

DISPENSING PERFECTION



Peristaltic pumping: the perfect dispensing solution

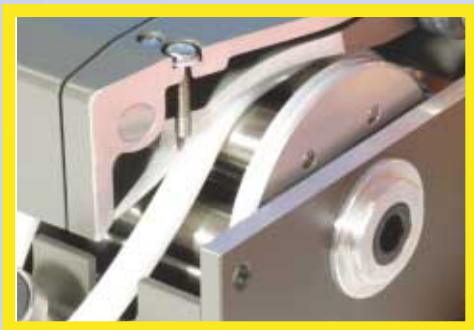
Watson-Marlow Bredel leads the world in manufacturing high accuracy peristaltic dispensing pumps and tubing, representing the best combination of speed, accuracy, ease-of-use, and versatility of any dispensing device. Our peristaltic design is perfect for dispensing delicate, viscous, corrosive or abrasive fluids in research and production processes around the globe.

With peristaltic pumping, only the tubing is in contact with the fluid; there are no moving components in the fluid path which may contaminate the product.

In a wide range of automated and manual dispensing applications, our customers rely on the accuracy, repeatability, efficiency, and contamination-free operation that only a Watson-Marlow Bredel peristaltic dispensing pump can deliver including:

- Fully automated aseptic fill/finish in pharmaceutical/biopharmaceutical drug manufacturing
- Benchtop media or reagent preparation in laboratory suites – filling or inoculating bottles, vials, Petri dishes and media bags
- High speed automated filling of blister packs and containers for contact lenses and cosmetics
- Dispensing of fragrances, extracts, and other additives
- Addition of colors, dyes, flavors, vitamins, and other ingredients in food production





Unmatched features

Watson-Marlow Bredel peristaltic dispensers offer many advantages over other types of dispensing methods such as pistons, gear pumps, time/pressure and pipettes:

At Watson-Marlow Bredel ...

We *engineer* our winning performance – we don't just turn up the speed. 60% fewer occlusions than our competitors for the same flow means 2 1/2 times the tube life.

- Pumps, pumpheads and tubing last longer
- There's less downtime, fewer failures – and less maintenance
- In the unlikely event of a problem, next-day delivery keeps your production rolling
- Our products are recognized for quality, reliability and performance, backed by a three-year guarantee

So the best pump really does cost less.
Call us for the proof.

It all adds up to – *Value for life*



- The fluid touches only the inside of the peristaltic tube which can be changed in seconds - no check valves, gears, seals or diaphragms to wear, clean or replace
- Software-controlled precision, with no cams, diaphragms and valves to adjust by trial and error and clean or replace when they clog
- Interface is through logical user-friendly key-presses with simple, on-screen readouts
- Links to a PC for batch records of all parameters right down to the operator's name. Instantaneous batch setup through up to 50 user-defined custom dispensing programs
- Industrial logic I/Os, RS232 or RS485 control for completely automated filling. Available with footswitches, handswitches, filling lances, or keypad control for simple manual filling
- Dispense from microliters to liters with the same pump - accurate to $\pm 0.5\%$
- Three year warranty NEMA 4X/IP66 enclosure for high-pressure washdown environments



Savings on cleaning



Reliability and easy cleaning are important features of Watson-Marlow Bredel peristaltic pumping, according to Dales Pharmaceuticals, who use a 500 series dispensing pump to package a wide range of pharmaceutical preparations. Before taking delivery of their new pump, Dales used a pneumatic machine to dispense volumes varying from 10ml to 100ml, of 10 major fluids.

The company reports substantial savings resulting from reduced downtime for cleaning between batches of fluids, as well as high-accuracy performance and the elimination of waste at set-up time.

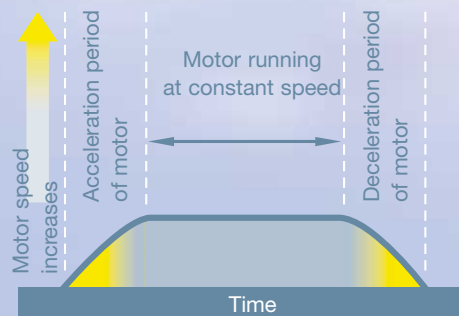
The technology behind perfect dispensing

A Watson-Marlow Bredel dispenser is designed to give the perfect dose every time without splashing, drips, or other inaccuracies.



Ramping – fast filling without splashing

Programmable ramping aids accuracy and protects your product by allowing filling to start and stop with no splashing or foaming. The pump speeds up at the start of a dose and slows down at its end, allowing the highest speed to be used for the main part of the dose.

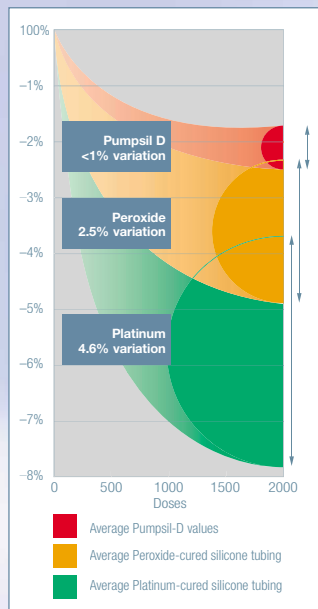


Drip Control

Programmable anti-drip control avoids end-of-dose dripping with a momentary direction reverse at the end of each dose.

Low Pulsation

Peristaltic pumps are less pulsatile than most positive displacement pumps but still have some pulsation. Our 520L and 620L pumpheads eliminate pulsation. The inlet flow is split between twin tubes compressed by offset tracks, producing two sets of pulses out of phase with each other. When the channels are merged at the discharge, the pulse of one is cancelled by the flow of the other – providing a smooth outlet flow.



Tubing Power

Our own Pumpsil-D platinum-cured silicone tubing is formulated specifically for high accuracy dispensing. Its resistance to fatigue stress and superior flex memory doubles its dispensing accuracy over other silicone, ensuring fewer calibrations over time.

Like all Watson-Marlow Bredel silicone tubing, Pumpsil-D is postcured during manufacturing to remove residual linear and cyclic siloxanes which can leach out of other platinum-cured tubing.

And with Pumpsil-D there's no concern for contamination from 2,4 DCBA which can leach from peroxide-cured silicone.

LaserTraceability™

Every piece of Pumpsil-D tubing is permanently laser-etched, end-to-end, with part number, lot number and use-by date. Pumpsil-D offers full traceability for validated processes.



Unrivaled flow range

Each dispensing drive can accept a variety of single channel or multichannel pumpheads to meet your needs. And each pumphead can accept a number of tubing bore sizes in continuous tubing or elements, allowing a single pump to have a flow range of over one million to one.



Maintenance-free brushless DC drive

Our pump drives feature brushless DC motors and high-performance gearboxes for speed accuracy to 0.1%. No brushes means no carbon-dust contamination and no maintenance. Drives are 24/7-duty rated, with full software protection. Turndown ratios extend to 3,500:1.



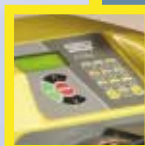
Clean and rugged construction

520Di and 620Di dispensers have a tough, corrosion resistant, crevice-free case for every environment. Choose NEMA 2/IP31 pumps for dry environments. Use the NEMA 4X/IP66 for wet areas subject to high pressure washdown.



User-friendly controllability

Control the pump through the waterproof membrane keypad with easy read, easy-to-use tactile keys big enough for gloved hand operation.



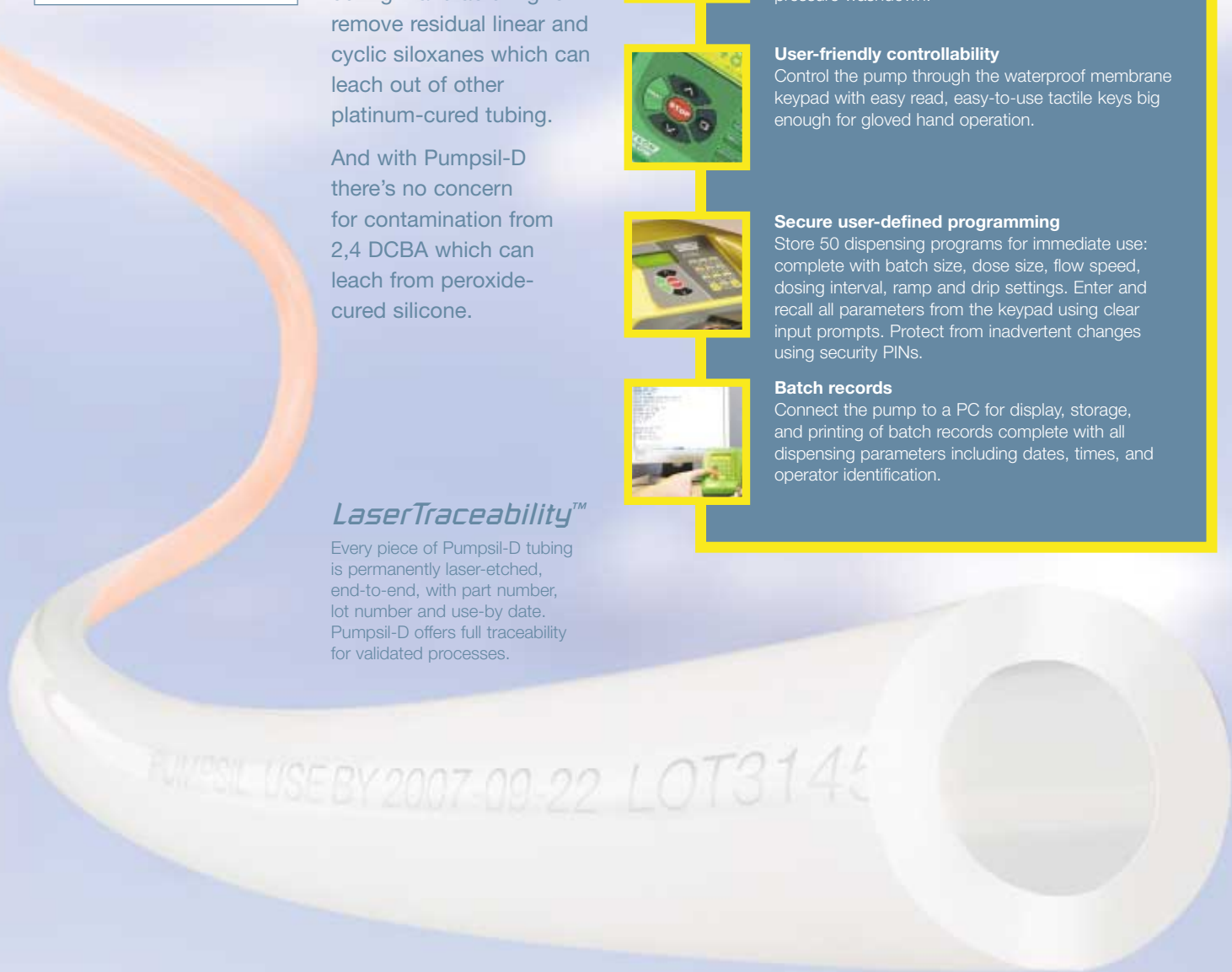
Secure user-defined programming

Store 50 dispensing programs for immediate use: complete with batch size, dose size, flow speed, dosing interval, ramp and drip settings. Enter and recall all parameters from the keypad using clear input prompts. Protect from inadvertent changes using security PINs.

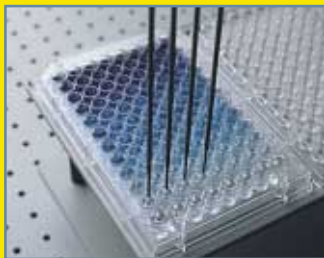


Batch records

Connect the pump to a PC for display, storage, and printing of batch records complete with all dispensing parameters including dates, times, and operator identification.



Accuracy boosts production



“A self-funding investment - a finance director's dream” is how Colin Paine, MD of Casp Products, describes the introduction of Watson-Marlow Bredel peristaltic pumps into his production process. Casp make bacteria-testing kits for companies maintaining water cooling towers throughout the world.

Testing accuracy is destroyed if quantities of viscous nutrient media are imprecise. Other pumps had failed to yield the required precision because of variations in ambient temperature.

A Watson-Marlow 500 series pump with twin 313 pumpheads dispenses more than 5,000 3.5ml shots per shift, at less than 1 second each. Since the pump was installed, improved dosing accuracy has increased production yield by 5-8%.

The most sophisticated dispensing pump available

The 520Di offers easy calibration by weight or volume, with doses triggered by interval, keypad, remote signal or additional footswitch, handswitch or proximity switch.

- Output batch records for cGMP requirements are automatic
- RS232 and RS485 are available on NEMA 2/IP31 and NEMA 4X/IP66 models respectively, plus control by logic I/O signals by contact closure, 5V TTL or 24V industrial standard logic
- NEMA 4X/IP66 protection allows high-pressure washdown
- On-screen menu and tactile keypad with high visibility display allow setting and storing up to 50 different dispensing programs, each complete with all dose parameters and calibration
- Protected by a built-in security system



520R and 520R2



- General-use, single-channel pumphead
- Twin spring-loaded rollers for long tube life
- Unrivaled chemical resistance

Minimum dispense (ml) based on accuracy required vs tube bore

Tube #	105	108	119	120	15	24	121	122
Tube bore size	0.5mm	0.8mm	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm	9.6mm
Accuracy								
±0.5% accuracy	1.1	2.9	11	46	100	180	290	410
±1.0% accuracy	0.8	1.9	7.7	31	69	120	190	280
±2.0% accuracy	0.3	0.8	3.3	13	30	53	83	120
Flowrate (ml/min)								
0.1 to 300rpm	0.001-13	0.01-33	0.04-130	0.18-530	0.40-1200	0.70-2100	1.1-3300	1.6-4800

• **Weight** 21lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 135VA • **Standards** Meets all applicable CE and American standards • **Dimensions** 10.87in x 15.16in x 6.22in

505CA



- Low flow multi-channel pumphead
- 4-48 channels for 40.8 ml/min per channel
- Eight stainless steel rollers for high precision

Minimum dispense (ml) based on accuracy required vs tube bore

Tube bore size	0.13mm	0.38mm	0.88mm	1.42mm	1.85mm	2.29mm	2.79mm
Accuracy							
±0.5% accuracy	0.02	0.1	0.6	1.4	2.2	3.2	4.2
±1.0% accuracy	0.01	0.06	0.3	0.7	1.1	1.6	2.1
±2.0% accuracy	0.005	0.03	0.1	0.4	0.6	0.8	1.1
Flowrate (ml/min)							
0.1 to 170rpm	0.0001-0.08	0.0007-1.22	0.0032-5.44	0.0080-13.6	0.013-21.4	0.018-31.3	0.024-40.8

• **Weight** 33lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 135VA • **Standards** Meets all applicable CE and American standards • **Dimensions** 10.87in x 19.4in (8-way pumphead) x 6.22in

313/314



- Stackable three and four roller pumpheads
- Stack up to six channels
- Simple flip-top tube loading

Minimum dispense (ml) based on accuracy required vs tube bore

Tube #	119	120	15	24	121
Tube bore size	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm
313 Accuracy					
±0.5% accuracy	4.7	17	38	62	87
±1.0% accuracy	1.9	7.0	15	25	35
±2.0% accuracy	1.4	5.0	11	18	25
313 Flowrate (ml/min)					
0.1 to 350rpm	0.03-95	0.10-350	0.22-770	0.36-1300	0.50-1800
314 Accuracy					
±0.5% accuracy	3.3	11	25	39	52
±1.0% accuracy	2.2	7.4	17	26	35
±2.0% accuracy	0.9	3.2	7.1	11	15
314 Flowrate (ml/min)					
0.1 to 300rpm	0.03-75	0.09-260	0.19-570	0.30-900	0.40-1200

• **Weight** 23.6lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 135VA • **Standards** Meets all applicable CE and American standards • **Dimensions** 10.87in x 12.34in x 6.22in

- Low-pulse high precision pumphead
- Twin offset tracks for pulse-free flow
- Six stainless steel rollers for high precision
- Stackable for two to four channels of flow
- Tubes from 1.6mm to 9.6mm bore may be used, giving recommended doses ranging from under 1ml to multi-liter fills, with better than ±0.5% accuracy

Minimum dispense (ml) based on accuracy required vs tube bore

Tube #	119	120	15	24	121	122
Tube bore size	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm	9.6mm
Accuracy						
±0.5% accuracy	3.7	20	36	61	78	110
±1.0% accuracy	2.5	13	25	41	52	73
±2.0% accuracy	1.1	5.7	11	18	23	31
Flowrate (ml/min)						
0.1 to 350rpm	0.04-150	0.23-800	0.42-1500	0.70-2500	0.90-3200	1.3-4400

• **Weight** 33lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 135VA
 • **Standards** Meets all applicable CE and American standards • **Dimensions** 10.87in x 17.68in x 6.22in

520L

500% production increase



Companies and industries of all sizes benefit from Watson-Marlow Bredel dispensing technology.

Lemur 2000 is a San Francisco importer of food from Madagascar. The company was using a syringe filling machine to make up 1 gallon and 2 gallon containers of vanilla extract*, and filling half-gallon bottles by hand. Accuracy and repeatability were problems, production was slow, and cleaning was an arduous task.

The installation of one 620 series dispensing pump increased their system's accuracy and repeatability and boosted production five-fold.

*Vanilla is a widely used flavoring in cookies and other foods.

Bringing industrial power to precision dispensing

The 620Di combines industrial power and durability with unrivaled precision, pumping up to 18 liters a minute and achieving pressures up to 60psi. It can store 50 dispensing programs using the simple screen-keypad interface and outputs batch records for cGMP requirements.

- Accurate, fast dispensing for ultimate batch consistency. Dispenses 500ml in 3.5 seconds with $\pm 0.5\%$ accuracy
- Calibration by weight or volume, metric or US units; calibration without disturbing batch dispensing
- Dose triggered by timed interval, keypad, remote signal or additional footswitch, handswitch or proximity switch
- Pin-secure Process Protection: safeguard your process with two levels of set-up security
- Stand-alone use or a fully integrated part of a filling line



NEMA 4X ingress protection



620R



- Two-roller, high-performance pumphead with retractable rollers for CIP
- 30 psi capacity
- Up to 15 liter/min
- Continuous tubing

Minimum dispense (ml) based on accuracy required vs tube bore

Tube #	26	73	82	184
Tube bore size	6.4mm	9.6mm	12.7mm	15.9 mm
Accuracy				
±0.5% accuracy	150	338	525	708
±1.0% accuracy	96	216	336	453
±2.0% accuracy	48	108	168	226
Flowrate (l/min) with silicone (Pumpsil-D) tubing				
0.1-265 rpm	0.001-3.2	0.003-7.2	0.004-11	0.01-15

- **Weight** 45.2lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 250VA
- **Standards** Meets all applicable CE and American standards
- **Dimensions** 11.02in x 17.84in x11.42in

620RE4



- Four-roller pumphead means double the occlusions for greater accuracy per revolution. With retractable rollers for CIP
- 60 psi capacity
- Up to 18* liter/min
- LoadSure™ elements

Minimum dispense (ml) based on accuracy required vs tube bore

Tube bore size	Dose in ml	
	12mm	17mm
Accuracy		
±0.5% accuracy	205	259
±1.0% accuracy	131	166
±2.0% accuracy	66	83
Flowrate (l/min) with silicone (Pumpsil-D) tubing		
0.1-265 rpm	0.003-8.7	0.004-11

- * 620RE 2-roller pumphead with STA-PURE™ tubing
- **Weight** 45.2lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 250VA
- **Standards** Meets all applicable CE and American standards
- **Dimensions** 11.02in x 17.84in x11.42in

Element change is a one-minute job with LoadSure™ elements. Open the guard and spring back the rollers ... Replace the old element with a new one ... Click the rollers out and close the guard



One minute maintenance

- Smooth-flow dispensing with offset tracks and Y-elements to eliminate pulsation
- Accurate to ±0.5%
- Flow rates from 0.002 liter/min to 11.5 liter/min from three sizes of Y-element
- Use with two separate tubes to create a twin-channel pump
- Alternatively, use two tubes to draw viscous fluid (effectively doubling bore capacity), merged into a continuous, pulseless flow on discharge

Minimum dispense (ml) based on accuracy required vs tube bore

Tube bore (4.0mm wall)	Dose in ml		
	8mm	12mm	16mm
Accuracy			
±0.5% accuracy	91	174	236
±1.0% accuracy	42	80	109
±2.0% accuracy	17	32	44
Flowrate (l/min) with silicone (Pumpsil-D) tubing			
0.1- 265 speed rpm	0.002-4.6	0.003-8.5	0.005-11.5

- **Weight** 55.6lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 250VA
- **Standards** Meets all applicable CE and American standards
- **Dimensions** 11.02in x 19.68in x12.01in

620L

Easy set-up, easy change



A US producer of earth friendly cosmetics including lip balm, skin lotions and hair care products uses twelve 520Di pumps to fill retail packages of his products. Before choosing Watson-Marlow Bredel pumps, they considered piston fillers, but dropped them in favor of ease of use, easy cleaning and easy fluid change. A choice of programs means that set-up takes only minutes when a line changes.

3500:1 filling speed adjustment allows the packaging equipment to keep exact pace with production.

Simple, menu-driven benchtop dispenser

The 323Dz brings accuracy and versatility to smaller-scale dispensing, delivering a dosing accuracy of $\pm 1.0\%$. Speed range from 3rpm to 400rpm.

- Powerful, brushless DC motor able to drive up to five ganged pumpheads
- Dispenses 100ml in 3 seconds
- Menu-driven calibration with mid-batch recalibration
- Dispensing by keypress or additional footswitch or handswitch



OEM / connectivity

Easy set-up and control, quick tube change, and minimal maintenance make Watson-Marlow Bredel dispensers the perfect choice for use with automated equipment.

Using industrial logic I/O's and digital networking through RS485 and RS232 for single or multi-pump daisy-chain style control, our dispensing pumps can be easily integrated into new equipment or retrofit into existing lines.

If you're an original equipment manufacturer, take advantage of our OEM capabilities. Whether your application requires the integration of a standard dispenser into your system or a custom-designed pump, we have the experience, technical know-how and dedicated engineering staff to design a dispenser to meet your specific need.

- Digital network control using RS485 and RS232
- Industrial logic I/O communications
- RS232 options include batch records retaining all details of a dispensing batch, from dose size to drip control, from operator name to date and time
- Pin-secure Process Protection safeguards user configurations

Dispensing pumpheads, including ATEX models, can be supplied with or without baseplates for fitting to existing or customer-specified drives.

313/314D



- Three-roller and four-roller flip-top pumpheads for instant easy loading
- Five tube sizes for flowrates from 0.50ml/min to 2000ml/min
- Up to five snap-fit pumpheads can be ganged: channel to channel accuracy of $\pm 2\%$
- 2.4mm wall option to handle higher pressure or high viscosity

Minimum dispense (ml) based on accuracy required vs tube bore

Tube #	119	120	15	24	121
Tube bore size	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm
313D Accuracy					
$\pm 0.5\%$ accuracy	5.1	19	42	69	95
$\pm 1.0\%$ accuracy	2.1	7.7	17	28	39
$\pm 2.0\%$ accuracy	1.5	5.5	12	20	28
313D Flowrate (ml/min)					
2 to 400rpm	0.54-110	2-400	4.4-880	7.2-1400	10-2000
314D Accuracy					
$\pm 0.5\%$ accuracy	3.6	12	27	43	57
$\pm 1.0\%$ accuracy	2.4	8.2	18	29	39
$\pm 2.0\%$ accuracy	1.0	3.5	7.8	12	16
314D Flowrate (ml/min)					
2 to 400rpm	0.50-100	1.7-340	3.8-760	6.0-1200	8.0-1600

- **Weight** 9.9lb • **Supply** 1ph 100-120V, 220-240V (selectable) 50/60Hz 100VA
- **Standards** Meets all applicable CE directives • **Dimensions** 9.06in x 8.89in x 5.2in

Dispensing accessories

Watson-Marlow Bredel dispensing accessories are important parts of any dispensing system.

Stainless steel filling needles are available as sets or individually in sizes perfectly matched to your application. We offer two choices of stainless steel filling stands with filling needle holders used for a wide range of bottle sizes.

Dispensing can be activated by automated filling equipment, or on a smaller scale by footswitch, handswitch or proximity sensor appropriate to each filling stand.

A switched, hand-held filling lance is also available for installations where a filling stand is not necessary.

Cables are available to link a computer to the pump, and for onward daisy-chaining, pump to pump.



Dispensing needles in a full range of sizes, are available for two sizes of filling stands, designed for use with 520 and 620 dispensing pumps. Handswitches, footswitches and a proximity switch, plus daisy-chain control cabling, complete a comprehensive range of accessories

Controllability	520Di	520DiN	620Di	620DiN	323Dz
Accuracy ± 0.5%	●	●	●	●	
Max speed (rpm)	350	350	265	265	400
Control ratio	3500:1	3500:1	2650:1	2650:1	200:1
Brushless DC motor	●	●	●	●	●
0.1% set speed accuracy	●	●	●	●	
0.1rpm speed resolution	●	●	●	●	
Keypad control	●	●	●	●	●
50 dose programs	●	●	●	●	
Manual control	●	●	●	●	●
Remote control – digital with contact closure, 5V TTL or 24 industrial logic inputs for run/stop, direction. Auto/manual toggle and liquid detection.	●	●	●	●	
Remote control footswitch only					●
Batch record RS485 output		●		●	
Ramp and drip	●	●	●	●	●
Batch dispensing, automatic or single shot dispensing	●	●	●	●	●
Calibration on the fly	●	●	●	●	●
Metric and US units displayed	●	●	●	●	
Digital network control RS232	●		●		
Digital network control RS485		●		●	
Four digital status outputs	●	●	●	●	
Programmable remote outputs 5V TTL or 24V Industrial logic	●		●		
Programmable remote with volt free 30V change over relays		●		●	
RS485 dose control		●		●	
RS232 dose control	●		●		
Keypad lock	●	●	●	●	●

General features	520Di	520DiN	620Di	620DiN	323Dz
Comprehensive calibration	●	●	●	●	●
Pin-secure process protection – two levels			●	●	
Security protection code to protect set-up (three digit code)	●	●			
3 year warranty	●	●	●	●	
2 year warranty					●
24 hour duty rated	●	●	●	●	
Corrosion-resistant and impact resistant polyester powder coat case work	●	●	●	●	
ABS plastic case top					●
NEMA 2	●		●		●
Washdown NEMA 4X		●		●	
ETL	●	●	●	●	●
CE marked	●	●	●	●	●
120VAC 60Hz, 1ph	●	●	●	●	●

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