PERISTALTIC PUMP SELECTION

February 20, 2025

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TRAINING – WEBINAR SESSION 3

Peristaltic Pump Overview

Peristaltic Pump Applications

Peristaltic Pump Selection

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QUICK RECAP – WEBINARS 1 & 2

Webinar 1

- What is a metering pump
- How a peristaltic pump works
- Common applications
- Benefits
- Key Components
- ProMinent Offering

Webinar 2

- When a peristaltic pump should be used
- When a peristaltic pump should not be used
- Advantages
- Common applications in specific industries

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PROMINENT DULCOFLEX COMPLETE PRODUCT LINE

DULCOFLEX DFXa

Capacities up to:
17.7 GPH (65 LPH)

DULCOFLEX DFBu

Capacities up to:
337 GPH (1,532 LPH)

DULCOFLEX DFCu

Capacities up to:
106.4USGPM (24,163 LPH)

DULCOFLEX DFYa

Capacities up to:
174.4 GPH (660 LPH)

NSF/ANSI/CAN 61
IAPMO R&T ®

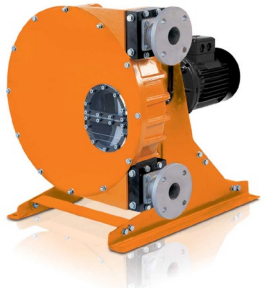
DULCOFLEX DFBr

Capacities up to:
337 GPH (1,532 LPH)

Pressures up to
218PSI/15Bar(g)

DULCOFLEX DFDu

Capacities up to:
160USGPM (36,336 LPH)



AGENDA

- Selecting the Right Pump
- Selection & Quotation Tools
- Designing a System
- Installation Tips

Selecting the Right Pump

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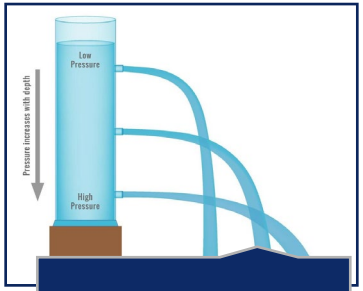
INFORMATION TO GATHER

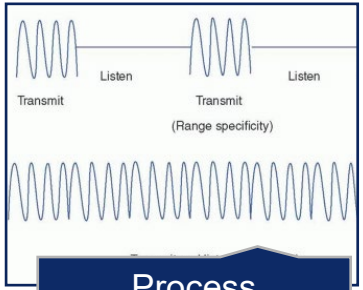
Chemical/Fluid

Flow Rates



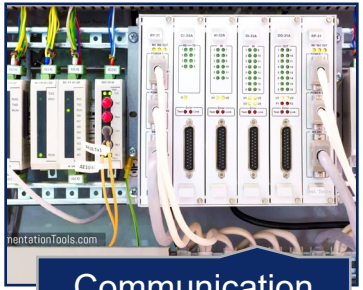
Pressures

Temperatures



Process Requirements

System Design and Layout



Communication Needs

Approvals or Certifications

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CHEMICAL

➢ Chemical Name and Concentration

- To determine material for the tube/hose and pump connections
- Depending on the concentration, the same chemical may require different material
- If incorrect material is selected, tube/hose lifetime is reduced due to swelling and/or delamination

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HOSE MATERIAL

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CHEMICAL

Chemical Viscosity

- Viscosity will have an impact on discharge pressure as well as the pump type that can be used. The DFXa peristaltic tube pump can pump viscosities up to 900,000 cPs
- For the hose pumps, the larger the pump, the more viscous the product that it can pump. Hose pumps can pump up to 20,000 cPs
- Viscosity will also affect the amount of suction lift the pump can perform in a lift application

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CHEMICAL

Chemical Density

- Density will affect the amount of suction lift that the pump can perform
- Slurries with a high specific gravity can affect the inlet pressure at the suction port of the pump if the pump is situated in a flooded suction condition
- The maximum allowable inlet pressure at the suction port of the pump is 3Bar(g)/43PSIG

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FLUID

➢ Particle Size

- In order for the solids to get through the pump without dewatering, the pump needs to be sized properly. Otherwise, the solids collect, dewater, and cannot get through the pump

- In a shear sensitive application such as pumping fruit, or candy the maximum solid size needs to be known to make sure that the product going through the pump is not damaged

- Maximum particle size:
  - For soft solids: <25% of the hose ID
  - For hard solids: <15% of the hose ID

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FLUID

Solid Content

- Hose pumps can pump slurries containing up to 80% solids by weight, if the solid content is higher than this, the pump will have difficulty pumping the solution, as at this point, it is basically pumping a solid

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FLOW

➢ Flow Rate

- This information is crucial to size any pump
- Recommended speed for better hose lifetime:
  - around 20-40 rpm (for continuous duty)
  - 20-30 rpm for polymer, slurry and other viscous fluid (> 1,000 cPs)
- The higher the speed, the shorter the hose lifetime

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PRESSURE

Discharge Pressure

- This is crucial information to select the pump technology (roller or shoe)
  - Shoe pump: max. 15 Bar(g) (218 PSIG)
  - Roller pump: max. 8 Bar(g) (116 PSIG)

- Fabric reinforced hose can handle higher pressures than tube

- The higher the pressure, the shorter the hose lifetime

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TEMPERATURE

Chemical temperature

- Max. 50-60°C (122-140°F) for continuous duty, and up to 80°C (176 °F) for short period of time
- The higher the temperature, the shorter hose lifetime

Ambient temperature

- -10 to 45°C (14 to 113°F)
- If pump is installed outdoors, shelter is recommended to protect pump from rain and sun

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PROCESS REQUIREMENTS

➢ Intermittent or Continuous Operation

- For intermittent duty: a smaller pump and operating it faster
- For continuous duty: a larger pump and running it slower

A balance of pump cost vs. hose lifetime

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SYSTEM DESIGN AND LAYOUT

➢ Flooded Suction or Suction Lift

- Pump can lift up to 8m (26 ft)
- Suction piping to be as short as possible and straight into the pump (Absolute minimum number of elbows or tees in the suction line, like any pump application)
- The compression of the hose by roller or shoe creates a pulsating flow, hence limiting the length and dimension of suction and discharge lines, unless a pulsation dampener is used

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COMMUNICATION NEEDS

➢ Input and Output Signals

- DFXa and DFYa are “smart” pumps
  - Control: manual, external contact, and analogue control (4-20 mA)
  - Relay: 4-20 mA analogue output + fault indicating
- DFB, DFC, DFD pumps require VFD for speed adjustment

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CERTIFICATION

NSF-61

- DFB series pumps with stainless-steel and PVDF connections with either EPDM, Natural Rubber (NR), or Hypalon
- DFC series 30, 40, and 50 series pumps with stainless-steel and PVDF connections with either EPDM, Natural Rubber (NR), or Hypalon
- DFC series 60 and 70 pumps with stainless-steel connection only with either EPDM, Natural Rubber (NR), or Hypalon

Note: The list of the chemicals can be provided by the ProMinent team.

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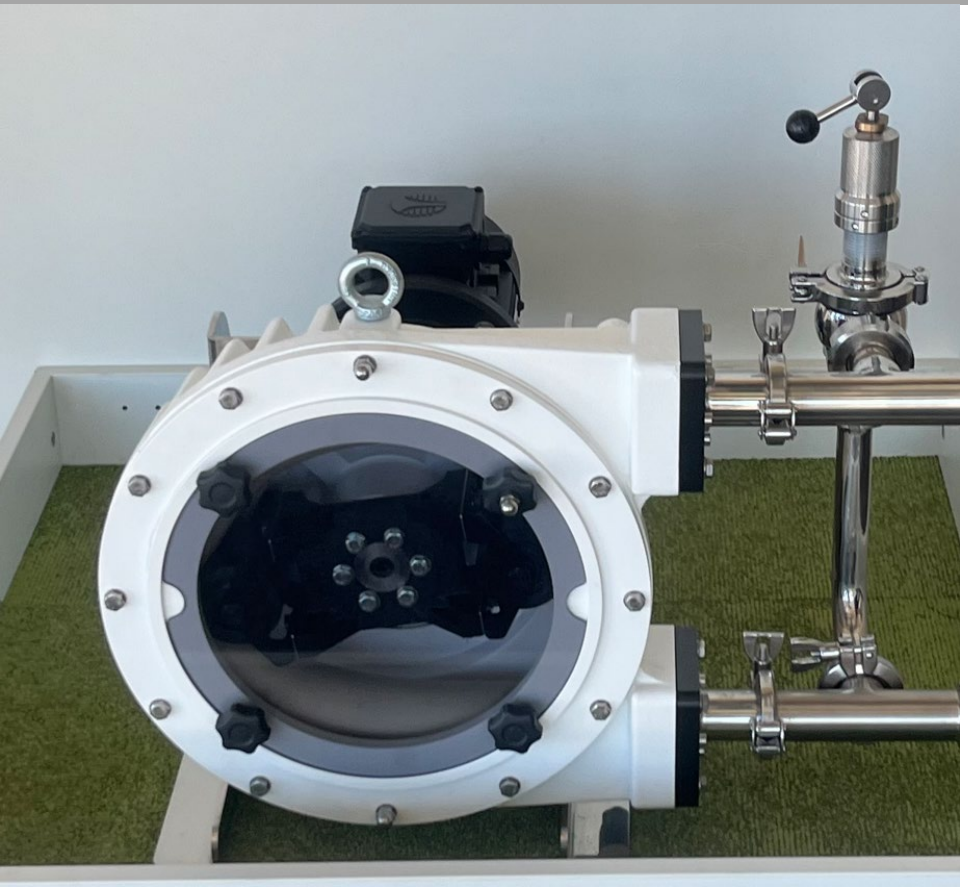
CERTIFICATION



➢ FDA:

- DFYa, DFB, and DFC with stainless-steel tri-clamp connection, NBR-A hose, and food grade grease
- DFXa with ‘F‘ option for FDA-compliant

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Any Questions at this Time?

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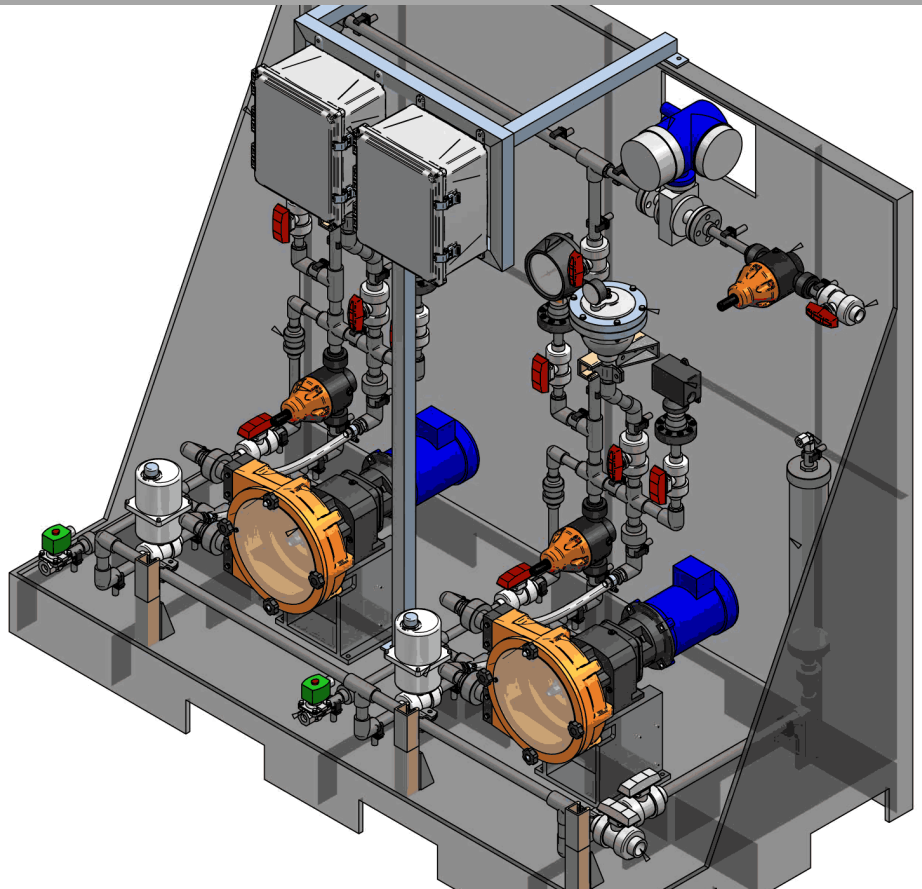
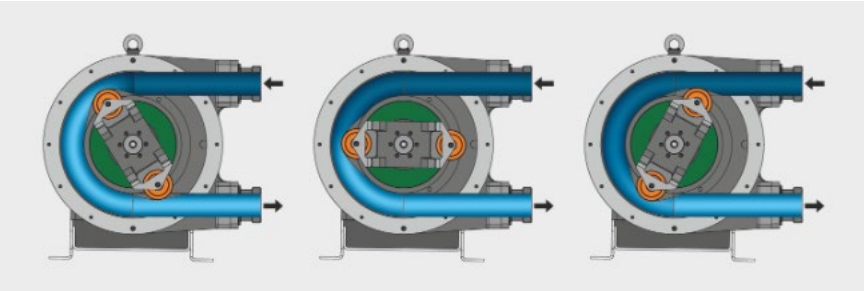
Selecting & Quoting



TUBE/HOSE LIFETIME

- Chemical
- Speed
- Temperature
- Discharge Pressure
- Suction Conditions



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CHEMICAL COMPATIBILITY CHART

- ProMinent Chemical Resistance Charts to confirm the fluid to be pumped is compatible with the hose and the connections/hose inserts

Chemical resistance chart - Hoses

	HOSES					CONNECTIONS			
Medium	Natural rubber (NR)	Buna-N (NBR)	EPDM	Hypalon (CSM)	Norprene A-60-F	STAINLESS STEEL	POLYPROPYLENE	PVDF	HALAR
Acetal	C	C	C	C		A	C	C	C
Acetic Acid 10%	A	C	A	A	A	A	B	A	A
Acetic Acid 20%	B	C	A	A		A	B	A	A
Acetic Acid 30%	B	C	A	A		A	B	A	A
Acetic Acid 99%	C	C	A	B		A	B	A	A
Acetic Acid 50%	B	C	A	A	B	A	B	A	A
Acetic Acid Anhydride	C	C	B	C	A	A	B	A	A

'A' means no chemical attack. Totally compatible
'B' means small chemical attack. Only to use when there aren't better options
'C' means strong attack. The material is not suitable for the application.

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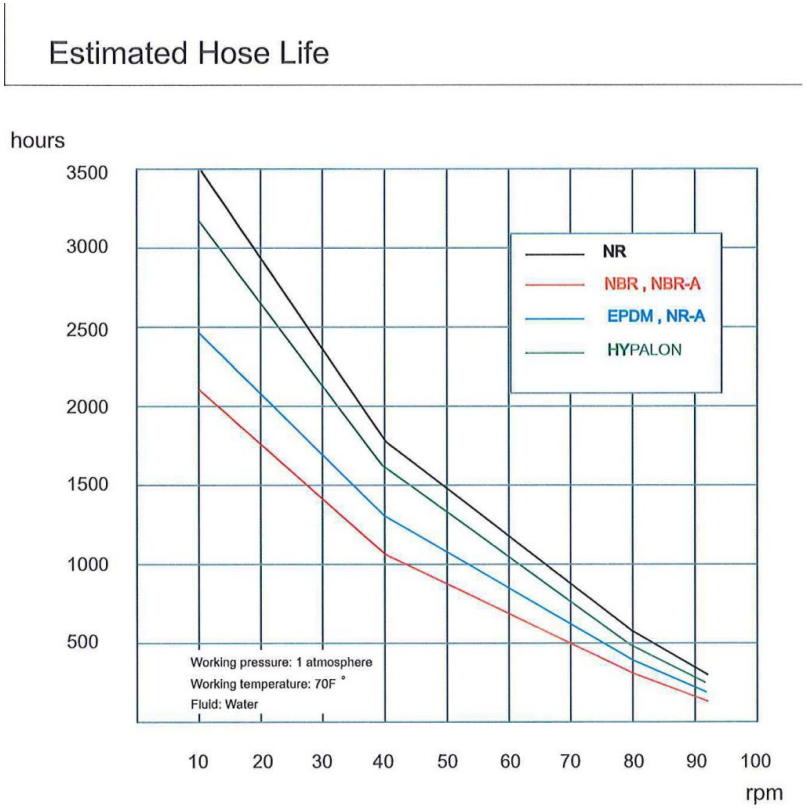
HOSE LIFETIME



Note: always choose **natural rubber (NR),** if material is compatible with chemical.

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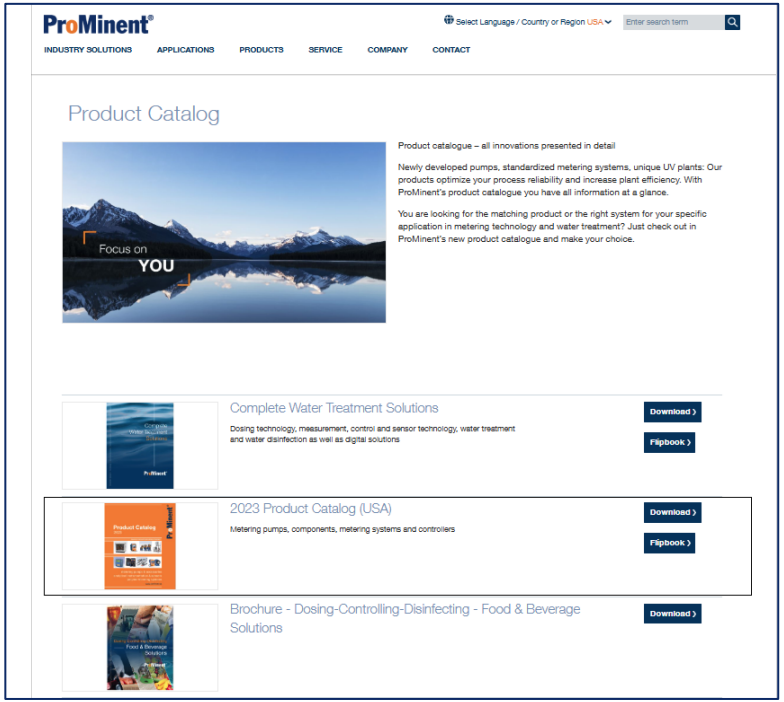
PRODUCT CATALOG

- Link: https://www.prominent.us/en/Products/Products/Product-Catalog/Product-Catalog.html

Capacity Data					
	DFCU30	**DFCU40**	**DFCU50**	**DFCU60**	**DFCU70**
DFCU Series					
Compression	Roller	Roller	Roller	Roller	Roller
Connection	1 1/4”	1 1/2”	1 1/2”	2”	2 1/2”
Capacity gal/rev	0.11	0.24	0.39	0.82	1.76
Max. Flow GPM	7.4	14.4	23.1	41.2	106.4
Max. Pressure Reinforced Hoses	116 psi	116 psi	116 psi	116 psi	116 psi
Tubing	N/A	Norprene	N/A	N/A	N/A
Max. Presure Tubing	N/A	30 psi	N/A	N/A	N/A

All models are available with one of the following reinforced hoses: Natural Rubber, Buna, EPDM, Hypalon

DFCU/A Series



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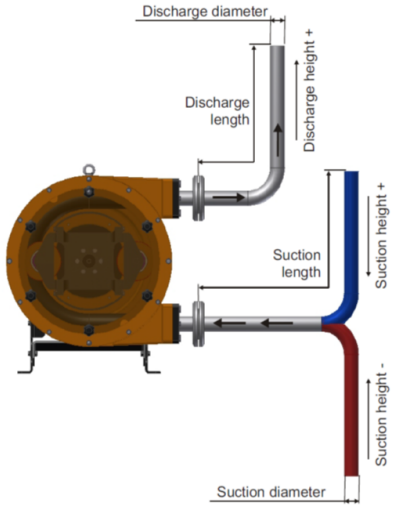
SELECTION TOOLS – APPLICATION SHEET

- Peristaltic Pump Selection Program to ensure the customer receives the correct peristaltic pump for the application

Application Details

FLUID SPECIFICATIONS		
Media:		
Flow rate:	800	l/h
Specific gravity:	1	kg/dm3
Viscosity:	500	mPas
Vapour pressure (standard: 0,024)	0.024	bar
SUCTION:		
Suction diameter:	25	mm
Suction length:	2	m
Suction height:	2	m
External losses:	0	bar
DISCHARGE:		
Discharge diameter:	25	mm
Discharge length:	20	m
Discharge height:	10	m
External losses:	0.5	bar
HOSE MATERIAL 1: NR, 2: NBR, 3: EPDM, 4: HYPALON, 5: NBR-A/NR-A, 6:NORPRENE	1	NR
Medium temperature:	25	ºC



Press button to select a pump

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HOW TO GET A QUOTE

USA:

- Pump: e-Quote or e-mail to prominentcsd-us@prominent.com
- Custom System: distributors can send RFQ (cc the Regional Sales Manager) by emailing Applications team at engrfq-us@prominent.com

Canada:

- Pump: e-mail to sales-can@prominent.com
- Custom System: distributors can send RFQs to the Sales Rep.

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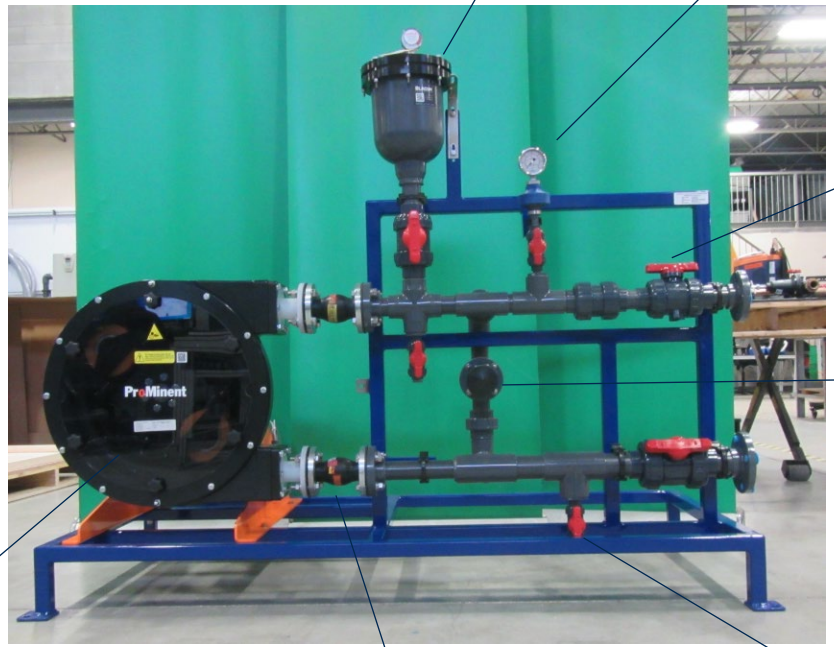
Tips for Designing a System

SYSTEM LAYOUT TIPS



General Installation Tips:

- Suction line should be as short and direct as possible
- The size of the suction and discharge lines need to be at least the same as the pump's connections
- Oversize suction line especially for chemical with high viscosity (150% ID hose)
- Remember to have easy access for maintenance and hose replacement. Use flexible hose or expansion joint (which is removable) at pump outlet
- If system has isolation valves, always install a pressure relief valve
- Install pulsation dampener close to the pump outlet
- Include drain valves

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EXAMPLES OF ASSEMBLED SYSTEMS

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EXAMPLES OF ASSEMBLED SYSTEMS

DFD pump
Shoe technology

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Installation Tips

FLOOR OR WALL MOUNT INSTALLATION

General Installation Tip:

- In case of suction lift, the tube/hose pumps do not need foot valve
- BPV is not needed

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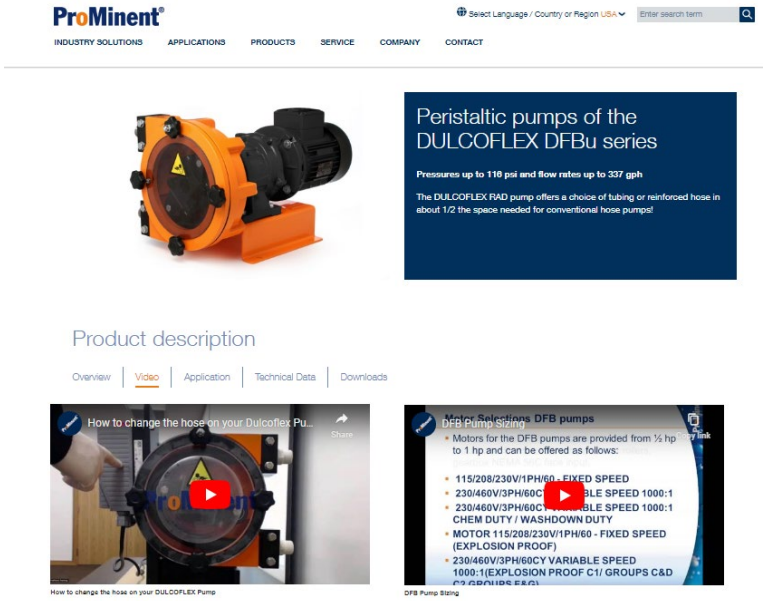
EXTRA INFORMATION

- YOUTUBE VIDEOS

https://www.prominent.us/en/Products/Products/Peristaltic-Pumps/p-dulcoflex-dfbu.html

Hose Replacement:

https://www.youtube.com/watch?v=7sjq1oq3GW4



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SUMMARY

- Information gathering is necessary to provide the appropriate pump and/or system:
  - Fluid data
  - Site specific specifications
- Ensure selection of proper components and layout when designing a dosing system
- Tools are available to help with selection and quoting
- ProMinent offers support throughout the entire life cycle of the peristaltic pump system

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THANK YOU FOR YOUR ATTENTION

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