



MASTERFLEX[®]

TUBING PUMP SYSTEMS

MASTERFLEX[®] PUMP SYSTEMS
FOR YOUR UNIQUE
PROCESS & INDUSTRIAL NEEDS



 **Cole-Parmer[®]**
scientific experts

Pump Technology Comparison

Precision, versatility, and ease of use make Masterflex® peristaltic pump technology the preferred solution to increasing numbers of applications in the processing industry and in industrial applications. The following comparisons prove that under real-world conditions, Masterflex sets the standard for excellence.

ROTARY LOBE PUMPS VS MASTERFLEX

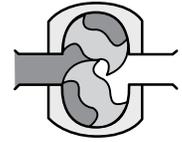
Application: A university research facility needs to pump cell media into a system containing cells (the cells are living off of the media in the system). This system is used to simulate a human circulatory system for research purposes; therefore a constant flow rate needs to be maintained.

ROTARY LOBE PUMP DISADVANTAGES

- Difficult to pump precise flow rates
- Does not self-prime
- Cannot handle particulates
- Difficult to clean

MASTERFLEX ADVANTAGES

- Easily maintains a precise, constant flow rate
- Excellent self-priming capabilities
- Able to handle shear-sensitive particulates/fluids
- Easy to change out tubing and clean/sterilize pump



CENTRIFUGAL PUMPS VS MASTERFLEX

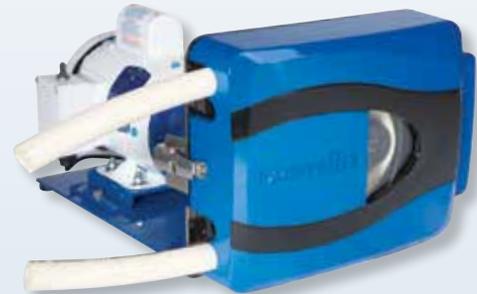
Application: A food manufacturer needs to pump a high-viscosity glue (60,000 to 90,000 cp) into a labeler machine. The pump must be food-grade compatible. The glue is placed on a roller and then onto a palette, which places a thin layer of glue onto a bottle. The label is then placed onto the bottle by a separate machine.

CENTRIFUGAL PUMP DISADVANTAGES

- Does not handle high viscosities
- Difficult to clean
- Internal pump parts are not food-grade compatible
- Limited automated capabilities

MASTERFLEX ADVANTAGES

- Handles high viscosities well
- Easy to change out tubing and clean pump—less maintenance
- Washdown models allow for quick and easy cleaning
- Tubing is food-grade compatible
- Has more automated capabilities



FLEXIBLE IMPELLER PUMPS VS MASTERFLEX

Application: A research laboratory needs to pump dilute sulfuric acid and a copper sulfate solution continuously (24 hours a day) for five days in a row. They need to recirculate these two chemicals at 60°C for a cell lab. They need to be able to vary the flow rate with a maximum flow of 15 LPM at 15 psi.

FLEXIBLE IMPELLER PUMP DISADVANTAGES

- Does not handle higher pressures at higher flow rates well
- Difficult to find chemically compatible internal pump parts
- Cannot run dry
- Variable flow control is difficult
- Difficult to clean

MASTERFLEX ADVANTAGES

- Handles higher pressures at higher flow rates
- Chemically compatible with a variety of tubing formulations
- Runs dry
- Easy to control flow with a variable-speed pump drive
- Easy to change out tubing and clean pump



Pump Technology Comparison

DIAPHRAGM PUMPS VS MASTERFLEX

Application: A manufacturer needs to pump ethylene glycol from a 55-gallon drum into six smaller containers. Once these six containers are filled with the ethylene glycol, they are used to lubricate needles for their process.

DIAPHRAGM PUMP DISADVANTAGES

- Cannot handle high viscosities—the flow would be reduced by 75% due to the 450-cp viscosity of ethylene glycol
- Requires routine maintenance and difficult to clean
- Numerous replacement parts: diaphragms and internal valves

MASTERFLEX ADVANTAGES

- Handles high viscosities well—improved customer's flow rate
- Fluid does not contact internal pump parts—only the tubing
- Easy tubing replacement; reduced maintenance time
- Excellent self-priming capabilities



AIR-OPERATED DOUBLE DIAPHRAGM PUMPS VS MASTERFLEX

Application: A cheese manufacturer needs to pump oil from a 55-gallon drum into small containers. Once placed in these containers, the oil is mixed with blocks of cheese and spices to create different flavors of cheeses. This company used an air-operated double diaphragm pump but was having difficulty with its operation.

AIR-OPERATED DOUBLE DIAPHRAGM PUMP DISADVANTAGES

- Difficult to control the flow rate
- Cavitation of the pump caused air bubbles within the flow path
- Difficult to clean and maintain sterility of internal parts of pump

MASTERFLEX ADVANTAGES

- Easy to control flow with variable-speed drives—reduces manual operation
- Reduced cavitation problems
- Easy to change out tubing
- Easy to maintain sterility of tubing and fluid path
- Offer food-grade tubing
- No valves to clean or maintain



DRUM PUMPS VS MASTERFLEX

Application: A pharmaceutical customer needs to pump a disinfecting agent from a drum into an 8-gallon tank. They had been using a hand pump in the past but in order to reduce time and maintenance they would like an automated system.

DRUM PUMP DISADVANTAGES

Hand Pump

- Manual, hard labor
- Not fast or efficient
- Risk of chemicals splashing on operator

Motorized Drum Pump

- Poor self-primers
- Doesn't remove all of the fluid in the drum
- Most models don't run dry
- Very few automated features

MASTERFLEX ADVANTAGES

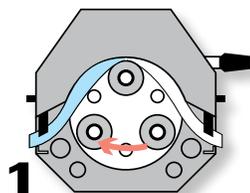
- More efficient and fast at pumping fluids—reduces labor
- Excellent self-priming capabilities
- Empties entire tank/drum
- Runs dry
- Excellent chemical compatibility
- More automated features to program fluid flow—improved accuracy



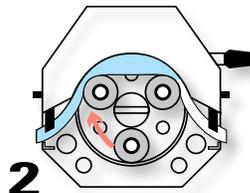
MASTERFLEX® Tubing Pumps

HOW MASTERFLEX TUBING PUMPS WORK

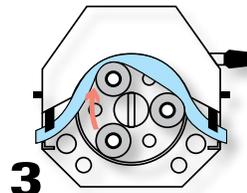
Precision, versatility, and ease of use make Masterflex peristaltic pump technology the preferred solution to increasing numbers of applications in the processing industry and in the lab.



1 A pump head consists of only two parts: the rotor and the housing. The tubing is placed in the tubing bed—between the rotor and housing—where it is occluded (squeezed).



2 The rollers on the rotor move across the tubing, pushing the fluid. The tubing behind the rollers recovers its shape, creates a vacuum, and draws fluid in behind it.



3 A “pillow” of fluid is formed between the rollers. This is specific to the ID of the tubing and the geometry of the rotor. Flow rate is determined by multiplying speed by the size of the pillow. This pillow stays fairly constant except with extremely viscous fluids.

FREQUENTLY ASKED QUESTIONS ABOUT MASTERFLEX TUBING PUMPS

FLOW RATES

What flow rates are attainable?

Depending on which series you select, our systems deliver flow rates from 0.0005 mL/min to 37 LPM.

What flow precision can I expect?

You can obtain a flow precision of up to $\pm 0.5\%$ with calibrated flow systems. For other systems, $\pm 3\%$ precision is possible for general transfer applications.

Are measured volumes repeatable?

Yes. Volumes are repeatable with accuracies of $\pm 0.25\%$ or better using calibrated systems.

What is the effect of viscosity on flow?

All flow rates are based on water. Increasing the fluid viscosity will decrease the flow rate.

PUMP HEADS

What is the maximum pressure?[†]

The maximum pressure using L/S® High-pressure tubing is 100 psi (6.8 bar); nominal pressure is 25 psi (1.7 bar).

What is the maximum inlet pressure?[†]

Typically 40 psi (2.7 bar), depending on tubing ID, wall thickness, and formulation.

What is the maximum suction lift?

The maximum suction lift is 8.8 m H₂O (29 ft H₂O).

Are check valves required?

No. Our unique designs eliminate this need.

Can Masterflex pumps run dry?[‡]

Yes. They can pump gases, liquids, or mixed phases.

Are Masterflex pumps self-priming?

Yes. They can develop a vacuum in excess of 660 mm Hg (26" Hg).

Are Masterflex pumps positive-displacement type pumps?

Yes. The flow rate with water is directly proportional to the rotor speed up to the maximum capabilities of the drive.

Are Masterflex pumps nonsiphoning?

Yes. One roller is always squeezing the tubing closed, so you don't get any backflow up to the rated pressure of the tubing/pump head.

Can slurries and abrasive solutions be pumped?

Yes. The limitations are viscosity and particle size relative to selected tubing ID.

Why are so many pump heads and tubing sizes offered?

To provide maximum flexibility in achieving desired flow at the optimal drive speed.

Is flow reversible?

Yes. All specifications apply in either clockwise or counterclockwise rotation.

TUBING

Is the tubing important?

Yes. The tubing is the pump chamber. The elasticity of the tubing provides suction lift; its strength provides pressure handling ability; its flexibility determines pumping life; its bore determines the flow rate; and its wall thickness determines pumping efficiency.

What is the chemical resistance?

It depends on the tubing formulation you select. To determine chemical resistance of the tubing formulations, such as Chem-Durance®, go to ColeParmer.com/mflexchem.

How long will the tubing last?

Tubing life depends on pump speed and pressure, tubing material and chemical compatibility, and abrasiveness of the liquid (media) being pumped.

How does pump speed affect tubing life?

To put it simply, the lower the speed, the longer the life of the tubing.

What tubing formulation gives longest life?

In order, Norprene®, PharMed® BPT, PharmaPure®, Tygon® LFL, silicone, BioPharm Plus, C-FLEX®, Tygon®, and Viton® last the longest.

Is tubing available that is compatible for food and sterile applications?

Yes. Some tubing formulations meet NSF specifications, 3A, FDA, and USDA requirements for food handling. Many can be sterilized.

DRIVES

Why are drives also offered separately from pump heads in the L/S® and I/P® series?

The modular concept lets you customize your system for flexibility and economy.

Can a single drive run more than one pump head?

In many cases, two to four pump heads can be stacked in any combination up to the max torque capability of the drive.

[†]PTFE-pump head can operate at pressures up to 100 psi.

[‡]Except the PTFE-pump head which can overheat when run dry.

MASTERFLEX® Tubing Pumps

TOP REASONS TO CHOOSE MASTERFLEX TUBING PUMPS

1. SIMPLICITY

Masterflex pumps are easy to use. In most cases, they can be installed within minutes. With few moving parts, they're easy to maintain.

2. CONTAMINATION-FREE PUMPING

Since peristaltic pumps confine the fluid to the tubing, the pump cannot contaminate the fluid and the fluid cannot contaminate your pump. To pump a different fluid, simply change the tubing.

3. ECONOMY

Feature-for-feature, you will not find a lower priced tubing pump on the market. For economical liquid transfer, Masterflex offers the best value; in both initial cost and in long-term operating expense.

4. ACCURACY

Each component of a Masterflex tubing pump is designed to strict standards and then rigorously tested; you can be confident of extremely accurate flow delivery.

5. SELECTION

Masterflex drives, coupled with interchangeable pump heads and tubing, offer wide flow ranges and more than 10,000 possible pump combinations. Our pumps are designed for a wide variety of environments, from basic laboratory to industrial process to field use applications.

6. DURABILITY

A Masterflex tubing pump system does not have direct contact with the pumped fluid, so it has a longer service life than other pumps.

7. VERSATILITY

One of the biggest advantages of variable-speed pumping is the wide variety of applications a single pump can handle. Masterflex pumps enhance this advantage by offering many different pump heads for each drive. By interchanging the components, you effectively customize the pump for your changing needs.

8. APPLICATION ASSISTANCE

Contact your Masterflex distributor for expert product and technical assistance on any Masterflex tubing pump system.

9. OEM ADAPTABILITY

Masterflex pumps are ideal for a wide variety of original equipment manufacturing (OEM) applications.

APPLICATION TIPS FOR MASTERFLEX TUBING PUMPS

TO MAXIMIZE TUBING LIFE

- Run larger tube sizes at slower speeds
- Select longer-life material (see "Tubing Selection Hints")
- Reduce pressure in system
- Stop pump periodically, move tubing 20 to 25 cm (8 to 10 inches) forward
- Reduce occlusion if possible

TO PUMP VISCOUS FLUIDS

- Choose tubing at least one size larger than the flow rate requires
- Keep drive speed below 300 rpm; the slower the motor, the better the flow
- Pressurize the inlet
- Use adjustable occlusion pumps: over-occlude to prime; reduce occlusion for longer life

TO PUMP ABRASIVE FLUIDS

- Keep soft particle sizes <25% of tube ID
- Keep hard particle sizes <5% of tube ID
- Keep drive speed below 300 rpm
- Use adjustable occlusion pumps: over-occlude to prime; reduce occlusion for longer life

TO REDUCE PULSATION

- Use a pulse dampener
- Use adjustable occlusion pump: reduce occlusion and apply back pressure
- Use dual (stacked) heads with offset rollers and unify channels
- Add extra discharge tubing to system
- Run smaller tube sizes at higher speeds
- Use a pump head with a higher number of rollers

TO CHECK TUBING COMPATIBILITY

- Go to ColeParmer.com/mflexchem for detailed compatibility information
- Always pretest unfamiliar chemicals before using with desired tubing
- Request a Free Masterflex® Tubing Test Kit today!



TUBING SELECTION HINTS

- Longest life: Norprene®, PharMed® BPT, PharmaPure®, STA-PURE®, CHEM-SURE®, Biopharm Plus silicone
- Best clarity: Tygon® formulations, silicone (platinum-cured)
- USP Class VI: Silicones, C-FLEX®, PharMed® BPT, PharmaPure®, STA-PURE®, CHEM-SURE®, Tygon® Chemical, Tygon® LFL, Chem-Durance® Bio
- High purity: CHEM-SURE®, PharmaPure®
- Pressure/vacuum: Norprene®, Norprene® HP, PharMed® BPT, PharMed® BPT HP, PharmaPure®



MASTERFLEX® I/P® Pump Systems

I/P MODULAR PUMP

Applications

- Printing ■ Laboratory research ■ Polishing/lapping ■ Chemical recirculation
- Sterile fluid transfer ■ Pumping from 55-gallon drums ■ Filtration

Benefits

- Place components where convenient—separate by up to 6 feet
- Easy tubing changes ■ Purge tubing before or after pumping
- Forward/off/reverse switch lets you reverse while maintaining speed setting



77962-00

I/P MODULAR PUMP WITH WALL-MOUNT CONTROLLER

Applications

- pH control ■ Process control ■ Food applications ■ Dispensing culture media
- Dye dispensing ■ Plating ■ Corrosive fluid transfer ■ Slurry pump

Benefits

- Ideal for wet or hostile environments
- Easy tubing changes
- Forward/off or reverse (reverse direction while maintaining speed setting)
- Control drive speed remotely (4 to 20 mA)
- Purge tubing before or after pumping



77962-10

I/P PROCESS PUMPS

Applications

- Media transfer ■ Filling/emptying large carboys and bags ■ Pumping dyes and pigments
- Pumping fermentation chemicals ■ Sewage and sludge sampling

Benefits

- Brushless, maintenance-free motor for continuous-duty applications
- Light enough to carry with one hand
- Displays percent speed from 5 to 100% for repeatable control
- Sealed, IP55-rated housing sprays or wipes down for easy cleaning
- Powerful enough to drive two Easy-Load® pump heads for twice the flow rate



77963-10



Catalog number	Flow range ¹ (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive included	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
I/P Modular pump								
MK-77962-00	0.2 to 8.0	I/P Easy-Load® 77601-10	Tygon® LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07591-00	20 to 650	Controller: IP22 Motor: IP34	90 to 130 VAC, 3.0 A
MK-77962-07					07591-07			180 to 260 VAC, 1.5 A
I/P Modular pump with wall-mount controller								
MK-77962-10	0.2 to 8.0	I/P Easy-Load 77601-10	Tygon LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07591-10	20 to 650	Controller: IP55 Motor: IP34	90 to 130 VAC, 3.0 A
MK-77962-15					07591-15			180 to 260 VAC, 1.5 A
I/P Process pumps								
MK-77963-10	0.4 to 8.0	I/P Easy-Load 77601-10	Tygon LFL I/P 73, 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	77410-10	33 to 650	IP55	90 to 130 VAC, 4.5 A; 220 to 260 VAC, 2.6 A
MK-77963-20	0.9 to 17.0	I/P High-Performance 77600-62	Tygon LFL I/P 88, 06429-88; 3 ft (1 m)	I/P 70, I/P 88, I/P 89				

¹Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order separately on page 9.

MASTERFLEX® I/P® Pump Systems

I/P PROCESS PUMPS WITH REMOTE CAPABILITY

Applications

- Purification/filtration/media transfer ■ Automated process
- Pumping anti-foaming agents ■ Food and pharma process pump
- Chemical feed and metering ■ Wastewater process pump

Benefits

- Remote control capability via fluid-resistant I/O connector on back of drive (requires 77300-32 remote cable kit)
- Analog outputs include “pump ready” signal (order 77300-32 remote cable kit below)
- Displays percent speed from 5 to 100% for precise, repeatable control
- Sealed, IP55-rated housing sprays or wipes down for easy cleaning
- Brushless, maintenance-free motor for continuous-duty applications



77965-10

I/P DIGITAL MODULAR PUMP

Applications

- Yogurt dispensing pump ■ Flavor concentrate/food additive dispenser
- Photochemical dispenser ■ Shampoo dispenser

Benefits

- Modular format lets you separate drive and controller up to 25 feet
- Remote control capabilities allow easy integration into a system (order connector 07595-52 below)
- Repeat dispensing ■ Reverse pumping
- Ideal for wet environments ■ Start/stop foot switch



77970-20

I/P DIGITAL MODULAR PUMP WITH WALL-MOUNT CONTROLLER

Applications

- Transfer cell culture media ■ Flavor concentrate/food additive dispenser
- Photochemical dispenser

Benefits

- Ideal for wet environments ■ Repetitive dispensing ■ Separate drive and controller
- Convenient components placement ■ Handheld remote offers remote control operation
- Analog remote control of speed/start/stop and direction (requires 77300-32; order below)



77970-30

Catalog number	Flow range† (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive included	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
I/P Process pumps with remote capability								
MK-77965-00	0.4 to 8.0	I/P Easy-Load® 77601-10	Tygon® LFL I/P 73, 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	77411-00	33 to 650	IP55	90 to 130 VAC, 4.5 A; 220 to 260 VAC, 2.6 A
MK-77965-10	0.9 to 17.0	I/P High-Performance 77600-62	Tygon LFL I/P 88, 06429-88; 3 ft (1 m)	I/P 70, I/P 88, I/P 89				
I/P Digital modular pump								
MK-77970-20	0.2 to 8.0	I/P Easy-Load 77601-10	Tygon LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07592-20	20 to 650	Controller: IP22 Motor: IP34	90 to 130 VAC, 4.4 A 190 to 260 VAC, 2.2 A
MK-77970-27					07592-27			
I/P Digital modular pump with wall-mount controller								
MK-77970-30	0.2 to 8.0	I/P Easy-Load 77601-10	Tygon LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07592-30	20 to 650	Controller: IP56 Motor: IP34	90 to 130 VAC, 4.4 A 190 to 260 VAC, 2.2 A
MK-77970-37					07592-35			

†Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 9.

[MK-07592-83](#) Handheld remote for 77970-30, -37 only

[MK-07595-43](#) Washdown foot switch for 77965-00, -10, and 77970-30, -37

[MK-77300-32](#) Remote cable kit for 77965-00, -10, and 77970-30, -37

[MK-07595-42](#) Foot switch for 77970-20, -27; momentary start/stop; 6 ft (1.8-m) cable

[MK-07595-52](#) DB15 male connector for 77970-20, -27. Use to create your own cable.

MASTERFLEX® I/P® Pump Systems

I/P DIGITAL PROCESS PUMPS

Applications

- Pharma and cosmetics process pump ■ Sanitary food/dairy process pump
- Automated process pump ■ Dosing/metering additives ■ Pilot scale fermentation
- Bulk media transfer and dispensing ■ Large-volume buffer transfer

Benefits

- Brushless motor virtually eliminates maintenance—no motor brushes to replace
- Full-featured digital dispenser ■ Programmed calibration ensures dispense accuracy
- Four-digit display shows rpm, flow rate, dispense volume, and copy number
- Programmable dispense interval for automated dispensing
- Analog remote control of speed, start/stop, and direction (order remote accessories below)
- Sealed, stainless steel housing for easy washdown in sanitary process environments
- Tach output for precise speed control and feedback



77964-00



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive included	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
MK-77964-00	0.01 to 8.0	I/P Easy-Load® 77601-10	Tygon® LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	77420-00	1 to 650	IP66	90 to 130 VAC, 4.5 A; 220 to 260 VAC, 2.5 A
MK-77964-10	0.02 to 17.0	I/P High-Performance 77600-62	Tygon LFL I/P 88 06429-88; 3 ft (1 m)	I/P 70, I/P 88, I/P 89				

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 9.

[MK-07592-83](#) Handheld remote

[MK-07595-43](#) Washdown foot switch, momentary start/stop; 1.8-m (6-ft) cable

[MK-77420-01](#) Caster kit for easy movement of the drive

[MK-77300-32](#) Remote cable kit

I/P AIR-POWERED PUMP

Applications

- Transfer of hazardous materials ■ Transfer of printing inks ■ Production fermentation

Benefits

- Safe where electrical power not advisable
- Operates from your compressor ■ Easy tubing changes
- High horsepower in a compact size ■ Cooler operation
- Smooth-starting, low-maintenance motor



77980-00

I/P HAZARDOUS-DUTY PUMP

Applications

- Transfer of chemicals where hazardous vapors are present
- Transfer of heat-sensitive fluids ■ Production fermentation

Benefits

- Ideal where electricity is unsafe ■ Easy tubing changes
- Variable-speed for wide flow ranges

Features

- ¼-hp continuous-duty drive ■ ±10% drive speed accuracy



77981-10



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive included	Drive speed range (rpm)	Drive IP rating	Power
MK-77980-00	1.2 to 8.0	I/P Easy-Load® 77601-10	Tygon® LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07589-30	100 to 650	IP34	3 to 25 cfm (0.08 to 0.7 m ³ /min) at 20 to 100 psi (1.4 to 6.9 bar)
MK-77981-10	0.12 to 5.3	I/P Easy-Load® 77601-10	Tygon® LFL I/P 73 06429-73; 10 ft (3 m)	I/P 26, I/P 73, I/P 82	07583-50	10 to 430	IP 21	115 VAC, 60 Hz

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 9.

Note: For safe operation of Masterflex® air-powered pumps, ground pump carefully to protect from static electricity.

MASTERFLEX® I/P® Pump Tubing

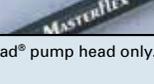
I/P® PRECISION AND HIGH-PERFORMANCE PRECISION PUMP TUBING

- Ensure optimal Masterflex pump performance
- Custom extruded for precise fit and long life in Masterflex pumps
- Lot-to-lot consistency provides superior accuracy and repeatability

Masterflex I/P pump tubing is manufactured to extremely close tolerances that match our I/P pump heads, ensuring accurate, repeatable flow and long tubing life. Our tubing is factory-tested and optically inspected to provide the best performance from your peristaltic pump.

Pump tubing cross sections	I/P Precision pump tubing			I/P High-performance precision pump tubing		
						
	I/P® 26	I/P® 73	I/P® 82	I/P® 70	I/P® 88	I/P® 89
Inside diameter (nominal)	0.25" (6.4 mm)	0.37" (9.5 mm)	0.5" (12.7 mm)	0.37" (9.5 mm)	0.5" (12.7 mm)	0.62" (15.88 mm)
Hose barb size (nominal)	¼" (6.4 mm)	⅜" (9.5 mm)	½" (12.7 mm)	⅜" (9.5 mm)	½" (12.7 mm)	⅜" (15.88 mm)
Flow range (approximate) [†] with 1 to 650 rpm drive	0.01 to 4 LPM (0.002 to 1.1 GPM)	0.01 to 8 LPM (0.002 to 2.1 GPM)	0.02 to 13 LPM (0.005 to 3.5 GPM)	0.01 to 8 LPM (0.002 to 2.1 GPM)	0.02 to 17 LPM (0.005 to 4.5 GPM)	0.03 to 19 LPM (0.007 to 5.0 GPM)
Maximum pressure [‡] , continuous	25 psi (1.7 bar)	25 psi (1.7 bar)	15 psi (1.0 bar)	25 psi (1.7 bar)	25 psi (1.7 bar)	15 psi (1.0 bar)
Maximum pressure [‡] , intermittent	40 psi (2.7 bar)	40 psi (2.7 bar)	20 psi (1.4 bar)	40 psi (2.7 bar)	35 psi (2.4 bar)	20 psi (1.4 bar)
Maximum vacuum [‡]	26" Hg (660 mm Hg)	26" Hg (660 mm Hg)	20" Hg (510 mm Hg)	26" Hg (660 mm Hg)	26" Hg (660 mm Hg)	24" Hg (610 mm Hg)
Suction lift [‡]	29 ft H ₂ O (8.8 m H ₂ O)	29 ft H ₂ O (8.8 m H ₂ O)	23 ft H ₂ O (7.0 m H ₂ O)	29 ft H ₂ O (8.8 m H ₂ O)	29 ft H ₂ O (8.8 m H ₂ O)	27 ft H ₂ O (8.2 m H ₂ O)

[†]Determined under the following conditions: 0 psi at inlet, 0.5 psi at outlet; water temperature at 72°F (22°C). [‡]Actual performance varies depending on tubing formulation—values shown are for firm tubing. Values for STA-PURE®/CHEM-SURE® pump tubing are 60 psi (4.1 bar) continuous, 100 psi (6.9 bar) intermittent.

Pump tubing formulation		Precision pump tubing			High-performance precision pump tubing			
		I/P 26	I/P 73	I/P 82	I/P 70	I/P 88	I/P 89	
Silicone (platinum cured)	25 ft (7.6 m) per pack		MK-96410-26	MK-96410-73	MK-96410-82	MK-96510-70 10-ft/pk	MK-96510-88 10-ft/pk	MK-96510-89 10-ft/pk
Silicone (peroxide cured)	25 ft (7.6 m) per pack		MK-96400-26	MK-96400-73	MK-96400-82	MK-96400-70 10-ft/pk	MK-96400-88 10-ft/pk	MK-96400-89 10-ft/pk
BioPharm silicone (platinum)	25 ft (7.6 m) per pack		MK-96420-26	MK-96420-73	MK-96420-82	MK-96421-70 10-ft/pk	MK-96421-88 10-ft/pk	MK-96421-89 10-ft/pk
BioPharm Plus silicone (platinum)	25 ft (7.6 m) per pack		MK-96440-26	MK-96440-73	MK-96440-82	MK-96441-70 10-ft/pk	MK-96441-88 10-ft/pk	MK-96441-89 10-ft/pk
C-FLEX® (50 A)	25 ft (7.6 m) per pack		MK-06424-26	MK-06424-73	MK-06424-82	MK-06424-70 10-ft/pk	MK-06424-88 10-ft/pk	MK-06424-89 10-ft/pk
PharMed® BPT	25 ft (7.6 m) per pack		MK-06508-26	MK-06508-73	MK-06508-82	MK-06508-70	MK-06508-88	MK-06508-89
PharmaPure®††	25 ft (7.6 m) per pack		MK-06435-26	MK-06435-73	MK-06435-82	—	—	—
STA-PURE®	24" (61 cm) per pack		MK-96200-26	MK-96200-73	MK-96200-82	—	—	—
CHEM-SURE®	24" (61 cm) per pack		MK-96210-26	MK-96210-73	MK-96210-82	—	—	—
Tygon® LFL	25 ft (7.6 m) per pack		MK-06429-26	MK-06429-73	MK-06429-82	MK-06429-70	MK-06429-88	MK-06429-89
Tygon® Food (B-44-4X)	50 ft (15.2 m) per pack		MK-06419-26	MK-06419-73	MK-06419-82	—	—	—
Tygon® lab (R-3603)	50 ft (15.2 m) per pack		MK-06409-26	MK-06408-73	MK-06408-82	MK-06409-70	MK-06409-88	MK-06409-89
Tygon® fuel & lubricant (F-4040-A)	50 ft (15.2 m) per pack		MK-06401-26	MK-06401-73	MK-06401-82	—	—	—
Tygon® chemical (2001)††	50 ft (15.2 m) per pack		MK-06475-26	MK-06475-73	MK-06475-82	—	—	—
Norprene® (A 60 G)	50 ft (15.2 m) per pack		MK-06404-26	MK-06404-73	MK-06404-82	MK-06404-70 25-ft/pk	MK-06404-88 25-ft/pk	MK-06404-89 25-ft/pk
Norprene® Food (A 60 F)	50 ft (15.2 m) per pack		MK-06402-26	MK-06402-73	MK-06402-82	MK-06402-70 25-ft/pk	MK-06402-88 25-ft/pk	MK-06402-89 25-ft/pk
Chem-Durance®	50 ft (15.2 m) per pack		—	MK-06432-73 ^{††}	MK-06432-82 ^{††}	MK-06432-70	MK-06432-88 25-ft/pk	MK-06432-89 25-ft/pk
Chem-Durance® Bio	50 ft (15.2 m) per pack		New MK-06442-26 ^{††}	MK-06442-73 ^{††}	MK-06442-82 ^{††}	MK-06442-70	MK-06442-88 25-ft/pk	MK-06442-89 25-ft/pk
Viton®	25 ft (7.6 m) per pack		MK-06412-26	MK-06412-73				
FDA Viton®	25 ft (7.6 m) per pack		MK-96412-26	MK-96412-73				

††Recommended for use with Easy-Load® pump head only.

MASTERFLEX® B/T® Pump Systems

B/T FIXED-SPEED PUMPS

Applications

- Bulk fluid pumping
- High-volume tank transfer and filling
- Transfer shear-sensitive and viscous fluids
- Process vat pumping

Benefits

- Integrated pump interlock—shuts pump down when head is opened
- IP55 rated for spraydown in wet or challenging environments
- Gentle enough for pumping shear-sensitive and viscous fluids
- Load tubing with ease
- Aluminum frame for durability
- Simple to set up and operate



77110-00



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
MK-77110-00	37	Rapid-Load®	Tygon® LFL B/T 91 06429-91; 3 ft (1 m)	B/T 87, B/T 91	321	IP55	115 VAC, 8.0 A
MK-77110-07	30.7				266		220 VAC, 4.0 A

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 13.

B/T HAZARDOUS-DUTY FIXED-SPEED PUMP

Applications

- Applying coatings to finished paper
- Pumping bulk volatile chemicals
- Media transfer

Benefits

- Nonsparking motor for hazardous environments
- Easy tube loading
- Integrated pump interlock—shuts pump down when head is opened
- IP55 rated for protection against dust and low-pressure jets of water
- Gentle enough for pumping shear-sensitive and viscous fluids
- Aluminum frame for durability



77110-20



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
MK-77110-20	37	Rapid-Load®	Tygon® LFL B/T 91 06429-91; 3 ft (1 m)	B/T 87, B/T 91	321	IP55	115 VAC, 8.0 A

[†]Flow rate with included tubing; extend the flow rate of these systems with additional sizes of tubing; order on page 13.

MASTERFLEX® B/T® Pump Systems

B/T VARIABLE-SPEED PUMP

Applications

- Drain tanks and drums quickly
- High-viscosity fluid transfer
- Large-volume chemical addition
- Shear-sensitive fluid transfer

Benefits

- Easy to clean with epoxy-powder coating
- Housing prevents chemical corrosion
- Easy tubing changes
- Rugged housing for durability
- Washdown IP56-rated housing
- Detachable controller mounts up to 16 ft (4.9 m) away for convenient placement



77110-60



77110-67 only

Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
MK-77110-60	0.67 to 37	Rapid-Load®	Tygon® LFL B/T 91 06429-91; 3 ft (1 m)	B/T 87, B/T 91	12 to 321	IP56	115 VAC, 5.0 A
MK-77110-67							230 VAC, 2.5 A

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 13.

B/T AIR-POWERED VARIABLE-SPEED PUMP

Applications

- Transfer of volatile solvents
- Media transfer
- Production fermentation
- Transfer of printing inks

Benefits

- Safe where electrical power should not be used
- Operates from your compressor
- Easy tubing changes
- Cooler operation
- Smooth-starting, low-maintenance motor
- ATEX Zone 2 rated; rated to E Ex II 3G c IIc T6



77110-80



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive speed range (rpm)	Drive IP rating	Power
MK-77110-80	1.9 to 37	Rapid-Load®	Tygon® LFL B/T 91 06429-91; 3 ft (1 m)	B/T 87, B/T 91	35 to 321	IP56	12 cfm (0.34 m ³) at 40 psi (2.7 bar) minimum

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 13.

MASTERFLEX® B/T® Pump Systems

B/T DIGITAL PUMP WITH WALL-MOUNT CONTROLLER

Applications

- Caustic detergents
- Car wash chemicals
- Polishing slurry pump
- Lubricator for ball bearings
- Pumping glue

Benefits

- One-handed opening and closing for easy tubing changes
- Swing-away cover for CIP or SIP protocols
- Quiet yet rugged operation
- Separate controller/drive connected by a 16-ft (4.9-m) cable
- Displays flow rate, dispense volume, copy, rpm
- IP56-rated controller and drive protect against dust and water



B/T digital pump 77110-40 shown with optional mounting bracket 77110-90



Catalog number	Flow range [†] (LPM)	Pump head included	Tubing included	Tubing sizes accepted	Drive speed range (rpm)	Drive IP rating	Power (50/60 Hz)
MK-77110-40	0.67 to 37	Rapid-Load®	Tygon® LFL B/T 91 06429-91; 3 ft (1 m)	B/T 87, B/T 91	12 to 321	Controller: IP56 Motor: IP56	90 to 130 VAC, 5.0 A
MK-77110-47							190 to 260 VAC, 2.5 A

[†]Flow range with included tubing; extend the flow range of these systems with additional sizes of tubing; order on page 13.

[MK-07592-83](#) Handheld remote controller, with 25-ft (7.6-m) cable

[MK-77300-32](#) Remote cable, 25 ft (7.6 m) for remote capabilities

[MK-77110-90](#) Mounting bracket for digital controller

B/T RAPID-LOAD PUMP HEADS

- Convert your existing motor into a high-capacity Masterflex® B/T pump
- Accept B/T PerfectPosition™ pump tubing sizes B/T 87 and B/T 91
- Compatible with standard 56C frame or IEC 72/ISO 71 motors with B5 motor flange
- Complete with mounting hardware and 3 ft (1 m) of Tygon LFL B/T 91 tubing 06429-91
- Order additional tubing separately on page 13.



Motor not included

77110-50



Catalog number	Motor mount	Motor size	rpm	IP rating	Mounting type	Dimensions (L x W x H)	Power
MK-77110-50	NEMA Type 56C	Motor size, rpm, and IP rating (up to IP56) depend on specifications of motor selected			Direct-coupled	20" x 15½" x 12½" (51 x 40 x 31.8 cm)	Power specifications depend on the type of motor selected (min ½ hp, max 1800 rpm required)
MK-77110-55	IEC 72/ISO 71 with B5 flange				Direct-coupled	20" x 15½" x 12½" (51 x 40 x 31.8 cm)	

MASTERFLEX® B/T® Pump Tubing

B/T PERFECTPOSITION™ PUMP TUBING

ENSURE OPTIMAL PERFORMANCE FROM YOUR MASTERFLEX PUMP

- PerfectPosition tubing retention marks indicate the exact placement of tubing in the pump head to provide the best performance and life of the tubing
- Custom extruded to fit 77110-series Masterflex B/T pumps and pump heads
- Engineered for long life in peristaltic pump applications

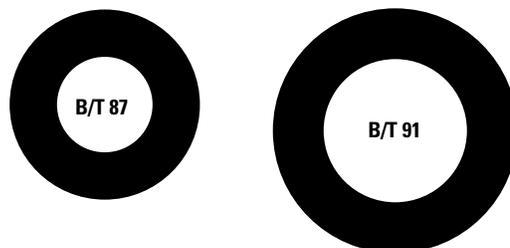
These Masterflex® B/T® tubing sizes 87 and 91 are optimized to provide better performance in higher-pressure applications. Each tubing size is manufactured to extremely close tolerances that match our B/T pump heads. These tight tolerances ensure accurate, repeatable flow, and long tubing life. Plus, the PerfectPosition tubing retention marks indicate the best placement of the tubing within the pump head.

Choose from a variety of tubing formulations below to allow for optimal performance in the most challenging applications.

B/T PerfectPosition tubing shown on pump head 77110-20



Cross Sections



Tubing Specifications

Pump tubing size	PerfectPosition™ pump tubing	
	B/T 87	B/T 91
Inside diameter (nominal)	0.5" (12.7 mm)	0.75" (19.0 mm)
Hose barb size	1/2" (12.7 mm)	3/4" (19.0 mm)
Flow range (approximate) [†] with 12 to 321 rpm drive	0.67 to 17.7 LPM (0.17 to 4.7 GPM)	1.4 to 37 LPM (0.4 to 9.8 GPM)
Maximum pressure [‡] , continuous	25 psi (1.7 bar)	20 psi (1.4 bar)
Maximum pressure [‡] , intermittent	40 psi (2.7 bar)	35 psi (2.4 bar)
Maximum vacuum [‡]	26" Hg (660 mm Hg)	
Suction lift [‡]	29 ft H ₂ O (8.8 m H ₂ O)	

[†]Determined under the following conditions: 0 psi at inlet, 0.5 psi at outlet; water temperature at 72°F (22°C). [‡]Actual performance varies depending on tubing formulation—values shown are for firm tubing.

More info FREE TUBING TEST KIT!

Find out which tubing formulations work best with chemicals you are using

Includes 17 FREE pump tubing samples, formulation descriptions, testing and ordering instructions.



Request a tubing test kit today!

Pump tubing formulation		PerfectPosition™ pump tubing	
		B/T 87	B/T 91
Silicone (platinum-cured)	10 ft (3.0 m) per pack	MK-96510-87	MK-96510-91
Silicone (peroxide-cured)	3 ft (0.9 m) per pack	MK-96406-87	MK-96406-91
BioPharm silicone (platinum-cured)	3 ft (0.9 m) per pack	MK-96424-87	MK-96424-91
BioPharm Plus silicone (platinum-cured)	3 ft (0.9 m) per pack	MK-96444-87	MK-96444-91
C-FLEX® (50 A)	10 ft (3.0 m) per pack	MK-96424-87	MK-06424-91
PharMed® BPT	25 ft (7.6 m) per pack	MK-06508-87	MK-06508-91
	3 ft (0.9 m) per pack	MK-95668-87	MK-95668-91
PharmaPure®	25 ft (7.6 m) per pack	MK-06435-87	MK-06435-91
Chem-Durance® Bio	25 ft (7.6 m) per pack	MK-06442-87	MK-06442-91
Norprene® food (A 60 F)	25 ft (7.6 m) per pack	MK-06402-87	MK-06402-91
	3 ft (0.9 m) per pack	MK-06403-87	MK-06403-91
Tygon® LFL	25 ft (7.6 m) per pack	MK-06429-87	MK-06429-91
	3 ft (0.9 m) per pack	MK-06430-87	MK-06430-91

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FREE TECHNICAL APPLICATIONS ASSISTANCE!

MASTERFLEX® Quick Selection Guide

 **PHARMACEUTICAL**

For harvesting cell media through ultrafiltration, choose...

- **I/P® Process pumps** for fast flow rates, up to 19 LPM

For pumping chemicals for fermentation control, choose...

- **I/P Process pumps** for repeatable digital speed control
- **I/P or B/T Air-powered pump** for locations where use of electricity is unsafe

For dispensing tablet-coating gels and mixtures, choose...

- **I/P or B/T Modular digital pump** for digital accuracy and convenient placement of pump components

For dispensing or dosing of solution and media such as agar, organic, saline solution, choose...

- **I/P Modular dispensing pumps** for remote operation and accurate dispensing

For sampling for validation processes, choose...

- **I/P Process pumps** for repeatable digital speed and sealed IP55-rated housing

 **FOOD & BEVERAGE**

For dispensing flavor concentrates and food additives, choose...

- **I/P Modular digital pump** for accurate, repetitive dispensing and remote operation
- **I/P Process pumps** with remote capability for easy-to-clean IP55-rated housing

For food processing, choose...

- **I/P or B/T Modular digital pump** for accurate, repetitive dispensing of viscous solutions

For food label application, choose...

- **B/T Variable-speed washdown pump** for quick and easy cleaning

 **INDUSTRIAL & MANUFACTURING**

For pumping dyes in textile manufacturing, choose...

- **I/P Process pumps** for maintenance-free brushless, continuous-duty motors with repeatable control

For pumping adhesives for envelope manufacturing, choose...

- **I/P or B/T Fixed-speed pumps** for easy-to-clean, sealed IP55-rated enclosure and reversible motor for line purge or bidirectional pumpings

For feeding solutions and additives to multiple process lines, choose...

- **I/P Fixed-speed multichannel pumps** for reversible motor for line purge or bidirectional pumping, and minimal downtime and cleanup

For polishing/lapping, choose...

- **I/P or B/T Modular analog pumps** for convenient placement of splash- and fire-resistant controller and chemical-resistant motor

 **PRINTING**

For transfer of printing inks, choose...

- **I/P Process pumps** for maintenance-free brushless, continuous-duty motors with repeatable control
- **I/P or B/T Air-powered pump** for locations where use of electricity is unsafe

For dispensing of photochemicals, choose...

- **I/P Modular digital pump** for splash-resistant design and convenient placement of pump components

 **CHEMICAL**

For chemical sampling of 55-gallon drums, choose...

- **I/P or B/T Modular analog pumps** for reversing fluid direction while maintaining speed setting and modular convenience

For acid/base delivery and pH control, choose...

- **I/P Modular dispensing digital pumps** for remote operation and greater accuracy with calibration
- **I/P Process pumps** with remote capability for quick flow adjustment via the precise three-turn speed control

For transfer of chemicals in hazardous locations, choose...

- **I/P or B/T Air-powered pump** for locations where use of electricity is unsafe

 **WATER/WASTEWATER TREATMENT**

For dosing reagents, surfactants, and antifoaming reagents, choose...

- **I/P Process pumps** with remote capability for repeatable control and IP55-rated steel enclosure

For sewage and sludge sampling, choose...

- **I/P Process pumps** for easy-to-clean, sealed IP55-rated housing and maintenance-free brushless motor