

## HEAVY DUTY PROCESS PUMPS

**NEW**

*Watson-Marlow Bredel ... Value for life*



# Pump perfection

For pumping harsh fluids, nothing beats a peristaltic pump; and when it comes to peristaltic pumps, there's none better than Watson-Marlow Bredel.

For over 50 years, Watson-Marlow Bredel has led the world in peristaltic pump innovation, developing products that do more than just move fluids, they improve the process.

Today over 1 million Watson-Marlow Bredel pumps keep processes running around the world, handling flows from 0.00015 GPD to 17.6 GPM and up to 100 psi.

Peristaltic pumps are positive displacement pumps. They use the perfect pumping principle with none of the disadvantages of other pump types, and cost far less in maintenance and interrupted production.

They successfully handle the harshest fluids, stand up to the toughest industrial environment, and pump with extraordinary accuracy and speed control up to 3,600:1.



## What is peristalsis?

Watson-Marlow Bredel pumps' low-shear peristaltic action is created by compressing the tube element between rollers and moving the pressure point along. Between roller passes, the element recovers to draw in fluid.

This valveless and sealless pump is self-priming and dry-running, with the flow totally contained within the tube element. No other positive displacement pump offers this separation of pump and fluid.

## Value for life

Watson-Marlow Bredel pumps offer the lowest-cost solution over the life of a pump in comparison to other pump types. We engineer our winning performance, we don't just turn up the speed. 60% fewer occlusions than our peristaltic competitors for the same flow means 2½ times the tube element life.

- The simplest possible pumping principle: no seals or valves to clog, leak, corrode or replace
- The perfect pump for difficult fluids: caustic, abrasive, viscous, shear-sensitive, gaseous, slurries, suspended solids
- Configured for industrial integration: PLC remote control, analog, network, and SCADA



## Why Watson-Marlow Bredel makes the right pump for your process

### Unbeatable turndown

With a 3600:1 control ratio and over a million:1 flow range, one Watson-Marlow Bredel pump can do the work of several lobe or diaphragm pumps. They handle a range of flow rates unmatched in the pump industry.

### Vapor lock eliminated

When pumping mixed phase liquids like sodium hypochlorite, lobe and diaphragm pumps can vapor lock when the gas enters the pump chamber. Watson-Marlow Bredel pumps handle the gas as easily as liquid, eliminating the risk of vapor lock.

### Chemical resistance

Inside and out, Watson-Marlow Bredel pumps stand up to today's most aggressive chemicals. NEMA 4X washdown enclosures ensure long pump life even in the toughest industrial environments. In addition, our wide range of tube element materials guarantee chemical compatibility with your fluid.

### Confident controllability

Watson-Marlow Bredel pumps integrate seamlessly into your process control system. The pump is self contained and easily configurable; there is no need for separate variable frequency drives or complex control devices. With built in manual, analog and digital control features, our pumps have the I/O capabilities to meet your process control and monitoring needs.



### Self-priming and dry-running

It is not always possible to position a pump in the ideal location and often self-priming and dry-running performance is required. These conditions will cause wear in traditional pumps, resulting in loss of performance and premature failure. Watson-Marlow Bredel pumps can dry prime up to 30 feet and run dry indefinitely.

### Unmatched accuracy

Using microprocessor controlled brushless DC drive technology, Watson-Marlow Bredel pumps meter within  $\pm 0.5\%$  accuracy, regardless of fluid viscosity changes ensuring economical use of expensive chemicals, correct system performance and finished product quality.

### Lowest life cycle cost

Leakage, clogging or blockage of pumps designed with seals, valves, lobes, rotors, pistons or vanes can be a regular occurrence and expensive to repair. Watson-Marlow Bredel pumps contain the fluid in a low cost tube element, that takes only minutes to replace. We also help save on capital and maintenance cost by not requiring ancillary equipment.



- Pump drives, pumpheads and tubing all last longer
- There's less downtime, less cleaning, less maintenance
- We back our continuous duty rated process pumps with a full five year warranty
- We offer personal worldwide service and technical support to keep your process running smoothly

## Five-year warranty

Demonstrating our total confidence in reliability and our commitment to customer satisfaction, Watson-Marlow Bredel cased pumps in this brochure carry a five-year warranty against faulty materials and workmanship. It covers everything except misuse of the pump and consumable items. Your production will not stall because of us.

Add it up and that's Value for Life



*Investment in our low shear pumps at a yeast production facility has increased efficiency*



*Chemically resistant 500 Series is the perfect solution for pumping corrosive cyanide in gold recovery operation*



*500 series pumps replaced high maintenance, high shear diaphragm pumps for coagulant dosing*



*At a remote water treatment plant, a 2000:1 chemical flow range is required to balance pH levels*

## Chemical

AEI Cables, a leading manufacturer of fire resistant cables has developed a novel process that requires low-dose metering of an aggressive fluid, with a constant flow rate. The previous engineering solution had used gear pumps to achieve the flow rate and pressure required, but this involved a high level of maintenance as well as a complicated pressure regulation system utilizing bypass valves.

John Cobbley of AEI states: "Before the installation of the new Watson-Marlow Bredel 500 series pumps, costs were somewhat unpredictable, but we had to allow at least \$3,400 per year/per pump for maintenance. We also had to allow for labor spent regularly adjusting gear pump flow rates. With the new pumps, we are finding that maintenance costs are far more predictable and much lower - as much as 70% less. We have also found that the new solution gives exceptionally stable flow rates, freeing up engineers' time to be spent elsewhere".





*In an aggressive chemical recovery application, the pump paid for itself in less than 12 months*



*Our 700 series handles abrasive printing ink without wear*



*Our pumps are impervious to vapor locking in sodium hypochlorite applications*



*520 pump accurately meters corrosive chemicals in punishing cellulose film manufacturing process*

## One million pumps keep industry productive

Watson-Marlow Bredel pumps save time and money worldwide by successfully handling the toughest applications in a broad range of industries including:

- **Chemical metering and transfer:** corrosive acids and bases
- **Water and waste water treatment:** alum, sodium bisulfite, sulfuric acid, sodium hypochlorite, hydrofluorosilic acid and ferric chloride
- **Paint and pigments:** dispersion mill feed, pigment and latex transfer
- **Pulp and paper:** dyes, brighteners, sizing agents, retention aids and titanium dioxide
- **Mining and mineral separation:** reagents, polymers and flocculants
- **Construction materials:** epoxies, cement, brick and roof tile materials; metering and spraying of colorants, coatings and additives
- **Brewing:** metering and transfer of yeast, flocculants, stabilizers, finings
- **Printing and packaging:** varnishes, inks, coatings and adhesives, with no color cross-contamination or aeration
- **Food and beverage:** Clean-in-place applications, dairy, bakery, flavorings and additives
- **Textiles:** fiber coatings, dyes and acids
- **OEM:** panel mount or stand alone pump versions available for system suppliers



## Paints and Pigments

Accurate and repeatable metering of process fluids into dispersion mills is critical in achieving uniformity from one batch of paint pigments to another.

Because of their ability to provide consistent, reproducible flows at low volumes, Watson-Marlow Bredel peristaltic pumps were chosen to replace double diaphragm pumps at BASF's Michigan paint mixing plant. The pumps require minimal set-up time and maintenance. The sealless design eliminates the need to clean the pumps, thereby avoiding the costs, health risks, and environmental issues associated with cleaning solvents. "It is essential for color consistency that flow rates to the mills be stable and reproducible," says the production manager. "The double diaphragm pumps we had been using were apt to stall at low flow rates. We no longer have that problem since we installed the peristaltic pumps."



# Pick a winner

Watson-Marlow Bredel's tough industrial cased pumps are a team, and they're on your side. The 520, 620 and 720, using continuous tubing or elements, cover flows from 0.00015 GPD to 17.6 GPM, with high accuracy and industrial compatibility.

**The 720 is a powerful pump** which can be fitted with one or two pumpheads for high flow metering or transfer

**The versatile, medium-flow 620** is available with two rollers, for maximum throughput, or four rollers, for minimum pulsation

**With its eight tubing sizes, the low flow 520** is a metering and chemical injection workhorse. The 520 also offers special pumping options, including multi-channel and low pulse dispensing

## No simpler maintenance

With a Watson-Marlow Bredel pump, cleaning and maintenance could never be easier. A simple tube change, that takes only moments, leaves the flow path as good as new.

It doesn't matter if you're changing a 520, 620 or 720 tube element, it only takes a minute.

- 1: Open the tool-unlockable safety guard or track** and lift off the old tube element
- 2: Put another tube element in place**
- 3: Close the guard** and connect up to your system



## Pick the pump you need

Choosing the perfect pump from our many options is easy. Just answer four questions:

- 1 How much fluid?
- 2 What pumphead characteristics?
- 3 What level of control?
- 4 Which tube?

All share the same technology, human-machine interface, and space-saving design concept. The controls are identical, allowing process scale-up and easy operator training: if you know one pump, you know them all.

- Flow to 8.8 GPM, 1 channel
- Flow to 17.6 GPM, 2 channels
- Pressures up to 30 psi

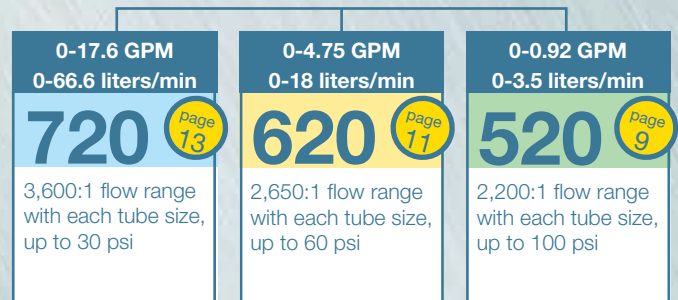
- Flow to 4.75 GPM
- Two or four roller versions
- Pressures up to 60 psi

- Flow to 0.92 GPM
- Pressures up to 100 psi
- Elements in 6 materials and 3 sizes
- Continuous tubing in 8 materials and sizes

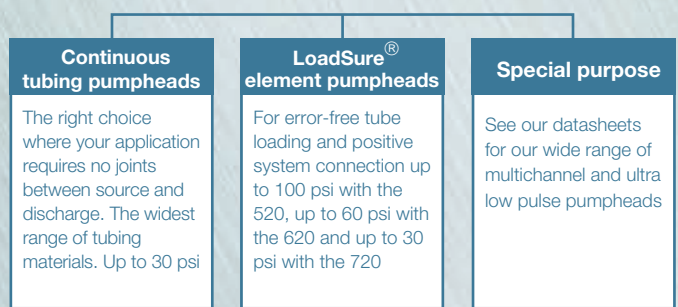
It's as easy as



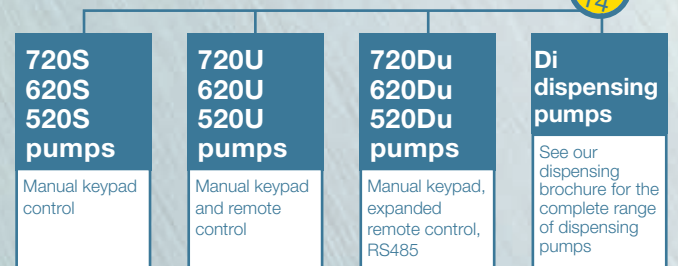
### HOW MUCH FLUID?



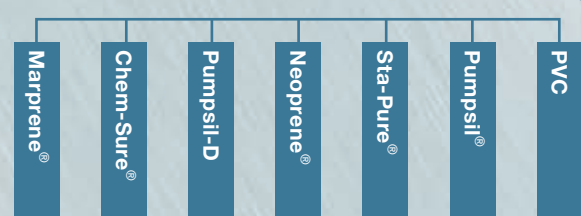
### WHAT PUMPHEAD CHARACTERISTICS?



### WHICH CONTROL OPTION? Page 14



### WHICH TUBING ELEMENT? Page 19



Whatever your needs, Watson-Marlow Bredel manufacture the industrial pumps of first choice.

**PICK YOUR PUMPHEAD**

## 520 LoadSure® Element pumpheads

When you need a pump with positive connection points and error-free tube loading, choose LoadSure® element pumpheads. High, medium and low pressure LoadSure® element pumpheads are available to meet your process pressure needs.

Industrial LoadSure® elements are available in six tubing materials with ½" PVDF quick release connectors. The element connectors are color coded to match the right tube element to the right pump.



**520REL**  
Low Pressure  
Pumphead  
Up to 30 psi

Flow rates up to 55 GPH. 3.2mm, 6.4mm and 9.6mm bore tube elements.



**520REM**  
Medium  
Pressure  
Pumphead  
Up to 60 psi

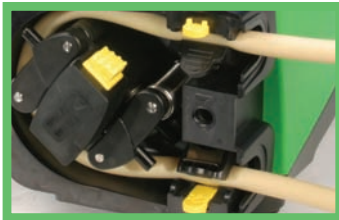
Flow rates up to 24 GPH. 3.2mm and 6.4mm bore tube elements.



**520REH**  
High Pressure  
Pumphead  
Up to 100 psi

Flow rates up to 7 GPH. 3.2mm bore tube elements.

## 520 Continuous tubing pumpheads are ideal for running source to discharge tubing with no breaks.



Choose from **520R** for 1.6mm thin wall or **520R2** for 2.4mm thick wall tubing. Nine different tube sizes from 0.5mm to 9.6mm bore are available in a wide range of materials.

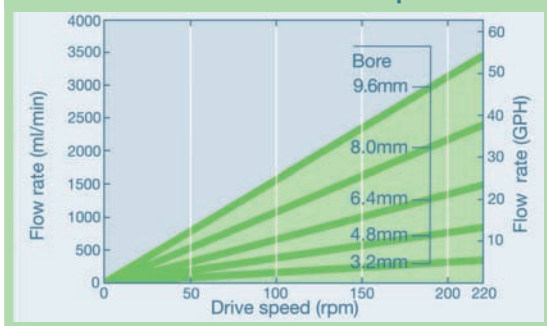
Continuous tubing pumpheads generate flow rates up to 55 GPH; pressures up to 30 psi.





# 55 GPH, with pressures to 100 psi

520R and 520R2 continuous tube performance

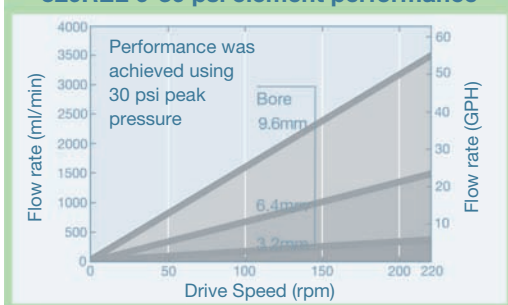


520R & 520R2 pumpheads: flow ranges, 0.1-220 rpm, GPH\*

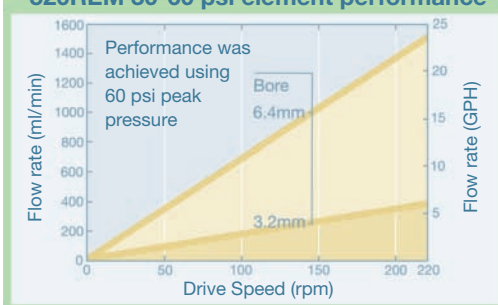
		0.5	0.8	1.6	3.2	4.8	6.4	8.0	9.6
Tube bore, mm		1/50	1/32	1/16	1/8	3/16	1/4	5/16	3/8
Tube bore, inch									
Tube number		112	13	14	16	25	17	18	193
520R & 520R2 (continuous tubing)	Neoprene® Sta-Pure® Chem-Sure® PVC, Pumpsil®	0.00006 -0.151	0.00002 -0.380	0.0006 -1.538	0.0029 -6.182	0.0063 -13.791	0.0111 -23.778	0.0174 -38.045	0.0254 -55.482
	Marpene® 64 shore tubing	0.00006 -0.143	0.00002 -0.365	0.0006 -1.458	0.0027 -5.865	0.006 -13.157	0.0106 -23.778	0.0174 -36.46	0.0238 -52.312
	Flourel®			0.0005 -1.11	0.0021 -4.439	0.0046 -9.987	0.0081 -17.437	0-0.127 -28.534	

\*1gal/hr = 63.1ml/min

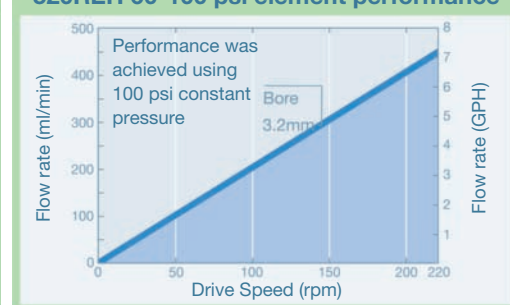
520REL 0-30 psi element performance



520REM 30-60 psi element performance



520REH 60-100 psi element performance



520 LoadSure® element pumpheads: flow ranges, 0.1-220 rpm, GPH\*

		3.2	6.4	9.6
Tube bore, mm		1/8	1/4	3/8
Tube bore, inch				
Quick release connectors		1/2"	1/2"	1/2"
520REL (elements to 30 psi)	Neoprene®, Chem-Sure®, Pumpsil®	0.0029-6.182	0.0111-23.778	0.0254-55.482
	Marpene® TL	0.0027-5.865	0.0106-23.778	0.0238-52.312
520REM (elements to 60 psi)	Chem-Sure®	0.0029-6.182	0.0111-23.778	
	Marpene® TM	0.0027-5.865	0.0106-23.778	
520REH (elements to 100 psi)	Marpene® TH, Sta-Pure®	0.0032-7.133		

\*1gal/hr = 63.1ml/min

**Construction materials:** All 520 pumpheads are constructed of high performance engineering plastics and stainless steel to defeat chemical attack from process fluids and cleaning agents. The pumps are tough enough for the most arduous environments. Pumphead track: PPS; guard, inner/outer: polycarbonate; guard seal: Neoprene; rotor hub: 316 stainless steel; roller arms, rotor cover: PPS; rollers, main/guide: 316 stainless steel; main roller bearings: stainless steel with PTFE seals; drain port and nut: polypropylene; drain plug: Hytrel

**NOW SELECT YOUR DRIVE PAGES 14-15**

## Water treatment

A water company in Washington State has replaced diaphragm pumps with Watson-Marlow Bredel 520 series pumps to inject sodium hypochlorite into a mains supply at 70 psi. The diaphragm pumps would periodically vapor lock on the gaseous hypo and with flow rate variations between 0.291 GPH and 2.01 GPH, accuracy and turndown were a problem.

With the new 520 high pressure pumps installed, vapor locking is no longer an issue, and the huge million:1 flow range capability easily handles their seasonal hypo needs...now and for years to come.

Initial set up couldn't be easier. The pump integrates effortlessly into existing SCADA control systems and on the wet end, the quick-connect pipe fittings make setup and maintenance a snap.



## 620 LoadSure® Elements

Like the 520, the 620 offers LoadSure® element pumpheads for positive connection and error free tube loading. Both the 620RE two roller and 620RE4 four roller LoadSure® element pumpheads are capable of pressures to 60 psi and feature retractable rollers for SIP or CIP cleaning cycles through the pump.

Industrial LoadSure® elements are available in 12mm and 17mm bore tubing with 3/4" Cam and Groove style connectors.



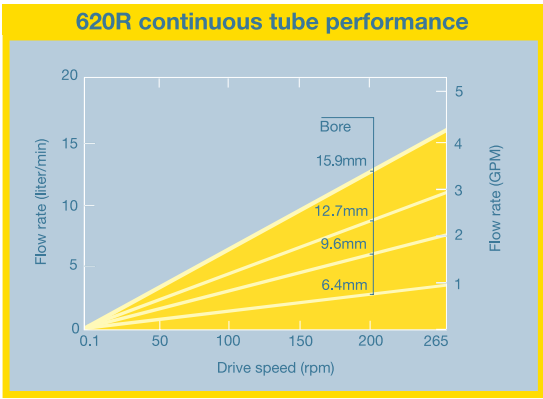
Choose two roller 620RE for maximum throughput. Choose four roller 620RE4 for low pulsation.



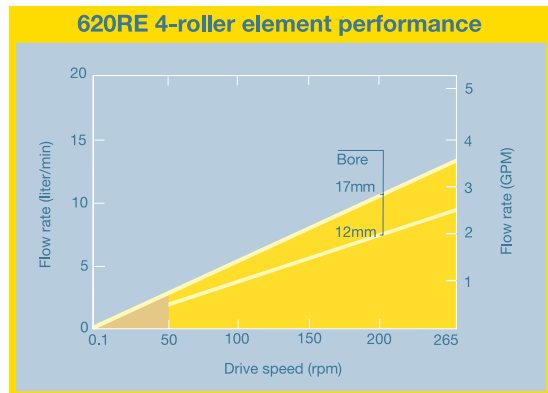
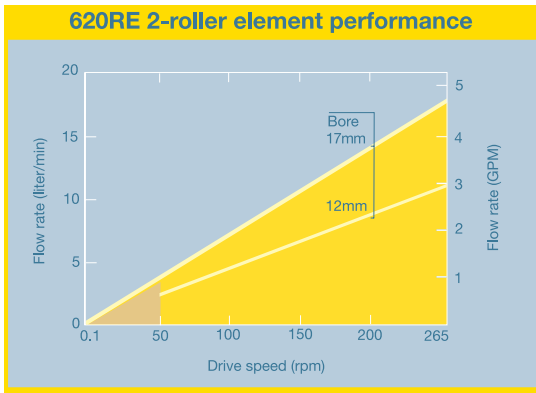
## Continuous tubing pumphead

When pressures are less than 30 psi, the 620R pumphead allows continuous source to discharge tubing connection without in-line breaks or joints. 620R accepts four tube sizes in a wide range of materials from 6.4mm to 15.9 mm bore and 3.2mm wall thickness.

# GPM with pressures to 60 psi



620R continuous tubing, two rollers pumpheads: flow ranges, 0.1-265 rpm								
	GPM	liters/min	GPM	liters/min	GPM	liters/min	GPM	liters/min
Tube bore mm	6.4	6.4	9.6	9.6	12.7	12.7	15.9	15.9
Tube bore in	1/4	1/4	3/8	3/8	1/2	1/2	5/8	5/8
Tube number	17	17	193	193	88	88	189	189
Marprene® TL	0.0003-0.9	0.001-3.4	0.001-1.7	0.003-6.6	0.001-2.9	0.004-11	0.003-3.2	0.01-12
Pumpsil®	0.0003-0.8	0.001-3.2	0.001-1.9	0.003-7.2	0.001-2.9	0.004-11	0.003-4.0	0.01-15
Sta-Pure®	0.0003-0.8	0.001-3.2	0.001-1.7	0.003-6.6	0.001-2.9	0.004-11	0.003-4.2	0.01-16



Note: beige portion of graphs refers to limit of 30 psi below 50 rpm

	620 pumpheads: flow ranges, 0.1-265 rpm							
	620RE two rollers pumpheads				620RE4 four rollers pumpheads			
	GPM	liters/min	GPM	liters/min	GPM	liters/min	GPM	liters/min
Element bore, mm	12.0	12.0	17.0	17.0	12.0	12.0	17.0	17.0
Element bore, inch	15/32	15/32	11/16	11/16	15/32	15/32	11/16	11/16
Cam and Groove connector size, inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Marprene® TL (elements to 30 psi)	0.001-2.6	0.004-9.8	0.003-4.8	0.01-18	0.001-2.2	0.003-8.3	0.001-3.2	0.005-12
Marprene® TM (elements to 60 psi)	0.001-2.6	0.004-9.8	0.003-4.2	0.01-16	0.001-2.2	0.003-8.3	0.001-2.9	0.004-11
Pumpsil® (elements to 30 psi)	0.001-2.6	0.004-10	0.003-4.2	0.01-16	0.001-2.3	0.003-8.7	0.001-2.9	0.004-11
Sta-Pure® (elements to 60 psi)	0.001-2.9	0.004-11	0.003-4.8	0.01-18	0.001-2.4	0.003-9.0	0.003-3.4	0.01-13

**Construction materials:** All 620 pumpheads are designed for ultimate impact and corrosion resistance. Pumphead track: powder coated aluminum LM24; guard, inner/outer: Grilamid TR55/Polyurethane PBA; rotor hub, roller arms: Fortron 1140L4 (PPS); rotor cover: DuPont Hytrel G5544; rollers, main/guide: stainless steel/nylatron; main roller bearings: carbon steel; continuous tube clamp set: polypropylene

**NOW SELECT YOUR DRIVE PAGES 14-15**

## Pulp & Paper

Precise, consistent, repeatable flow rates and minimal maintenance are the primary reasons why Boise Cascade switched from diaphragm pumps to Watson-Marlow Bredel peristaltic pumps for dye addition.

Overall shade losses at the Oxford Specialty Papers Division were costing as much as 60 tons of off-quality paper a month. In addition, stripping, cleaning and repair of the diaphragm pumps were causing excessive downtime and lost productivity.

Since installing the Watson-Marlow Bredel pumps, losses due to color irregularities have been negligible and productivity has increased substantially. Maintenance now consists of only scheduled tubing changeovers which take only minutes.



### Continuous tubing for joint-free flow from source to discharge

The 720R and 720RX extension pumpheads allow continuous source to discharge tubing connection without in-line breaks or joints. The 720 accepts five tube sizes in a wide range of materials from 9.6mm to 25.4mm bore and 4.8mm wall thickness. Flow rates to 17.6 GPM. Pressures to 30 psi.



### LoadSure® element pumpheads ensure correct tube loading every time

The 720RE and 720REX extension LoadSure® element pumpheads are available to accept 12.7mm, 15.9mm, 19.0mm and 25.4mm bore elements with 1" Cam and Groove style connectors. Flow rates up to 17.6 GPM. Pressures up to 30 psi.



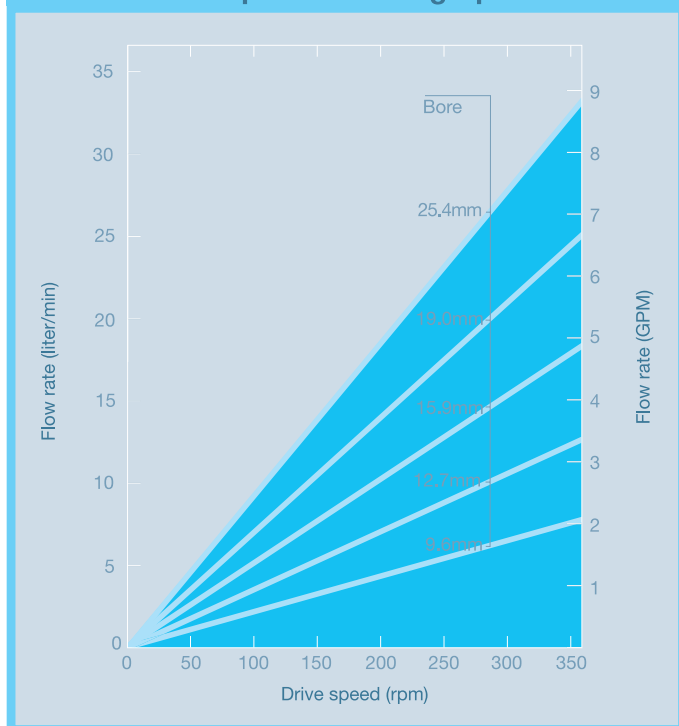
# GPM with pressures to 30 psi

## 720 pumpheads: flow ranges, 360rpm

	720R continuous tubing					720RE elements			
	9.6 3/8	12.7 1/2	15.9 5/8	19 3/4	25.4 1	12.7 1/2	15.9 5/8	19 3/4	25.4 1
Tube or element bore, mm	9.6	12.7	15.9	19	25.4	12.7	15.9	19	25.4
Tube or element bore, inch	3/8	1/2	5/8	3/4	1	1/2	5/8	3/4	1
Tube number	193	88	189	191	92	-	-	-	-
Can and groove connector size, inch	-	-	-	-	-	1	1	1	1
GPM	0.0005-1.8	0.001-3.5	0.001-4.8	0.002-6.6	0.003-8.8	0.001-3.5	0.001-4.8	0.002-6.6	0.003-8.8
liters/min	0.002-6.9	0.004-13.2	0.005-18.3	0.007-25.2	0.009-33.3	0.004-13.2	0.005-18.3	0.007-25.2	0.009-33.3

Flow listed is per channel. Double your flow by adding a 720RX or 720REX extension pumphead as shown below.

### 720 performance graph



**Construction materials:** All 720 pumpheads are designed for strength and durability. Pumphead track: epoxy coated aluminum; drive shaft: stainless steel 440C; rotor end plates: aluminum; cradle assembly, track: aluminum epoxy finished; central shaft: EN24 steel; rollers: MOS2 filled Nylon 6 (Nylatron); springs, spindles: stainless steel

**NOW SELECT  
YOUR DRIVE  
PAGES 14-15**

## Abrasive slurry

With 50% solids, the oxide-water mix that a major roof tile manufacturer uses to color his products is highly abrasive.

The plant engineer tried piston pumps, but abandoned them when the slurry was effectively being de-watered: the pumps pumped the water, but left the solids to clog the cylinders. He tried centrifugal pumps, but poor flow control led to inconsistent coloring.

The plant was then converted over to Watson-Marlow Bredel 720 pumps. The slurry remained uniform and could be applied in precise quantities. Since the fluid is contained within the tube, the pump cannot clog. In addition, the pump is small enough to be conveniently set up in various parts of the factory, and its impervious casing protects the pump in a washdown environment.



## Watson-Marlow Bredel peristaltic pumps offer a complete range of features to suit industrial application needs.

- Maintenance-free brushless DC motors are efficient and reliable.
- Tough, corrosion resistant powder-coated housing and NEMA 4X water-tight enclosures are perfect for industrial washdown environments.
- Speed controls up to 3,600:1 and multiple tubing sizes give metering capability of several thousands to one. Sophisticated microprocessor control with 0.1 rpm resolution ensures reliable metering accuracy.
- Manual control for plug-and-go, auto control for straightforward setup of analog remote control, or digital control using RS485 offer comprehensive functionality for easy production system integration.
- Pump scale-up has never been easier. The 520, 620 and 720 pumps have the same footprint; they are interchangeable on the line. With similar keypad layout and menu options, no further operator training is required; if you know one pump, you know them all.
- Value for life: the tube is the only consumable; unbeatable tube life; no accessories; minimal maintenance; and a five-year warranty.



### Drop-in diaphragm or lobe pump replacement

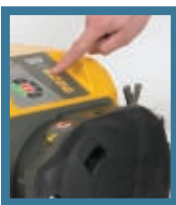
- Tubing is the only consumable. No valves, seals, ball checks, or rotors to clean, unclog, or replace
- Variable speed control with an unrivaled 0.1 rpm resolution for precise metering is built right in. No separate panels or ancillaries required. Simple and easy installation
- Minimal maintenance means less downtime, less downtime means more productivity. A cost effective solution for production
- High efficiency motors means less power consumption



# Choose from three levels of control

## SN: when only manual control is needed

520SN, 620SN and 720SN are the simplest version of control. Just plug it in and switch on. They offer low cost of ownership, simple, accurate metering and one-key keypad access to all major controls.



- Manual control: 9-key display pad
- Calibration to display flow rate
- MemoDose for easy repetitive discrete volume dispensing

## UN: with analog and remote control

520UN, 620UN and 720UN bring auto control functionality. They offer a manual keypad and remote control with analog speed inputs and status outputs. The pump settings are configurable and can be password-protected

- Analog speed control
- Industrial logic remote control
- Analog speed feedback



## DuN: the ultimate pump for production process

The 520DuN, 620DuN and 720DuN offer ultimate control of the range with everything the SN and UN can do and so much more. With board interface capabilities the pump can be controlled through a PC, PLC, SCADA or other plant process controller. A numeric keypad makes manual control truly simple, too: just type in the flow rate or speed you need.

- Digital network control with RS485
- Comprehensive calibration with a choice of flow units
- Two levels of PIN-secure process protection
- Twin analog inputs for simultaneous flow adjustment



## Printing ink feed

Reduced downtime and spares costs meant that a heavy-duty corrugated box manufacturer paid for their new Watson-Marlow Bredel 720 series pumps in less than a year.

Supplying ink to flexographic presses caused air-operated diaphragm pumps to fail when paper fibers and dried ink particles clogged filters and jammed ball valves. Every jam costs 90 minutes of production, with an entire in-line operation stalled. Production also suffered from continual minor problems.

Watson-Marlow Bredel peristaltic pumps have no valves to clog and can handle suspended solids, so they need no filters. A one-minute tube change at extended intervals avoids production line stoppages.



# Rugged and reliable

Advanced technology and design underlie Watson-Marlow Bredel industrial pumps' long life of quality service.

Our reliability record is maintained by features such as brushless DC drive, a toughened LCD screen and a rugged membrane keypad. The chemical resistance of the whole range outlasts our competition; using a powder-coated NEMA 4X casing that outperforms stainless steel when exposed to aggressive fluids such as ferric chloride or sodium hypochlorite.

## Speed scaling

Programmable twin analog inputs allow flow pacing to be coupled with downstream quality feedback. The second input over-rides the main speed control, making stroke adjustment on a diaphragm pump redundant. Drop-in diaphragm pump replacement could not be simpler.

## Accuracy

Class-leading flow control up to 3,600:1 and simple, accurate configuration mean that your flow will match your needs precisely. Couple that with tube bores from 0.5mm to 25.4mm and you have a range of unbeaten versatility.



## PIN-secure process protection

Customize your pump setup to your precise validated process needs and lock it. With twin Pin-secure Process Protection, top-level PIN-code holders retain full control. Calibration can also be released to production staff with second-level PIN access.



## Operator safety

Operator safety comes first, with sturdy metal or impact-resistant guards and drain ports for safe disposal of spillages. Tool lockable or electronic guard switches are standard on all pumps. Optional leak detection is available for all models.

## NEMA 4X protection

All pumps meet the criteria for IP66 and NEMA 4X classification: they are secure against high-pressure washdown. NEMA 2 wipe-down models are also available in the 520 and 620 series.

## Status outputs

Four configurable relay outputs. Monitor Run/Stop; Rotation direction; Auto/Manual operation; general fault alarm; automatic shut-down if the guard is opened; leak-detected shutdown.



## RS485

Full industrial-standard connectivity with RS485 and easy-wire relays for permanent connection to control systems including PC, PLC and SCADA.



<b>Control range</b>	520N: 0.1-220 rpm; 620N: 0.1-265 rpm; 720N: 0.1-360rpm
<b>Voltage/frequency</b>	Filtered 100-120V/200-240V 50/60Hz 1ph ±10% of nominal voltage. A well regulated electrical mains supply is required along with cable connections conforming to the best practice of noise immunity
<b>Maximum voltage fluctuation</b>	
<b>Installation category (overvoltage)</b>	II
<b>Power consumption</b>	520N: 135VA; 620N: 250VA; 720N: 350VA
<b>Full load current</b>	520N: <0.6A at 230V; <1.25A at 115V; 620N: <1.1A at 230V; <2.2A at 115V; 720N: <1.5A at 230V; <3.0A at 115V
<b>Eprom version</b>	Accessible through pump software

<b>Enclosure rating</b>	IP66 to BS EN 60529; Equivalent to NEMA 4X to NEMA 250* (indoor use). Suitable for heavy industrial, process and harsh environments. The drive uses a Gore membrane vent to equalize the pressure inside the enclosure and to prevent ingress of water and corrosive vapors.
<b>Operating temperature</b>	5C to 40C, 41F to 104F
<b>Storage temperature</b>	520N: -40C to 70C, -40F to 158F; 620N, 720N: -25C to 65C, -13F to 149F
<b>Maximum altitude</b>	2,000m, 6,560ft
<b>Humidity (condensing)</b>	10% - 100% RH
<b>Noise</b>	520, 620 <70dB(A) at 1m, 720 <85dB(A) at 1m



# Select your pump control features

Feature	520DuN 620DuN 720DuN	520UN 620UN 720UN	520SN 620SN 720SN
<b>Manual control</b>			
Run/stop; speed adjustment; forward/reverse; max key for rapid priming and purging; auto-restart; keypad lock, flow calibration in metric units	•	•	•
Choice of flow rate display; metric and imperial units	•		
Numeric keypad for entry of speed, flow or PIN	•		
Cumulative flow display	720DuN		
<b>Remote control</b>			
Run/stop direction change; auto/manual mode; leak detector input (via contact closure or 5V TTL to 24V industrial logic)	•	•	
<b>Analog speed control</b>			
Software programmable inputs; 0-10V, 1-5V or 4-20mA	•	•	
Second analog or keypad key scaling	•		
<b>Digital network control</b>			
Full RS485 network connectivity for process control through PC or PLC	•		
<b>Process security</b>			
Basic security code to protect setup		•	
PIN-secure process protection: two-level PIN access	•		
<b>Pump status outputs</b>			
Analog frequency output of pump speed	•	•	
Four 24V change-over relay pump status outputs	•	•	
4-20mA pump speed feedback	•		
<b>MemoDose</b>			
Accurate, easy, single-shot dispensing	•	•	•
Remote switch operation of MemoDose	•	•	
<b>Calibration</b>			
Simple calibration to display the flow rate as well as the rotation speed	•	•	•
Comprehensive calibration for precise metering. Choice of flow units	•		

**NOW SELECT  
YOUR TUBE  
PAGES 19-21**

## Specifications

	Width	Depth	Height	Weight
520N with 520R pumphead	276mm 10 <sup>7</sup> / <sub>8</sub> in	407mm 16in	158mm 6 <sup>1</sup> / <sub>4</sub> in	11.48kg 25lb 5oz
620N with 620R pumphead	280mm 11in	448mm 17 <sup>5</sup> / <sub>8</sub> in	305mm 12in	20.5kg 45lb 3oz
720N with 720R pumphead	280mm 11in	508mm 20in	305mm 12in	25.0kg 55lb 2oz



**NEMA 4X  
NEMA 2  
IP66**

# Close-Coupled Pumps

Watson-Marlow Bredel Pumps can also be supplied with standard industrial motor gearbox configurations. Close-Coupled pumps satisfy a host of industrial pumping duties in harsh atmospheres including explosion-proof. Same great Watson-Marlow Bredel performance with off-the-shelf constant or variable speed drive options.



## 521

- Flow to 1.16 GPM
- Pressures up to 100 psi
- Elements in 6 materials and 3 sizes
- Continuous tubing in 8 materials and sizes



## 621

- Flow to 4.75 GPM
- Two or four roller versions
- Pressures up to 60 psi



## 701

- Flow to 8.8 GPM, 1 channel
- Flow to 17.6 GPM, 2 channels
- Pressures up to 30 psi

## Varmeca Drive

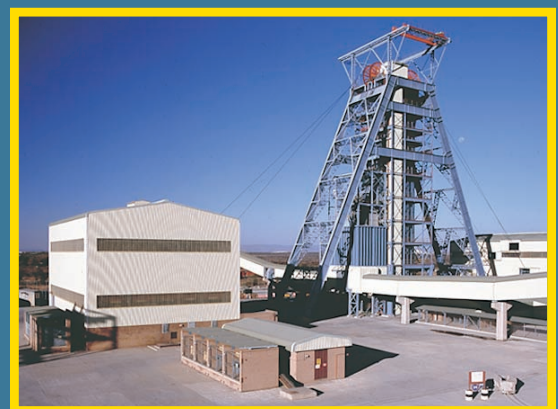
The Varmeca drive brings 10:1 speed control, constant torque output and total reliability to the industrial environment. With no external wiring and resin-shrouded electronics, humidity and vibration are no threat. Inverter and motor are UL Approved and sealed to NEMA 4X. Control could not be simpler, with local forward/stop/reverse switching and a large speed control knob calibrated in percentage of maximum speed. The drive offers 230V and 460V three phase power options, plus 115V and 230V single-phase.



NOW SELECT  
YOUR TUBE

## Mining

Used throughout the mining and mineral-processing world, Watson-Marlow Bredel peristaltic pumps are the solution to many of the rigorous metering challenges found in the mining industry including: reagent feed, shear sensitive polymer metering for flocculation, abrasive lime slurries for pH control, or corrosive cyanide for gold recovery. With a wide variety of drive configurations available, including integral NEMA 4X washdown, TEFC and explosion proof, Watson-Marlow Bredel offers the flexibility to meet the requirement of any mining application. By changing either the bore diameter of the tube or the rpm of the rotor, the rate of reagent feed will vary proportionally. And, each unit can be interfaced to any digital or analog process control signal.



At the heart of all Watson-Marlow Bredel pumps is a range of abrasion-resistant tubes and elements available in chemically stable materials including Marprene<sup>®</sup>, Neoprene<sup>®</sup> and Sta-Pure<sup>®</sup>

	Marprene <sup>®</sup>	Chem-Sure <sup>®</sup>	Neoprene <sup>®</sup>	Sta-Pure <sup>®</sup>	Pumpsil <sup>®</sup>	PVC	Pumpsil-D	Fluorel
Up to 10,000 hours pumping life	•	•		•				
High performance sodium hypochlorite injection	•			•				
Wide chemical resistance	•	•						•
High pressure capability 100 psi	•	•		•				
Additional abrasion resistance	•		•					
High dispensing accuracy	•	•		•			•	
Lowest levels of leachables		•		•	•		•	
Low gas permeability	•					•		
High clarity						•		
Meets or exceeds USP Class VI requirements		•		•	•		•	
FDA regulations CFR 177.2600 for contact with food	•	•		•	•		•	
ISO 10993		•		•	•		•	

## Choosing the right tubing: where to start

The best way to select a tube is to decide which materials are chemically suitable, and choose the one which best meets the physical demands of your application. The longest tube life material will usually be Marprene<sup>®</sup>. Given proper chemical compatibility, Marprene<sup>®</sup> will deliver thousands of hours of service at a fraction of the price of diaphragms, rotors, stators and other traditional pump replacement parts.

- For maximum tube life use a large bore tube at low speed.

- For maximum flow rate use the largest tube at maximum speed.
- For maximum accuracy use a small bore tube at high speed.

Suction lift depends on the tube restituting fully before the advance of the next roller. If it does not, the flow rate will be reduced. For maximum suction lift use the smallest practical bore size of tubing and run the pump at the slowest speed.

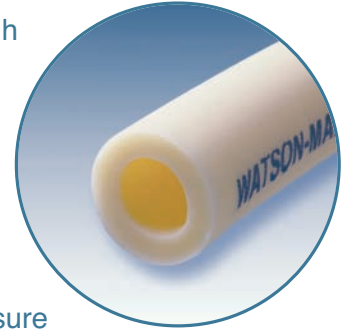


*LoadSure<sup>®</sup> elements have rugged industrial connections in PVDF that offer exceptional resistance to chemicals attack. There are no metallic components in the product zone.*

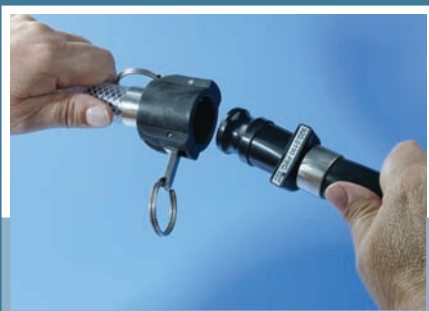
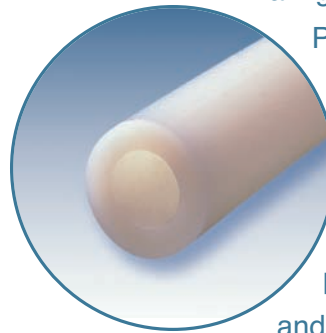
# Heavy-duty tube elements provide thousands of hours of service

Watson-Marlow Bredel is the only peristaltic pump manufacturer in the world to manufacture its own tubing, optimizing our tubing element tolerances and formulation to deliver the best process pump performance. In a peristaltic pump, the tubing largely dictates pump and system performance. Its restitution creates suction, its strength resists pressure, its flex resistance determines pumping life, its bore defines the flow rate, its wall thickness controls pumping efficiency and its purity protects your product from contamination. Watson-Marlow Bredel offers tubing in eight materials and over 40 sizes, giving an extraordinary range of chemical and application capability.

**Marprene®** is our high performance all-purpose long-life tube. This thermoplastic elastomer offers the best combination of chemical compatibility, long pumping life and pressure handling capability. Marprene® is ideal for heavy-duty pumping and is highly resistant to oxidizing agents such as ozone, peroxides and sodium hypochlorite. Meets FDA and USDA standards for food handling. Working temperature range 41F to 176F.



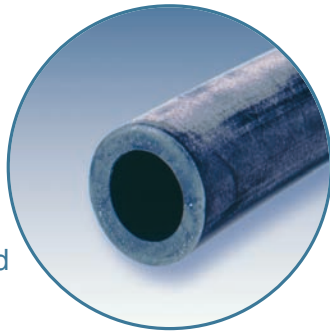
**Chem-Sure®** is effectively pumpable PTFE - a high performance composite of PTFE and a high-grade fluoroelastomer - offering extraordinary chemical resistance, long life and very high burst pressures. It's the perfect tube for high pressure and aggressive chemical applications. Chem-Sure® is USP Class VI and food grade approved.



## Secure linking up

Watson-Marlow Bredel tubing elements for 520, 620 and 720 pumps link to the rest of your system using secure instant connectors: industrial-standard Cam and Groove connectors for 620 and 720, left; and quick-release push-fit connectors for 520 pumps, above. Both guarantee a secure seal and immediate release when required.

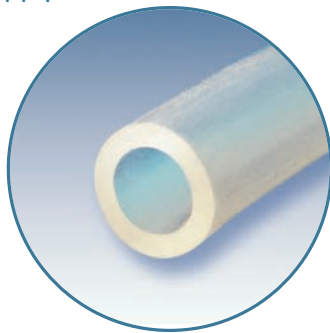
**Neoprene®** offers excellent performance with abrasive slurries and sustained pressure applications. Good suction and pressure capabilities. Working temperature range 32F to 176F. Black.



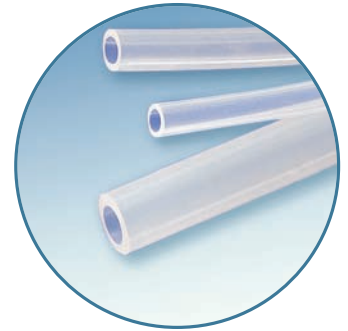
**Sta-Pure®** has a unique composite construction of silicone in a PTFE lattice giving it superior burst resistance and exceptional tubing life, making it the perfect tube for high performance sodium hypochlorite injection. Working temperature range 32F to 176F. Opaque white. SIP and CIP compatible.



**Pumpsil® platinum-cured silicone** tubing is manufactured by Watson-Marlow Bredel in our own silicone-dedicated ISO1644-1 class 7 (class J/10,000) cleanroom. Reliable, pure, durable, and highly precise for accurate dispensing. Working temperature range: 68F to 176F. USP Class VI and Food Grade. Translucent.



**Pumpsil-D platinum-cured silicone** tubing manufactured by Watson-Marlow Bredel adds ultimate dispensing performance to Pumpsil. Pumpsil-D is formulated with a superior flex memory that doubles the accuracy of dispensed volumes compared to standard silicone tubing. Fewer pump calibrations are needed, so maximizing process efficiency. USP Class VI and food grade. Working temperature range: 68F to 176F. Translucent.



**PVC** has a high Shore hardness giving excellent pressure and suction performance and low gas permeability. FDA approved for use with food and is NSF listed. Working temperature range: 68F to 140F. Glass clear.



## Checking your choice with an immersion test

Always conduct an immersion test before choosing a tube material for critical applications. Immerse a short length of the tubing or a disk of rubber sample (always available from Watson-Marlow Bredel or its distributors) in a closed container of the fluid for 48 hours, and then examine for signs of attack, swelling, embrittlement or other deterioration.

## Make reel savings

Many of our tubes are available on bulk reels as well as in the standard shorter lengths - up to 500 ft at a time, depending on the bore size.

Bulk buying gives important benefits in convenience and huge cost savings. Further discounts are available on orders for multiple reels.

Ask for our reel leaflet for further details on the tube material of your choice.



# Need more options? Our pumps deliver...

- Accurate and repeatable flow rates
- Heavy-duty pumping - ideal for shear-sensitive fluids, viscous sludges or slurries, and aggressive acids and caustics

100

Low flow single channel pumps. Fixed and manual/auto control variable speed.

- Flow rates from 0.0002 GPD to 20.2 GPD
- Rapid and simple tube loading
- Manual, auto and digital TTL control



30 psi

101F/R



101U/R



200

Near pulseless, multi-channel cassette pumps with up to 32 channels.

- Flow rates from 0.0001 GPD to 8.38 GPD per channel
- Precise flow control for each individual channel
- Manual, auto and digital TTL control



30 psi

205S/CA



205U/CA



300

Single or multi-channel benchtop pumps with manual, remote, analog, RS232 control and accurate dispensing.

- Flow rates from 0.001 GPH to 31.7 GPH
- High visibility digital display with membrane keypad
- Single channel or up to ten separate channels
- Zero maintenance brushless DC motors
- New 323Dz general purpose dispensing pump



30 psi

323E/D



323S/D



400

Ultra-compact pumps for low flow single or multi-channel applications.

- Flow rates from 0.0001 GPH to 9.67 GPH
- Precision multi-roller pumpheads for accurate flows
- Configured with either single or multi channel pumphead
- Digital and analog process signal control



30 psi

401U/D1



401U/DM3



500

Superb range of NEMA 2 and NEMA 4X rated pumps for science and industry as well as fixed and variable speed close-coupled pumps.

- Flow rates from 0.00006 GPH to 76 GPH
- Manual, analog and digital RS232/RS485 control
- Explosion Proof rated, 3 phase and pneumatic drives
- Seven pumpheads and including low-pulse high accuracy 505L element pumphead
- Dosing and dispensing pump for ±0.5% accuracy



100 psi

520S/R



520U/R



600

NEMA 4X mid-flow process pumps with full clean-in-place and steam-in-place capability.

- Flow rates from 0.0003 GPM to 4.8 GPM
- Manual, auto and digital control
- Close coupled pumps for the three phase operation including pneumatic and Explosion Proof options
- One minute maintenance LoadSure® elements



60 psi

620SN/RE



620UN/RE



700

Industrial cased and baseplate mounted pumps for use with continuous tubing or new LoadSure® elements. 3 phase motors, explosion proof rated drives or pneumatic.

- Flow rates from 0.001 GPM to 17.6 GPM
- Single or twin channel operation
- Driven roller pumphead extends tube life
- LoadSure® elements ensure correct tube loading
- Fixed or variable speed drives



30 psi

720U/R, 720U/RE and 720S/R



720U/RE, 720U/RE and 720S/RE



800

High-flow hygienic pumping using USP Class VI Bioprene tubing or Sta-Pure® tubing.

- Flow rates up to 35 GPM
- Full Clean-In-Place and Steam-In-Place capability
- Extensive motor/gearbox control options



100 psi

825 and 840



SPX

High flow high-pressure industrial pumps with unique patented direct coupled design. Duplex and CIP models available.

- Flow rates to 0.08 GPM to 400 GPM
- Reinforced hoses enable pressures up to 232 psi
- Fixed and mechanically or electronically variable speed drives including explosion proof versions



232 psi

SPX10 and 15



SPX25 and 32



OEM

A wide range of instrument quality and industrial OEM pumpheads for fitting to users own drives, or with faceplate-mounted motor options.

- Flow rates from 0.01 µl/min to 300 GPM
- Single and multi-channel pumpheads
- Synchronous, DC, induction, shaded-pole or stepper motors
- Optional Eurocard pcb enables full controllability



30 psi

100



300



Tubing Hoses

Extensive range of tubing ensures chemical compatibility. USP Class VI and FDA approvals. Precision machined, re-enforced hoses provide flow stability and excellent suction performance.

- Twelve tubing materials in bore sizes 0.13mm to 25.4mm
- Four hose materials including Natural Rubber, Nitrile NBR, Hypalon and EPDM from 10mm to 100mm

Marprene®



Bioprene®



- Easy to install, operate and maintain
- Virtually maintenance-free – no expensive seals, valves, diaphragms or rotors to leak, clog or corrode
- Designed for continuous duty - 24 hours/7 days
- Pumps act as their own check-valves
- Self-priming up to 30 feet and dry running
- Reversible flow direction

**Code descriptions** eg: 101U/R = Manual/auto control variable speed with single channel pumphead

**Drive**

F	Fixed speed
S	Manual control variable speed
U	Auto/Manual control variable speed
Du	Digital/Auto/Manual control variable speed
Dz	Dispensing/Auto/Manual control
Di	Dispensing/Digital/Auto/Manual control
VI	Varmeca controlled
FD	Fixed speed duplex drive
P	Pneumatic
PB	Pneumatic, baseplate mounted
SN/UN/DuN (N)	denotes NEMA 4X protection

**Pumphead**

R	Single channel pumphead for continuous tubing - 1.6mm wt
R2	Single channel pumphead for 2.4mm wall continuous tubing
RE	Single channel pumphead for LoadSure® elements
CA	High precision multi-channel cassette pumphead
D1	Single channel, four roller pumphead
D	Single channel, three or four roller, 'flip-top' pumphead
DM2-3	Three channel pumphead for three bridge manifold tubing
R1	Single channel, four roller pumphead
L2	Two channel, four roller pumphead
L	Precision 'low pulse' pumphead
VM2-4	Precision low flow multi-channel pumphead for two bridge manifold tubing



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The information contained in this document is believed to be correct, but Watson-Marlow Bredel accepts no liability for any errors it contains and reserves the right to alter specifications without notice.

Typical flow rate on all graphs printed varies with tube material, discharge pressure, suction and viscosity.

**WARNING** These products are not designed for use in and should not be used for, patient connected applications.

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 Members of the Spirax-Sarco Engineering Group

## Watson-Marlow Bredel ...

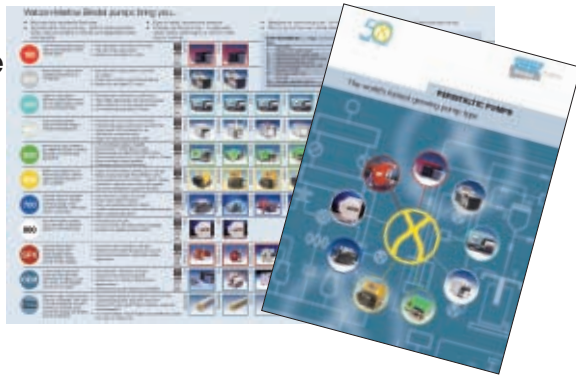
With 60% fewer roller passes than our competitors, our pumps deliver 2 1/2 times the tube life.

So the best pump really does cost less. Call us for the proof. It all adds up to -

Value for life

### Overview Brochure

A quick and easy outline of the complete range of process, laboratory and OEM pumps offered by Watson-Marlow Bredel.



### Dispensing brochure

Covers our extensive range of dispensing pumps for industrial production filling.



### Industry sector brochures

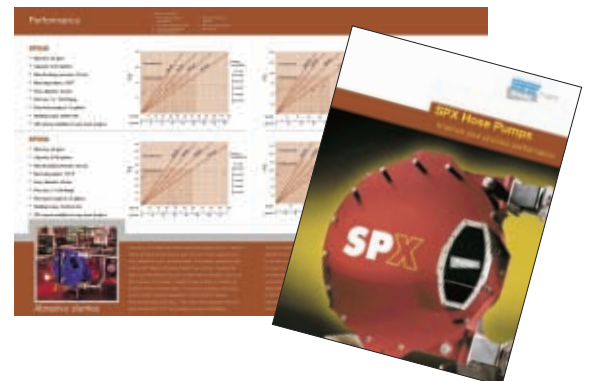
Whatever your industry, find out how Watson-Marlow Bredel can improve your process.

- Pharmaceutical and Biotechnology
- Food and Beverage
- Brewing
- Water and Waste
- Print and Packaging
- Chemical
- Ceramics
- Pulp and Paper
- Paints and Pigments
- Engineering



### SPX brochure

Offers a more in depth look at our high flow, high pressure SPX Hose Pumps.



Call 1-800-282-8823 for further information on the industrial pumps and tubing range including technical data sheets or log on to our web site: [www.watson-marlow.com](http://www.watson-marlow.com) to view details on our complete peristaltic pump range

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