Streamline Blending Applications

Tri-Blender® Brand Blenders

PD 66500 US1 2001-10

Application
Our Tri-Blender is specially designed to thoroughly and efficiently blend dry ingredients and liquids, while minimizing the air introduced into the process. That means the lumping, foaming and flooding associated with conventional mixing equipment is almost totally eliminated. The Tri-Blender has been designed for easy adaptation to a variety of blending applications within the food, beverage, dairy, chemical and biopharmaceutical industries. The Tri-Blender is simple, fast and extremely compact. It is capable of absorbing dry powders into liquids at the rate of 25 to 350 lbs. (11 to 159 kg) per minute (as determined by product characteristics and Tri-Blender model size).

The Portable F2116EZ System Tri-Blender is equipped with a wheeled platform for easy portability from application to application. However, the wheeled platform can be ordered as an option on all other Tri-Blender models. Portable units come complete with supply pump, motor starters, dolly and tube assembly.

All Tri-Blender product contacting components are FDA compliant.

Tri-Blender® brand blenders

Standard Design
The Tri-Blender consists of a hopper, a pump with a blending chamber and screen, a diffuser tube and a butterfly valve.

The Tri-Blender design utilizes a butterfly valve to control the rate of dry material flow through the hopper. Manual valves are furnished as standard equipment. An optional electrical butterfly valve control prevents the valve from opening before the blender motor is operating. This control also prevents the blender motor from stopping before the valve is closed. Pneumatic valves are also available.

With auxiliary controls, the Tri-Blender can easily be integrated into an automated system. It can also be adapted for CIP installations.

Seals
The Tri-Blender is equipped with a type D sanitary external balanced seal. Optional sanitary seals available include: type DG (clamped-in seal/seat design) and type E (water-cooled balanced double seal).

Models F1114L / F2114 / F2116MD

Pump Requirements

Systems handling viscosity up to 500cps		
	Model F1114L and F2114	Model F2116MD
Supply Pump	C114MD56T-S centrifugal pump	C114MD56T-S centrifugal pump
Impeller	3¼" (82.6mm) diameter	3¾" (82.6mm) diameter
Seal	Type D- external balanced	Type D- external balanced
Casing	1½" (38.1mm) inlet, 1½" (38.1mm) outlet Tri-Clamp	1½" (38.1mm) inlet, 1½" (38.1mm) outlet Tri-Clamp
Motor	¾ HP - 1750 RPM	¾ HP - 1750 RPM
Discharge Pump	A discharge pump may be required on some applications, consult Alfa Laval for recommendations.	A discharge pump may be required on some applications, consult Alfa Laval for recommendations.

Systems handling viscosity over 500cps		
	Model F1114L and F2114	Model F2116MD
Supply Pump	Consult Alfa Laval	SRU4WLS20MDU0C(X)-AO positive pump
Base		Standard
Drive		Gearhead Motor 3 HP, 3PH, 60Hz, 230/460V, 277 RPM
Discharge Pump		SRU4WLS25MDU0C(X)-AO positive pump
Base		Standard
Drive		Gearhead Motor 3 HP, 3PH, 60Hz, 230/460V, 251 RPM

Materials

Product wetted steel parts: ..... Acid-resistant steel AISI 316L
Base: ..... Stainless steel
Hopper: ..... 304 stainless steel
Other steel parts: ..... 32 Ra
Product wetted seals: ..... C vs. SS (type D&E)
C vs. SC, C vs. TC (type DG)

Motor

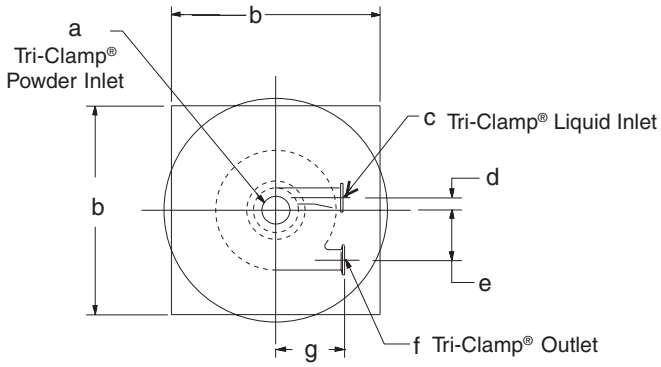
3 HP - 3500 RPM (2.2kW) TEFC 3 phase 230/460 volt. Dual frequency and voltage rated at 60 Hz, 230/460 volts, 3500 RPM or 50 Hz, at 220/380 volts, 2900 RPM. Optional explosion-proof motor available.

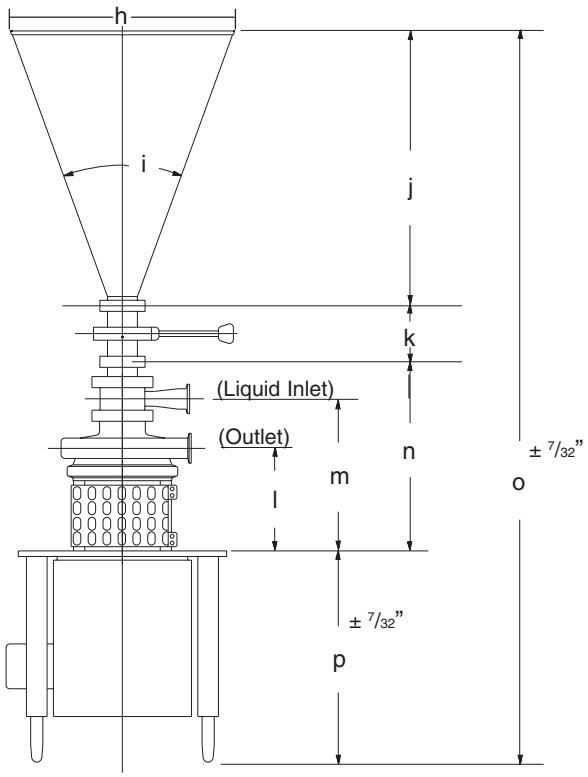
Technical data

Dry ingredient capacity
Model F1114L ..... Up to 25 lbs. (11.3 kg) per minute*
Model F2114 ..... Up to 45 lbs. (20.4 kg) per minute*
Model F2116MD ..... Up to 50 lbs. (23 kg) per minute*

* Absorption dependant on characteristics of product

Models F1114L / F2114 / F2116MD
Dimensions





Model F1114L

	with 40° hopper		with 60° hopper	
	in	mm	in	mm
a	1 1/2	38	1 1/2	38
b	14	356	14	356
c	1	25	1	25
d	5/16	8	5/16	8
e	2 5/8	67	2 5/8	67
f	1 1/2	38	1 1/2	38
g	3 5/8	92	3 5/8	92
h	15	381	22 11/16	576
i	40°		60°	
j	21 13/16	554	21 13/16	554
k	3 7/8	98	3 7/8	98
l	6 1/4	159	6 1/4	159
m	9 3/32	231	9 3/32	231
n	11 13/32	290	11 13/32	290
o	54	1372	54	1372
p	16 13/16	427	16 13/16	427
Installation Size	18" x 18" (460mm x 460mm)			

Model F2114

	with 40° hopper		with 60° hopper	
	in	mm	in	mm
a	2	51	2	51
b	14	356	14	356
c	1	25	1	25
d	5/16	8	5/16	8
e	2 5/8	67	2 5/8	67
f	1 1/2	38	1 1/2	38
g	3 5/8	92	3 5/8	92
h	15	381	22 11/16	576
i	40°		60°	
j	18 13/16	478	18 13/16	478
k	3 7/8	98	3 7/8	98
l	6 1/4	159	6 1/4	159
m	9 3/32	231	9 3/32	231
n	14 13/32	366	14 13/32	366
o	54	1372	54	1372
p	16 13/16	427	16 13/16	427
Installation Size	18" x 18" (460mm x 460mm)			

Model F2116MD

	with 40° hopper		with 60° hopper	
	in	mm	in	mm
a	2	51	2	51
b	14	356	14	356
c	1 1/2	38	1 1/2	38
d	3/4	19	3/4	19
e	3 11/16	94	3 11/16	94
f	1 1/2	38	1 1/2	38
g	4 1/2	114	4 1/2	114
h	15	381	22 11/16	576
i	40°		60°	
j	18 13/16	478	18 13/16	478
k	3 7/8	98	3 7/8	98
l	6 21/32	169	6 21/32	169
m	10 1/8	257	10 1/8	257
n	10 1/8	257	10 1/8	257
o	52 11/16	1338	52 11/16	1338
p	16 13/16	427	16 13/16	427
Installation Size	18" x 18" (460mm x 460mm)			

Tri-Blender®
Product Data / Specifications

Construction Materials & Order Information

Standard Design

The Tri-Blender Series consists of a standard NEMA C-flange motor, 316L grade stainless steel blending chamber, a balanced mechanical seal, a powder inlet assembly, liquid inlet assembly, 304 stainless steel hopper, and a 304 stainless steel base.

Seal Types

Single Stage Models

Type D (standard)

Description: sanitary external balanced seal

Seal Face Material:
- Stainless steel vs. Carbon (rotating)

Type DG (option)

Description: clamped-in seal/seat design

Seal Face Material:
- SiC clamped-in seat vs. Carbon (rotating)
- Tungsten carbide vs. Carbon (rotating)
- Ceramic vs. Carbon (rotating)

Type E (option)

Description: water-cooled balanced double seal

Seal Face Material:
- Stainless steel vs. Carbon (rotating)

Dual Stage Models

Type DG (standard)

Description: clamped-in seal/seat design

Seal Face Material:
- Stainless steel clamped-in seat vs. Carbon (rotating)
- SiC vs. Carbon (rotating)
- Tungsten carbide clamped-in seat vs. Carbon (rotating)

Tri-Blender®

Materials of Construction

Model F2116MD

Dry Ingredient Capacity:	Up to 50 lbs. (23 kg) per minute*
Installation Size:	18 x 18 in. (46 x 46 cm) floor space requirement
Height:	40° hopper, $52^{7}/_{8}$ in. (134 cm) 60° hopper, $52^{15}/_{16}$ in. (134 cm)
Controls:	Manually actuated butterfly valve. Optional electrically actuated valve with control panel or pneumatic valve available.
Construction:	All wetted parts are 316 stainless steel with quick-couple Tri-Clamp® connections.
Base:	Stainless steel
Motor:	3 HP - 3500 RPM (2.2 kW) TEFC 3 phase 230/460 volt. Dual frequency and voltage rated 60 Hz at 230/460 volts, to 50 Hz at 380 volts. Optional explosion-proof motor available.
Hopper:	304 stainless steel – 40° or 60° angle available
Powder Inlet:	2 in. (50.8mm) connection
Liquid Inlet:	1½ in. (38.1mm) connection
Liquid Outlet:	1½ in. (38.1mm) connection

Pump Requirements:

Systems handling viscosity up to 500cps

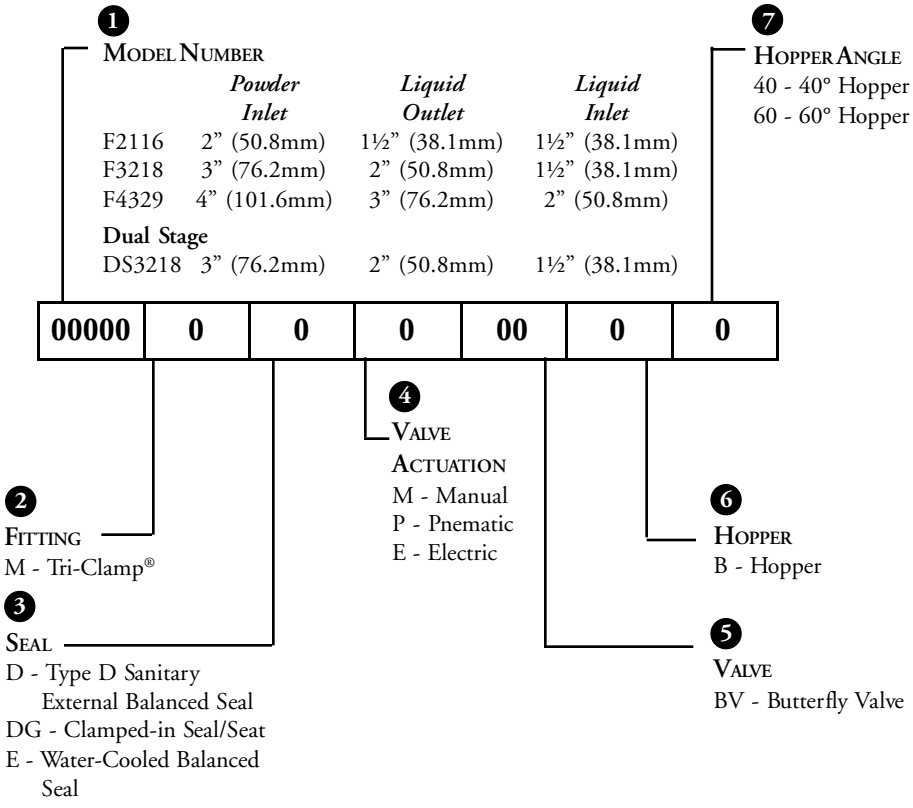
Supply Pump:	C114MD56T-S Tri-Flo® Centrifugal Pump
Impeller:	3¼" (82.6mm) Dia.
Casing:	1½" (38.1mm) inlet, 1½" (38.1mm) outlet
Motor:	¾ HP - 1750 RPM
Discharge Pump:	A discharge pump may be required on some applications, consult Tri-Clover for recommendations

Systems handling viscosity over 500cps

Supply Pump:	TSR4NLS20MDU0C(X)-AO Positive Pump
Base:	Standard
Drive:	Gearhead Motor 3 HP 3PH 60Hz 230/460V, Model SK22-182TC, 317 RPM
Discharge Pump:	TSR4NLS20MDU0C(X)-AO Positive Pump
Base:	Standard
Drive:	Gearhead Motor 3 HP 3PH 60Hz 230/460V, Model SK22-182TC, 332 RPM

**Absorption dependent on characteristics of product.*

Order Information



MODEL NUMBER EXAMPLE

❶ ❷❸ ❹❺ ❻❼

F2116MD - MBV - B60

Tri-Blender®

The Tri-Blender is designed to integrate easily into your present process system. Plus, its compact size and easy portability means it can be moved or installed virtually any place in the process.

Other Key Tri-Blender Benefits Include:

- Fast, uniform and continuous material absorption -- up to 350 lbs. (159 kg) per minute
- Choice of automatic or manual feed controls
- Designed for batch blending in some in-line applications
- Dual-stage Tri-Blender is recommended for higher concentrations where consistent addition rates are needed over a long run
- Easily adapted for CIP applications (Dual-stage only)

Fast, Thorough & Trouble-Free Blending

Tri-Clover makes it easier than ever to mix dry ingredients with liquids, and avoid the time, trouble and lost product associated with reprocessing and pre- and post-blending operations.

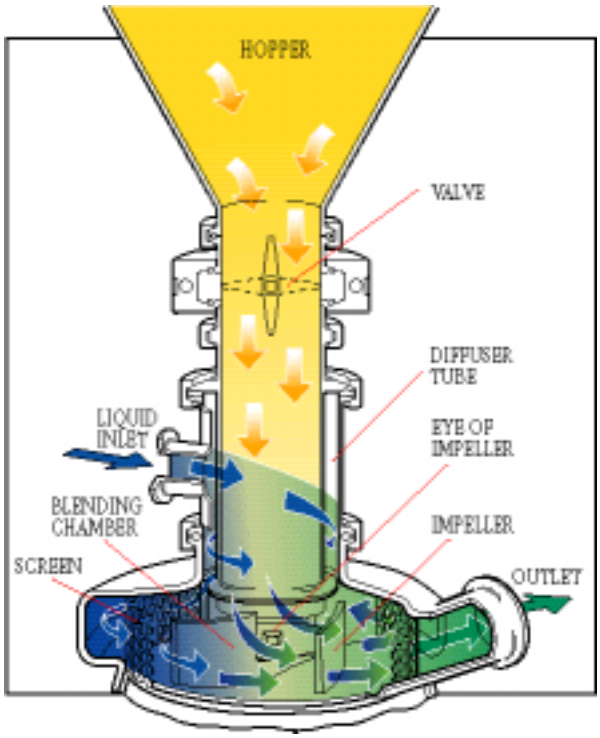
Our Tri-Blender is specially designed to thoroughly and efficiently blend dry ingredients and liquids, while minimizing the air introduced into the process. That means the lumping, foaming and flooding associated with conventional mixing equipment is almost totally eliminated.

Unique Tube-in-Tube Design

The Tri-Blender incorporates a unique tube-within-a-tube design which keeps dry ingredients and liquids separated until they are introduced to the mixing chamber. That's key to the Tri-Blender's efficient operation. And that's why companies from every process industry are turning to the Tri-Blender to streamline blending applications.

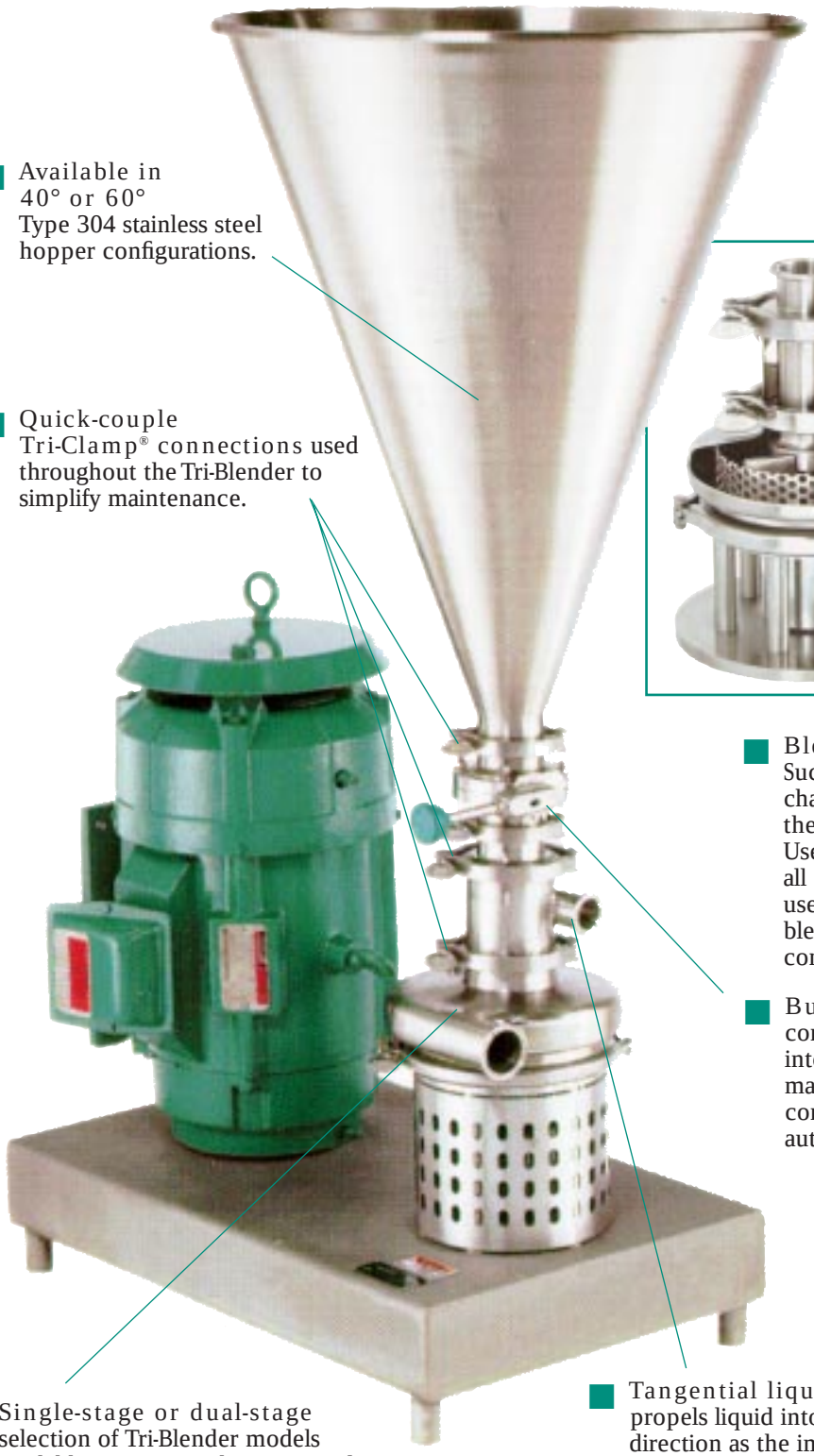
Proven In Applications Throughout The Process Industry

The unique Tri-Blender design means easy adaptation to a variety of blending applications in the food, beverage, dairy, chemical and biopharmaceutical industries.



Tri-Clover TEAM 2000™

Proven in Applications Throughout the Process Industry



- Tube-within-a-tube design effectively eliminates all problems associated with prewetting. Liquid and dry ingredients remain separated until each enters the mixing chamber.
- Available in 40° or 60° Type 304 stainless steel hopper configurations.
- Outer tube directs liquids to the impeller.
- Quick-couple Tri-Clamp® connections used throughout the Tri-Blender to simplify maintenance.
- Blending chamber screen actually enhances blending of highly hydroscopic powders.
- Type 316 stainless steel used on all wetted parts.
- Blending chamber
  Suction generated in the blending chamber pulls dry ingredients from the hopper into the diffuser tube. Use of a supply pump means that all of the blender's vacuum will be used to draw powder into the blending chamber resulting in a consistent rate of powder addition.
- Butterfly valve
  controls rate of dry ingredient feed into mixing chamber. Can be operated manually, or equipped with auxiliary controls for integration into automated system.
- Single-stage or dual-stage selection of Tri-Blender models available to meet application needs.
- Tangential liquid inlet
  propels liquid into the blending chamber in the same direction as the impeller rotation, which reduces energy consumption and wetting of the powder inlet tube.

Wide Selection of Capacities to Meet Your Blending Application Needs

- Model F3218MD Single Stage

  Dry ingredient capacity up to 100 lbs. (45 kg) per minute. Short runs lower concentrations

- Model DS3218 Dual Stage

  Dry ingredient capacity up to 100 lbs. (45 kg) per minute. Double mixing. Addition rates remain consistent as concentration increases

- Model F2116MD Single Stage — *Not shown*

  Dry ingredient capacity: Up to 50 lbs. (23 kg) per minute

- Model F2116EZ Single Stage Portable

  Dry ingredient capacity: Up to 50 lbs. (23 kg) per minute

- Model F4329MD Single Stage

  Dry ingredient capacity: Up to 350 lbs. (159 kg) per minute

To enhance application convenience, the portable F2116EZ System Tri-Blender goes where you need it. Portable units come complete with supply pump, motor starters, dolly and tube assembly.

A choice of single-stage or dual-stage Tri-Blenders means you can select a model that fits your application like a glove. Simply choose the model you need, and specify the electrically actuated valve, pneumatic valve, or the manual valve. Other options include skid mounting, automatic custom control packages, and automatic feeds.

The Model F2116EZ is equipped with a wheeled platform for easy portability from application to application. However, the wheeled platform can be ordered as an option on all other Tri-Blender models.

Seals

Single-Stage Models

Standard units are furnished with Type D sanitary external balanced seal. Optional sanitary seals available include:

- Type DG – clamped-in seal/seat design
- Type E – water-cooled balanced double seal

Double-Stage Models

Standard clamped-in seat design is Carbon vs. SS featuring the convenience of a replaceable insert. Optional materials also available.

Patented Dual-Stage Tri-Blender® Maximizes Efficiencies

Our patented Model DS3218 Dual-Stage Tri-Blender incorporates a secondary blending chamber which effectively "double blends" liquid and dry ingredients for improved end-product consistency and a smoother, more uniform blend.

Depending on the application, the secondary chamber effectively functions as a discharge pump. In applications up to 500 CPS and up to 50 feet (15 m) of discharge head, the DS3218 entirely eliminates the need for an additional discharge pump, and also delivers significantly higher and more consistent vacuum rate over a wider range of process conditions. That means fast, consistent product flow rates with minimum drop-off through the entire production run.

Try It Before You Buy It – The Tri-Blender Rental Program

Find out how the Tri-Blender simplifies your blending application with little risk and no long-term commitment. Our "loaner" program lets you experience the simplicity and efficiency of the Tri-Blender in your own application. Ask your Tri-Clover distributor for complete details.

Ordering Information

Product Numbering System

Model Number Example

1 2 3 4 5 6 7
F2116 M D - M BV - B 60

1 Model Number

	Powder Inlet	Liquid Outlet	Liquid Inlet
F2116	2" (50.8 mm)	1½" (38.1 mm)	1½" (38.1 mm)
F3218	3" (76.2 mm)	2" (50.8 mm)	1½" (38.1 mm)
F4329	4" (101.6 mm)	3" (76.2 mm)	2" (50.8 mm)
Dual Stage			
DS3218	3" (76.2 mm)	2" (50.8 mm)	1½" (38.1 mm)

7 Hopper Angle
40 - 40° Hopper
60 - 60° Hopper

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2 Fitting
M - Tri-Clamp®

3 Seal
D - Type D Sanitary External Balanced Seal
DG - Clamped-in Seal/Seat
E - Water-Cooled Balanced Seal

4 Valve Actuation
M - Manual
P - Pneumatic
E - Electric

6 Hopper
B - Hopper

5 Valve
BV - Butterfly Valve

Valves

Tri-Flo® Mix-Proof – *Catalog MPV*
Multiple actuator stem designs with full-stroke capability.

Air-Actuated – *Catalog AV*
Many styles for automatic flow, and full CIP capability. Also available with optional control top housing. 1" - 4" (25.4 - 101.6 mm) sizes.

Fractional Sizes – *Bulletin FV*
Type 316L SS ½" and ¾" (12.7 - 19.0 mm) sizes.

Ball – *Bulletin BV*
3-piece body with PTFE seats and packing. 1" - 4" (25.4 - 101.6 mm) sizes.

Butterfly – *Bulletin BFV*
Aluminum body. Adaptable to a variety of end connections. 1" - 4" (25.4 - 101.6 mm) sizes.

SS Butterfly – *Bulletin B-51*
Stainless steel body. Tri-Clamp® end connections. Variety of seat materials. 1½" - 4" (38.1 - 101.6 mm) sizes.

Diaphragm – *Bulletin SV*
Maximum product flow with minimum agitation. ¼" - 4" (6.4 - 101.6 mm) sizes.

Diaphragm – *Bulletin DV*
Low-cost systems-oriented diaphram valve. 1" - 3" (25.4 - 76.2 mm) sizes.

Pumps

Tri-Flo® Centrifugal – *Catalog TF*
5 sizes in capacities to 1150 GPM (261 m³/hr). 1½" - 6" (38.1 - 152.4 mm) inlet.

Tri-Flo® CL Series Centrifugal – *Catalog CL*
11 sizes in capacities to 2000 GPM (454 m³/hr). 2½" - 4" (63.5 - 101.6 mm) inlet.

Tri-Flo® Centrifugal (Water For Injection/Pharmaceuticals) – *Bulletin WFI*
4 sizes in capacities to 700 GPM (159 m³/hr). 1½" - 4" (38.1 - 101.6 mm) inlet.

Series EH Centrifugal (Low Shear) – *Bulletin EH*
3 sizes in capacities to 1000 GPM (227 m³/hr). 3" - 6" (76.2 - 152.4 mm) inlet.

Positive Rotary – *Catalog PR*
6 sizes to 300 GPM (68 m³/hr) 1" - 6" (25.4 - 152.4 mm) inlet and outlet.

T Series Positive Rotary – *Bulletin TS*
(TSR Standard Rotor Design)
12 sizes to 500 GPM/290 psi (113 m³/hr/20 bar) 1" - 6" (25.4 - 152.4 mm) inlet and outlet.
(TSK Ultra CIP) 5 sizes to 250 GPM/ 145 psi (56 m³/hr/10 bar) 1" - 3" (25.4 - 76.2 mm) inlet and outlet.

Diaphragm Pumps – *Bulletin AOD*
5 sizes to 200 GPM/100 psi (45 m³/hr/ 7 bar) ¼" - 4" (6.4 - 101.6 mm) inlet and outlet.

Fittings

The Complete Line – *Catalog FTGS*

Tri-Clamp®
Sanitary, ½" - 6" (12.7 - 152.4 mm) Tube OD; General service, 1" - 12" (25.4 - 304.8 mm) Tube OD.

Tri-Weld®
Standard, 1" - 4" (25.4 - 101.6 mm) Tube OD; Extended tangent, ½" - 4" (12.7 - 101.6 mm) Tube OD.

Bevel Seat
Acme thread fittings with combination ends and adapters, 1" - 4" (25.4 - 101.6 mm) Tube OD.

Zephyrweld®
For general service, ¾" - 12 " (19.0 - 304.8 mm) Tube OD.

Tri-Flo® – *Bulletin TF-FT*
Sanitary, 1" - 4" (25.4 - 101.6 mm) Tube OD.

AL-6XN® Alloy – *Bulletin AL6-FTG*
Sanitary 1" - 3" (25.4 - 76.2 mm) Tube OD.

Automated Systems

Tri-Blender® – *Bulletin TB*
Blends up to 350 lb./min. (159 kg) dry powder with up to 150 GPM (34 m³/hr).

CIP Systems – *Bulletin CIP*
Four standard models. Variations for hot sanitizing service.

Filters/Strainers – *Bulletin BFS*
Built to sanitary standards. Low pressure drop and extended service.

Bio-Pharm Systems – *Bulletin B-P*
For sterile integrity.

A Company Engineered For The Customers We Serve

Our Food & Dairy, Bio-Pharm, and Export Divisions ensure the highest levels of customer support in the industry. Each division is organized to provide specific application, equipment and logistics support to help our customers achieve the highest levels of process system efficiency. For more information on how Tri-Clover can be of benefit to your company, contact your local Tri-Clover distributor, or call us at 1-800-242-4000.

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