

**NEW**

Every peristaltic pump for science



200 series from  
Watson-Marlow Bredel



# sci from Watson-Marlow Bredel

## The new standard in scientific pumping

With over one million pumps sold, Watson-Marlow Bredel is the world's leading peristaltic pump manufacturer, entrusted with the handling of valuable, difficult and sensitive fluids in research, pilot and production processes everywhere that science is building our future.

### science

Sci-Q pumps have been created for **science**, by science, exploiting every latest technique from 3D solid design, finite element analysis, rapid prototyping, intensive tooling and cellular build. The results are as near perfection as the state of the art can provide.

### intelligence

At the heart of a Sci-Q pump is microprocessor **intelligence**, but what really marks it out is the intelligence of its design, born from a passion for engineering fluid-handling solutions. Watson-Marlow Bredel creates intelligent designs for intelligent users.

### quality

The highest **quality** peristaltic pump available today, every Watson-Marlow Bredel product is engineered for quality. Zero-maintenance motors, whisper-quiet gearboxes and the most sophisticated control electronics designed and manufactured to ISO9001:2000 are backed by expert local support.



#### Inside the Sci-Q 323

Four modular pumphead types for single or multi-channel flows from  $\mu\text{l}/\text{minute}$  to 2 liters per minute

Precision brushless DC motor: servo-quality for precise speed control; zero maintenance

Easy-use interface: high-visibility display and contoured membrane keypad designed for intuitive operation

Durable chemical-resistant case, crevice-free for hygiene; distinctive, contemporary and functional

# 200

## SERIES



205U/CA

### 205U/CA low-flow multi-channel pumps

- High precision, near-pulseless flow through 4 to 32 channels
- Flow rates from 0.6 microliters to 22ml/min per channel
- Eight planetary-driven stainless-steel rollers give extended tube life
- 180:1 speed control range and 19 tube sizes give 36,000 :1 control range
- Manual control or analog auto-control (up to 30V or 32mA)
- Change cassettes without stopping the pump or disturbing other channels

The 200 series provides high-precision pulsation-free pumping. Flow control for each individual channel is provided by multi-turn "click-stop" pressure adjustment on each cassette. Manual and analog auto-control options. Selectable dual-voltage operation.

The 205CA pumphead with its snap-fit cassettes and sprung track is factory-set for standard applications, but lockable occlusion adjustment allows settings to be optimized when necessary and, uniquely, remain undisturbed during tube changes. 205CA pumpheads accept manifold pump tubing in five different materials and nineteen sizes.

Keypad lock prevents tampering or accidental changes. Max high speed priming function. All functionality controlled from wipe-clean membrane keypad. 0-5V DC tachometer output for speed monitoring, 5V auxiliary output for motor run indication. Remote low voltage, or TTL (PLC compatible) of start/stop and direction. Selectable dual voltage 100-120V or 220-240V 50/60Hz operation.



Snap-fit cassettes

### 205S/CA low-flow multi-channel pumps

If you require only manual control, please order the 205S/CA.



205S/CA

#### 205U/CA and 205S/CA flow rate ranges ml/min (maximum 32 channels)

Color code	Orange/Black	Orange/Red	Orange/Blue	Orange/Green	Orange/Yellow
Tube bore	0.005"	0.007"	0.010"	0.015"	0.020"
	0.13mm	0.19mm	0.25mm	0.38mm	0.50mm
0.5-90rpm	0.0006-0.10	0.0009-0.16	0.0013-0.23	0.0036-0.65	0.0056-1.01
Color code	Orange/White	Black/Black	Orange/Orange	White/White	Red/Red
Tube bore	0.025"	0.030"	0.035"	0.040"	0.045"
	0.63mm	0.76mm	0.88mm	1.02mm	1.14mm
0.5-90rpm	0.0083-1.49	0.011-2.02	0.016-2.92	0.021-3.76	0.026-4.68
Color code	Gray/Gray	Yellow/Yellow	Yellow/Blue	Blue/Blue	Green/Green
Tube bore	0.050"	0.055"	0.060"	0.065"	0.070"
	1.29mm	1.42mm	1.52mm	1.65mm	1.85mm
0.5-90rpm	0.033-5.95	0.04-7.20	0.043-7.69	0.051-9.12	0.063-11.3
Color code	Purple/Purple		Purple/Black	Purple/Orange	Purple/White
Tube bore	0.080"		0.095"	0.100"	0.110"
	2.05mm		2.38mm	2.54mm	2.79mm
0.5-90rpm	0.076-13.8		0.092-16.5	0.11-19.3	0.12-22.0

#### 205U/CA and 205S/CA ordering information

Supply 100-120/220-240V 50/60Hz 1ph 60VA

Channels	205U/CA	205S/CA	Channels	205U/CA	205S/CA
4	020.5704.00A	020.3704.00A	20	020.5720.00A	020.3720.00A
8	020.5708.00A	020.3708.00A	24	020.5724.00A	020.3724.00A
12	020.5712.00A	020.3712.00A	28	020.5728.00A	020.3728.00A
16	020.5712.00A	020.3716.00A	32	020.5732.00A	020.3732.00A



Color code	Bore	Marprene	PVC	Silicone	Solvent resistant	Acid resistant
Orange/black	0.005" (0.13mm)		980.0013.000		984.0013.000	
Orange/red	0.007" (0.19mm)		980.0019.000		984.0019.000	
Orange/blue	0.010" (0.25mm)	978.0025.000	980.0025.000		984.0025.000	
Orange/green	0.015" (0.38mm)	978.0038.000	980.0038.000		984.0038.000	
Orange/yellow	0.020" (0.50mm)	978.0050.000	980.0050.000		984.0050.000	986.0050.000
Orange/white	0.025" (0.63mm)	978.0063.000	980.0063.000	982.0063.000	984.0063.000	986.0063.000
Black/black	0.030" (0.76mm)	978.0076.000	980.0076.000	982.0076.000	984.0076.000	986.0076.000
Orange/orange	0.035" (0.88mm)	978.0088.000	980.0088.000	982.0088.000	984.0088.000	986.0088.000
White/white	0.040" (1.02mm)	978.0102.000	980.0102.000	982.0102.000	984.0102.000	986.0102.000
Red/red	0.045" (1.14mm)	978.0114.000	980.0114.000	982.0114.000	984.0114.000	986.0114.000
Gray/gray	0.050" (1.29mm)	978.0129.000	980.0129.000	982.0129.000	984.0129.000	986.0129.000
Yellow/yellow	0.055" (1.42mm)	978.0142.000	980.0142.000	982.0142.000	984.0142.000	986.0142.000
Yellow/blue	0.060" (1.52mm)	978.0152.000	980.0152.000	982.0152.000	984.0152.000	986.0152.000
Blue/blue	0.065" (1.65mm)	978.0165.000	980.0165.000	982.0165.000	984.0165.000	986.0165.000
Green/green	0.070" (1.85mm)	978.0185.000	980.0185.000	982.0185.000	984.0185.000	986.0185.000
Purple/purple	0.080" (2.05mm)	978.0205.000	980.0205.000	982.0205.000	984.0205.000	986.0205.000
Purple/black	0.090" (2.29mm)	978.0229.000	980.0229.000	982.0229.000	984.0229.000	986.0229.000
Purple/orange	0.100" (2.54mm)	978.0254.000	980.0254.000	982.0254.000	984.0254.000	986.0254.000
Purple/white	0.110" (2.79mm)	978.0279.000	980.0279.000	982.0279.000	984.0279.000	986.0279.000

\* For autoclavable Marprene tubing, please replace last "0" with "+" for example 978.0238.00+

#### 205U/CA and 205S/CA specifications

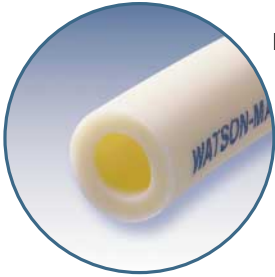
Channels	Dimensions (inches)	Weight (pounds)
4	H6.1 x W5.8 x L11.4	14.3lbs
8	H6.1 x W5.8 x L13	16.7lbs
12	H6.1 x W5.8 x L15	19.4lbs
16	H6.1 x W5.8 x L16.9	22.0lbs
20	H6.1 x W5.8 x L20.1	27.3lbs
24	H6.1 x W5.8 x L20.8	29.7lbs
28	H6.1 x W5.8 x L24.8	32.3lbs
32	H6.1 x W5.8 x L26.8	35.0lbs
Standards		BS800, IEC 335-1, EN60529 (IP31), CE
Operating temperature range		5 to 40C

## Tube selection guide

### CHOOSING THE BEST TUBE

Watson-Marlow Bredel tubing is available in seven materials and over forty sizes, giving an extraordinary range of chemical and application capability. Watson-Marlow Bredel pumps are designed to use Watson-Marlow Bredel tubing tolerances and performance, and no other tubing will provide comparable results.

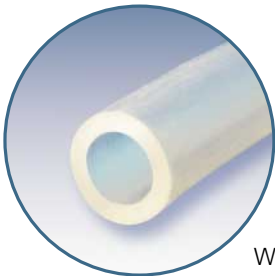
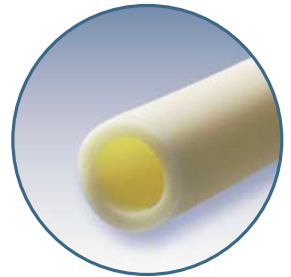
The tubing largely dictates pump performance: Its restitution creates suction, its strength resists pressure, its flex resistance determines pumping life, its bore defines the flow rate, and its wall thickness controls pumping efficiency.



**Marprene** is Watson-Marlow Bredel's exclusive thermoplastic elastomer.

Always our first recommendation. Marprene is the longest life tubing with a wide chemical compatibility, and is highly resistant to oxidizing agents such as ozone and peroxides and sodium hypochlorite. Marprene is beige in color, opaque to both visible and ultra-violet light with low permeability to gases such as oxygen, carbon dioxide and nitrogen, and meets USDA standards for food handling. Working temperature range 40F to 175F. Autoclavable.

**Bioprene** has the same long life as Marprene but complies with USP Class VI, FDA requirements 21 CFR 177.2600 and NSF and USDA standards for food handling. It has a wide chemical compatibility, and can handle repeated autoclaving. Bioprene can be sterilized by ethylene oxide or gamma irradiation. Working temperature range 40F to 175F. Beige. Available in 15 meter packs only.



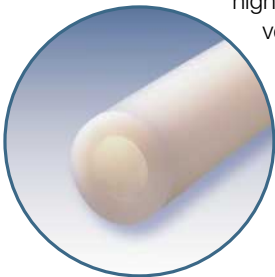
**Silicone** is the standard laboratory tubing used for small bore sizes up to 3/8" (9.6mm). Food and medical quality, meets USP and NSF Class VI standards and autoclavable.

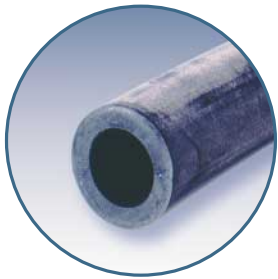
**Watson-Marlow** offers a specially developed **platinum-cured silicone tubing** for additional protection from contamination during the pumping process. Platinum-cured tubing produces a smoother surface, less protein binding offers high levels of purity. It is ideal for medical devices, chemical analysis and pharmaceutical production applications, particularly where there is long term contact with the process fluid. Working temperature range -4F to 175F. High permeability to oxygen. Translucent. Autoclavable.

**Sta-Pure** has a unique composite construction of silicone in a PTFE lattice giving it superior burst resistance up to 100 psi (7bar) and 18 times longer life than silicone tubing. It produces virtually no spalling, is USP Class VI approved and is classified as non toxic. Working temperature range 32F to 175F. Opaque white. Autoclavable, SIP and CIP compatible.



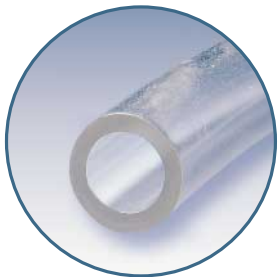
**Chem-Sure** is effectively pumpable PTFE - a high performance composite of PTFE and a high-grade fluoroelastomer - offering extraordinary chemical resistance, long life and very high burst pressures. Chem-Sure is USP Class VI and food grade approved making it suitable for foods and pharmaceuticals as well as aggressive chemicals





Neoprene tubing

**Neoprene** offers excellent performance with abrasive slurries and sustained pressure applications. Good suction and pressure capabilities. Food quality. Most often used in bore sizes greater than 1/2" (12.7mm). Working temperature range 32F - 175F. Black.



PVC tubing

**PVC** has a high Shore hardness giving excellent pressure and suction performance and low gas permeability. FDA approved for use with food and is NFS listed. Working temperature range 70F - 140F. Glass clear

The best way to select a tube is to first decide which materials are chemically suitable, and then choose the one which best meets the physical demands of the application.

Normally, use the longest tube life material, which will usually be Bioprene or Marprene if they are chemically and physically suitable. Otherwise, silicone tubing is most often chosen for sizes up to 3/8" (9.6mm), and Neoprene tubing for bore sizes of 1/2" (12.7mm) or more.

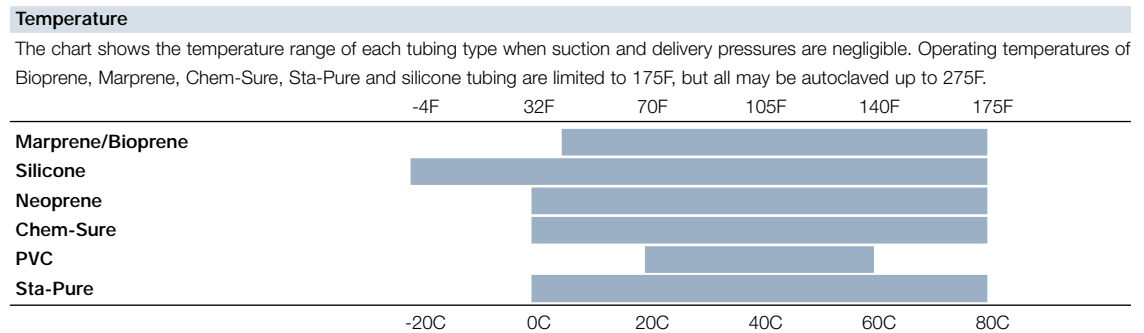
For maximum tube life, use a large bore tube at low speed. For maximum flow rate use the largest tube at maximum speed. For maximum accuracy, use a small bore tube at maximum speed.

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 or pressure, use the smallest practicable bore size of tubing and run the pump at the slowest possible speed.

### CHECKING YOUR CHOICE WITH AN IMMERSION TEST

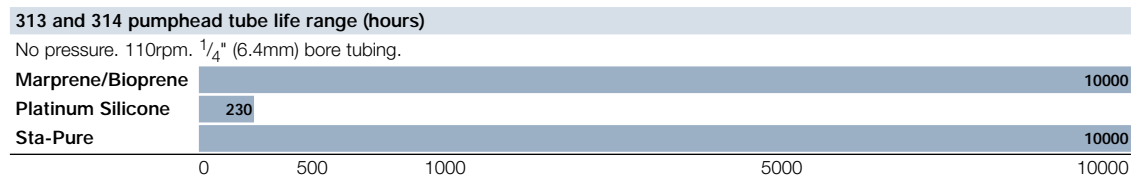
Always conduct an immersion test before choosing a tube material for critical applications. Immerse a short length of the tubing or a disk of rubber sample (always available from Watson-Marlow Bredel or its distributors) in a closed container of the fluid for 48 hours, and then examine for signs of attack,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

### PHYSICAL COMPATIBILITY



### TUBE LIFE

TUBE LIFE



### VISCOSITY

The flow rates given in this brochure are valid for fluids with viscosities in the range 1 to 100 centipoise. Increased fluid viscosity will result in decreased flow rate. Choose a tubing with as large a wall thickness as possible, which could, for instance, mean using a 300 series pump which user greater wall thickness tubing, rather than a 200 series pump.

Contact Watson-Marlow Bredel or its local distributor for advice on specific applications.



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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.

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

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HBO161

**sci Q Pump Series Flow Rates** Put a peristaltic pump in your lab Improve your performance

<b>200</b>	Near pulseless, multi-channel pumps with up to 32 channels.	0.6µl/min - 22ml/min	205U
<b>300</b>	Single or multi-channel pumps with manual, remote or dispensing control.	2µl/min - 2 liters/min	313U
<b>400</b>	Instrument-quality, ultra-precise, single and multi-channel pumps with manual or process control.	1µl/min - 730ml/min	405U
<b>500</b>	Microprocessor controlled dispensing pumps and systems.	0.02ml/min - 3.0 liters/min max	505DZ



**PROFILE OF FLOW RATE AGAINST TIME**

The flow rate of all peristaltic pump tubing will reduce over time, with the majority of the change occurring in the first hours and days of use, after which the flow rate will stabilize. Maximum accuracy of metering and dosing will be obtained during this period of stability. Where precise flow rates are required, it is recommended that the flow rate is calibrated after at least a one hour running-in period.

**FLOW RATES**

All flow rates given in this brochure were obtained pumping water at 68F (20C) with zero suction and delivery heads. PVC tubing was used to obtain the 200 series flow rates. All other flow rates were obtained using silicone tubing.

**OPERATING AND STORAGE TEMPERATURES**

Unless otherwise stated, all pumps listed in this brochure may be operated at ambient temperatures between 41F and 104F (5C and 40C). They may be stored at temperatures between -40F and 158F (-40C and 70C), but allow time for acclimatization before operating.

**STANDARDS**

**CE** Meets all relevant directives  
**EN601010** is the European Norm standard dealing with "Safety requirements for electrical equipment for measurement, control and laboratory use".

**IEC 335-1** is the International Electrotechnical Commission standard dealing with the "Safety of household and similar appliances, general requirements". Equivalents are BS3456: Part 101 and DIN VDE 0700: Part 1).

**EN60529** is the European Norm standard dealing with the "Classification of degrees of protection provided by enclosures for rotating machines. Equivalents are BS 4999: Part 105, IEN 60 034: Part 5, and DIN VDE 0530: Part 5. IP numbers (such as IP34, IP42, IP55) indicate the degree of ingress protection of the product, with the first digit indicating protection against the ingress of objects, and the second digit indicating the degree of protection against the ingress of water.

**SPARE PARTS AVAILABILITY**

Watson-Marlow Bredel's policy is to provide spare parts for all products for a minimum of seven years from discontinuation. The ability to implement this policy is not entirely within Watson-Marlow Bredel's control and cannot be guaranteed, but every effort will be made to honor this policy.

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