



# Tri-Clover Bio-Pharm Package

# Tri-Clover® Products for the Bio-Pharm Industry

## How We Build Excellence Into Our Products and Your Process

The trend in the biotechnology and pharmaceutical industries is clear. Today's bioprocess systems demand the highest levels of product quality and purity attainable. In order to realize the ambitious goals of tomorrow, biotechnology and pharmaceutical manufacturers depend on component suppliers to deliver equipment of uncompromising quality and performance.

Purified Water (PW), Water for Injection (WFI) and product systems all require components which provide reliable performance, precision fit and a product flow path with a virtually perfect surface finish.

Tri-Clover delivers all of this and more.

## Comprehensive Solutions and Complete Selection

Our Bio-Pharm expertise offers a remarkable team of products, people, facilities and resources. A single phone call puts you in touch with the know-how and equipment you need for pumping, flow control, batching, CIP or SIP applications.

Our customers draw from the industry's most comprehensive product selection, including:

- n ASME-BPE compliant Tri-Weld® and Tri-Clamp® mechanically and electropolished 316L fittings
- n Complete selection of mechanically and electropolished tubing
- n Tri-Clover Saunders diaphragm valves
- n Tri-Clover check, seat and mix-proof valves
- n Tri-Clover C, CL and SP Series centrifugal pumps
- n Tri-Clover TCIP and TSR rotary lobe positive pumps
- n Filters/strainers
- n Pressure gauges
- n Tri-Blender mixing systems



*Tri-Clover® offers one of the broadest equipment selections in the process industry. With one call you can access the pumps, valves, fittings, tubing and other accessories for your entire process system.*



## Industry Expertise and A Quality Focus

The Tri-Clover Bio-Pharm Package is the latest evolution in the history of a company established in 1919 to serve the needs of the sanitary process industries. The Bio-Pharm Package enables Tri-Clover to focus more effectively on the unique requirements of the rapidly evolving bioprocess industry, thereby helping this key industry achieve continually higher levels of quality and process-system efficiency.

## Dedicated Biopharmaceutical Specialists

Bio-Pharm application, product and field specialists, in tune with the unique requirements of bioprocess systems, handle each inquiry and application. At the manufacturing level, welders certified to section IX of the ASME pressure-vessel code, work hand-in-hand with skilled polishers and QC inspectors to deliver products of the highest quality.

## Single-Source Convenience and Service

The Tri-Clover Bio-Pharm Package provides optimal solutions that help our customers:

- n Run processes more efficiently
- n Reduce installation risk
- n Speed up validation
- n Reduce purchasing cost
- n Reduce QC and inspection costs



*Tri-Clover Bio-Pharm distributors are biopharmaceutical process specialists. You can turn to them for solutions involving single components or entire process systems.*

- n Optimize system performance
- n Lower overall costs

What's more, we deliver this marvelous capability to the global marketplace more effectively through established worldwide distribution channels.



## Fittings & Tubing

Achieving absolute control in each step of the manufacturing process is essential to the successful production of biopharmaceutical-grade fittings and tubing. As a single-source supplier, you are assured of the consistency of polish, encompassed with reduced QC and validation costs.

We can closely monitor every aspect of the manufacturing process and deliver the highest quality product. Raw material is subject to a rigorous acceptance criteria. To ensure the highest of quality, all fittings are subject to 100% visual inspection. Once products are capped and bagged, your satisfaction is assured.

Tri-Clover offers the widest selection of polishes ranging from an unpolished finish to mechanical and electropolished interior finishes as high as 10Ra maximum. Our manufacturing facilities contain in-house mechanical polishing and electropolishing.

All tubing, Tri-Weld® and Tri-Clamp® Bio-Pharm fittings are supplied with material tests reports (MTR) and are fully compliant with ASME-BPE-1997.

*We cap and bag all pharmaceutical-grade fittings and tubing to ensure ultraclean condition upon delivery.*

*All Tri-Clover Bio-Pharm fittings are heat traced with permanently marked Heat Trace Numbers and Material Test Reports*

ITEM	PRODUCT	MATERIAL	LOT NUMBER	WEIGHT	SIZE	WALL THICKNESS	TENSILE STRENGTH	ELONGATION	REDUCED SECTION ELONGATION	HARDNESS
963408414	BIOLAM-2-316L-PR	316L	AKD672	.009	1.84	.032	.005	.31	16.36	11.95 .03 7-14

# Fittings, Tubing & Gauges



## Uniformity of Chemistry and Fit

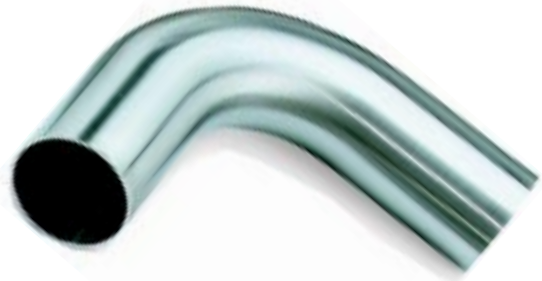
All Bio-Pharm stainless steel tube fittings are manufactured to Tri-Clover® specifications. All Tri-Clover fittings are manufactured from select heats of stainless steel to provide the best possible weld characteristics, including controlled sulfur content. Our weld-end fittings ensure uniform weld chemistry to maximize weld quality and corrosion resistance, while minimizing costly setup time and weld rejects.

## A Process Based on Dimensional Precision

Advanced manufacturing techniques enable us to meet or exceed the industry's highest standards of dimensional tolerance and surface finish.

In elbow fittings, for instance, Tri-Clover is the only manufacturer to employ hydrosizing. This process ensures precise dimensional stability throughout the bend of the elbow.

Fittings are also subjected to statistical analysis with sophisticated stylus-measurement procedures to access outside diameter circularity.



## Fast Response to Your Special Needs

Because today's complex process designs often require custom-designed valve assemblies, our Product Support Group can quickly respond to your needs. This in-house team will work from your design or fabricate a manifold based on the requirements you specify. Fast quotes and rapid turnaround are available on all special requests.



*Tri-Clover pharmaceutical pressure gauges are designed to meet the most stringent requirements of the pharmaceutical and biotech industries. Both stem-mounted and back-mounted models are available.*





*Our wide selection of centrifugal pumps includes eleven models that help you "fine tune" pump performance to the needs of your application.*

Pumps are the "heart" of any process system. Tri-Clover's wide selection of pump models and capacities allow you to match a pump to the precise performance requirements of your application. A variety of mechanical seals including many commercially available types, can be furnished to help tailor Tri-Clover® pumps to your system's needs.



Exhaustive research into every aspect of pump design and function has resulted in an entirely new family of Tri-Clover advanced centrifugal pumps. Our CL Series pumps feature many design advantages that make them attractive to the bioprocess industry. Available in a wide range of capacities, the CL Series simplifies the task of matching pump to application. All feature an easy-maintenance design along with cleanability and are available with optional casing drains.

The design of the Tri-Clover CL Series pump reduces the potential for air entrapment. The risk of cavitation is greatly reduced, while lower NPSH is required. Within a heavy-duty front cover and casing crafted from 316L stainless steel is a high-efficiency impeller. Tight tolerances between impeller and front cover, together with optimized inlet configurations, result in high levels of pumping efficiency.



### Water-for-Injection

Wherever pure, sterile, deionized or pyrogen-free water is used, a Tri-Clover WFI pumping system can safeguard media against external contamination. Choose from a wide selection of single and double mechanical seals, elastomers and surface finishes to match specific applications, and ensure trouble-free operation and extended service life.

If specified at the time of order, full documentation on the traceability of all product wetted surfaces (including seals) can be supplied for CLWFI pumps.

*Developed specifically for use in biopharmaceutical applications, Tri-Clover WFI feature a 45° discharge and casing drain as pictured here. A 90° discharge casing and a tangential casing drain are also available.*



## TSR Series Positive Rotary Pumps

Tri-Clover® TSR Series pumps have set a new standard in positive rotary design and performance.

Tri-Clover TSR Series pumps feature the broadest selection available in any positive pump family. Combined with your choice of several rotor styles, TSR Series pumps let you tailor performance characteristics to safeguard product integrity and accommodate a wide range of viscosity and temperature requirements.



*Tri-Clover TSR pumps feature a broad selection of seal combinations*

## TCIP Positive Rotary Pump

The TCIP range of pumps is ideally suited to applications in the pharmaceutical and biotechnology industries, where full cleanability and corrosion resistance are essential. The TCIP operates with a highly-efficient, smooth, clean and low-shear pumping action for assured gentle handling of delicate and sensitive products, including fermentation broths, cultures and blood fractions with organic solids in suspension. The design conforms to 3A requirements and wetted materials are FDA compliant. Also, the pump meets the cleanability standards established by EHEDG (European Hygienic Design Group) which demands that the unit be as cleanable as a straight piece of sanitary tubing.



*Tri-Clover TCIP meets the cleanability standards established by EHEDG (European Hygienic Equipment Design Group).*

## C Series Centrifugal Pumps

The C Series pump is the original, all-purpose, sanitary process centrifugal pump. Its practical design and flexibility have provided processors with strong performances in thousands of applications. A great value, the C Series pump maintains an integral Clean-In-Place design as standard. This close-coupled unit is also available in a pedestal-mount configuration (SP version).



*Tri-Clover C Series centrifugal pumps feature CIP capability and meet 3A requirements*

# Valves

## Fractional Valves

Tri-Clover offers a broad line of fractional valves available in either tee or cross body styles, and in both ½" (12.7 mm) or ¾" (19 mm) sizes. All valves feature a proven sanitary design including self-draining ports that help protect against product entrapment, thus minimizing the threat of product contamination. Air-actuated or manual valve styles are available, as well as an aseptic design complete with a sterile barrier.



*Butterfly valves in either 304 or 316L stainless steel are available for sizes 1" (25.4 mm) to 6" (152.4 mm). Manually operated with pneumatic or electric actuator variants, these Tri-Clover valves can be supplied with seat materials in EPDM, silicone or fluoroelastomer.*

## Seat Valves

One of the most diverse ranges of seat valves in the industry gives processors more body and control options and more flexibility in every type of biopharmaceutical process. Our selection of seat valves include an entire family of air-actuated valve styles, as well as, elbow, tank outlet, throttling and aseptic valves.

## Fully Automated Valve Control

For advanced control capabilities and reduced installation costs, all Tri-Clover air-actuated valves can be equipped with a e:Top™ control top, an intelligent fieldbus system. e:Top™ delivers distributed control of multiple valves by way of a multi-drop communication network. e:Top™ simplifies wiring and installation while providing many advanced control functions including: real-time feedback alarms, built-in service counter and visual diagnostics. e:Top™ interfaces with many widely used programmable controllers and process control systems.



*Tri-Clover balls valves ½" (12.7 mm) to 4" (101.6 mm) are made of 316L stainless steel (with a wide range of seat materials) are available in a manually operated version, or can be supplied with pneumatic or electric actuators.*