

ENGINEERING PHARMACEUTICAL INNOVATION



Keeping it Clean – Sanitary Pumps 101

Specifying Peristaltic Pumps

Presented by: Mark J. Atkinson

Watson-Marlow Breidel Pumps

Wilmington, MA

Who Is Watson-Marlow?



- In business over 50 years, the world's largest, most experienced manufacturer of peristaltic pumps and tubing
- Leading experts in peristaltic pumps. . . it is all we do. 100% dedicated to peristaltic pump technology for the sanitary process industry.
- Worldwide company with direct stocking, sales, and support offices in US, UK, Netherlands, France, Germany, Italy, Belgium, South Korea, China, South Africa, Brazil
- Subsidiary of the Spirax Sarco Engineering Group - world leading manufacturer of steam equipment & systems

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Agenda

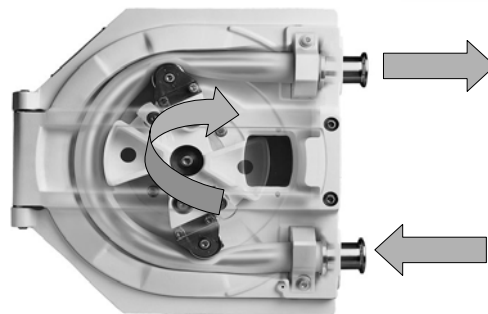
- How a Peristaltic Pump Works
- Features of the Peristaltic Pump
- Specifying a Peristaltic Pump

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How a Peristaltic Pump Works

- **Simplicity**
- **Rotor Turns**
- **Rollers Squeeze Tubing**
Trapping Fluid/Gas
- **Product Is Pushed Ahead and**
Out Pump as Rollers Advance
- **Suction is Achieved by Tubing**
Springing Back, Sucking in
Fluid – Like a Squeeze Bulb

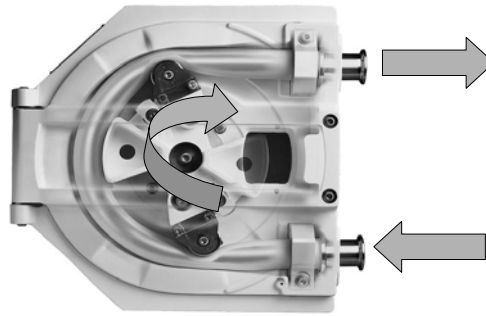


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How a Peristaltic Pump Works

- Tubing Life Proportional to Speed/Number of Roller Passes
- Slower Speed, Fewer Rollers = Longer Life



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Features of the Peristaltic Pump

- Wide Performance Range
- Metering
- Self Priming, Dry Priming
- Dry Running –No Damage to Pump
- Low Shear – Will Not Damage Fluid Being Pumped
- Handles Mixed Phase Flow – Solids/Gases



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Features of the Peristaltic Pump

- Reversible Flow
- No Valves/No Seals
- Low/Cost Maintenance
- Completely Sanitary
- No Contact Between Product and Pump
- Tubing = Single-Use, Inexpensive Fluid Path



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Specifying a Peristaltic Pump

- Flow Rate
- Pressure – suction and discharge
- Fluid
- Duty Cycle
- Type of Control
- Enclosure
- Voltage

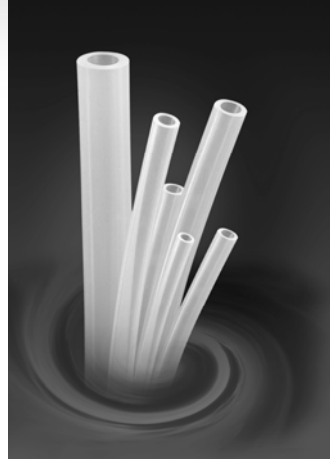


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Pump Selection – Three Steps

- Pump Size
- Tubing
- Drive Selection



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Pump Size

- Using Flow Rate Find Pump Series

500	<p>Superts range of NEMA 2 and NEMA 4X rated pumps for science and industry as well as food and variable speed dose-coupled pumps.</p>	<ul style="list-style-type: none"> • Light and analog process signal control • Flow rates from 0.00396 gph to 76 gph • Manual, analog and digital RS232/RS 485 control • Close coupled pumps up to 134 gph - single or 3-phase; pneumatic or explosion proof motors also available • Seven pump head options available • Dispensing pump for 20.5% accuracy 			
600	<p>NEMA 2 and NEMA 4X mid-flow process pumps with full clean-in-place and steam-in-place capability.</p>	<ul style="list-style-type: none"> • Closed drive flow rates from 0.00396 gph to 4.8 gph • Manual, analog and digital RS232/RS 485 control • Close coupled pumps up to 8 gph - single or 3-phase; pneumatic or explosion proof motors also available • One minute maintenance LoadSure™ alert arms 			
700	<p>Industrial cased and baseplate mounted pumps for use with continuous tubing or new LoadSure elements. Three phase motor, or pneumatic.</p>	<ul style="list-style-type: none"> • Flow rates from 0.03 gph to 6.8 gph • Single or twin channel operation • Driven roller pump head extends tube life • LoadSure elements ensure correct tube loading every time • Fixed or variable speed drives 			

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Tubing Selection – Function of...

- Pump Head
- Flow Rate
- Fluid
- Pressure
- Duration of Use

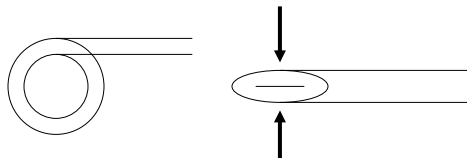
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Tubing Selection – Wall Thickness

- Tubing works hand in hand with pump head
- Wall thickness must match pump head gap

Gap
between
roller
and wall



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Tubing Selection

- Use Flow Rate Table to Select Tube Size

Flow Rate Ranges with 520R2 or 520R head (ml/min*)

2.4 mm Thick Wall Tube #	105	108	119	120	15	24	121	122
1.6 mm Thin Wall Tube #	112	13	14	16	25	17	18	N/A
Tube Bore	0.5mm	0.8mm	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm	9.6mm
Speed Range (0.1 to 220rpm)	1/50"	1/32"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"
Neoprene, Sta-Pure™, Chem-Sure™, Tygon®, Platinum-cured silicone	0.004-9.5	0.01-24	0.04-97	0.18-390	0.40-870	0.70-1500	1.1-2400	1.6-3500
Marprene/Bioprene	0.004-9.0	0.01-23	0.04-92	0.17-370	0.38-830	0.67-1500	1.1-2300	1.5-3300
Fluorel™			0.03-70	0.13-280	0.29-630	0.51-1100	0.80-1800	

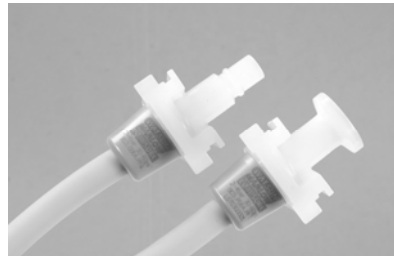
*1 gal = 3785.4ml

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Tubing Selection

- Platinum Cured Silicone
 - most commonly used material
 - life 100+ hours
 - low pressure 15psi
- Santoprene (Bioprene, Pharmed)
 - good chemical resistance
 - life 3000+ hours
 - low pressure 30psi
- StaPure (Trademark W.L. Gore)
 - reinforced platinum cured silicone
 - life 3000+ hours
 - pressure up to 100psi

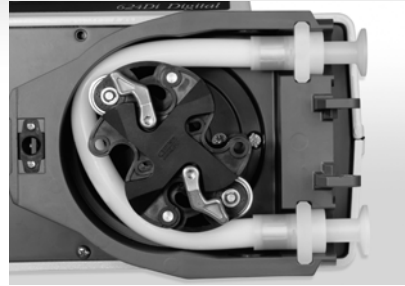


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Tubing Selection

- Continuous Tubing
 - Fewer connections
- Pre-fitted Tubing Elements
 - Secure loading
 - Higher pressure



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Tubing Selection— Single Use Bag Sets

- Trend in Industry
- Not Just Specifying a Bag!
Tubing on Bag
Must Work with Pump



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Drive Selection

- Control Options
 - Manual
 - Control at pump only
 - Speed
 - Direction

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Drive Selection

- Control Options
 - Analog
 - 4-20mA control
 - Remote stop/start
 - Remote direction
 - Status outputs
 - Speed output

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Drive Selection

- Control Options
 - Digital
 - RS232, RS485
 - Profibus, Foundation Fieldbus
 - Complete control of pump
 - Enhanced outputs – status, maintenance
 - Single wire

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THANK YOU!!

- **Questions?**
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