Outlet check valve after the stuffing box
Connecting tubing

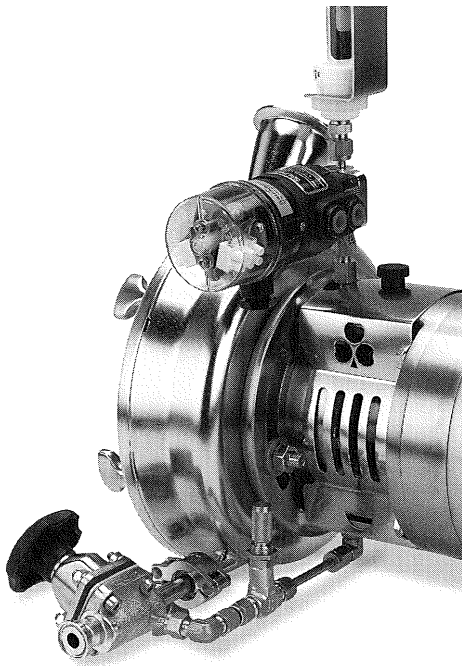
Flushed Seal: Water Pressure - Normally atmospheric pressure, maximum 50 psi (3.5 bar) above inlet pressure.
Note: At atmospheric pressure, flow must be adjusted so the outlet water temperature never exceeds 200°F (93°C)
Water consumption - 4 to 8 GPH (0.25 to 0.5 L/min)

Standard WFI arrangement with optional Flowmeter and/or Saunders Air-Actuated Valve.



CL Series Pumps

Optional WFI Features



The Tri-Clover CL pump with optional tangential casing drain connected via the zero dead leg Saunders valve with needle valve to adjust flush flow. The optional air-actuated Diaphragm valve and flowmeter are fitted to the outlet of the seal flush.

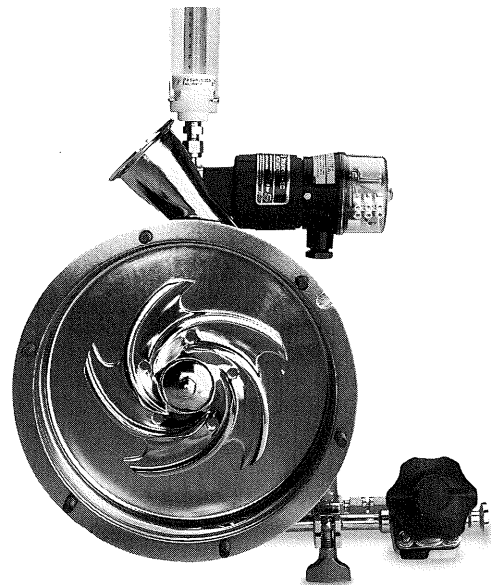
Casing: Discharge - 90°
Drain - Radial, ¾" (19mm) or 1" (25.4mm) Tri-Clamp®
Tangential, ½" (12.7mm), ¾" (19mm)
or 1" (25.4mm)

Finish: 15 Ra µ-inch (0.4µm) electropolish (I.D.)
32 Ra µ-inch (0.8µm) mechanical polish (O.D.)

Elastomers: PTFE
EPDM

Shaft Seals: DG External Balanced Seal (no seal flush included)
John Crane Double 8 Seal
John Crane Double 9 Seal
Note: All Seals SiC (rotating) on SiC (stationary)

Flush System Components: **Option 1** - PTFE Flowmeter
Option 2 - ½" (12.7mm) Saunders Diaphragm with EC actuator on discharge.

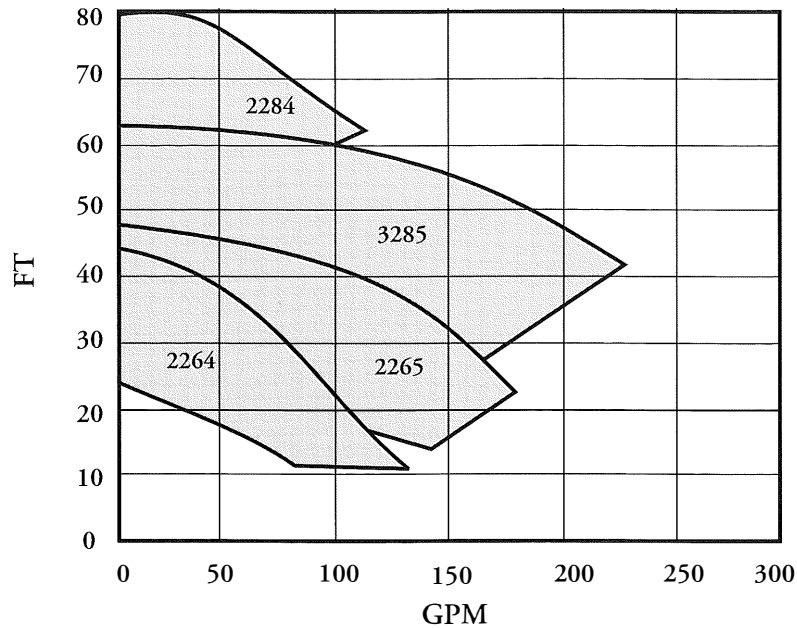


The Tri-Clover CL pump with optional tangential casing drain provides complete draining of the pump casing and a smooth outlet for the seal flushing liquid.

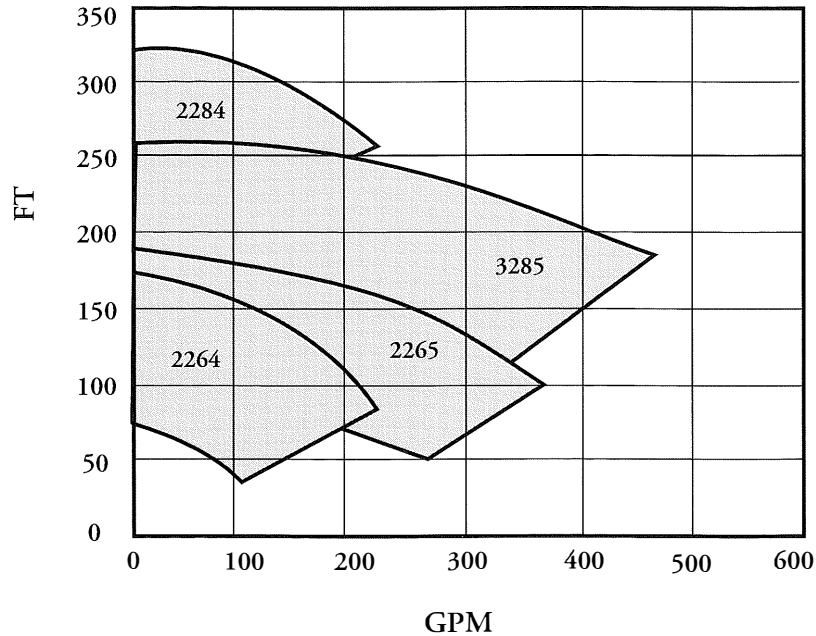
CL Series

Performance Envelopes

CL Pump Series 1750 RPM (60Hz)



CL Pump Series 3500 RPM (60Hz)



Performance envelopes displayed above indicate performance ranges only, and are not intended for the purpose of specifying pumps. Larger capacity pumps are available upon request.



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