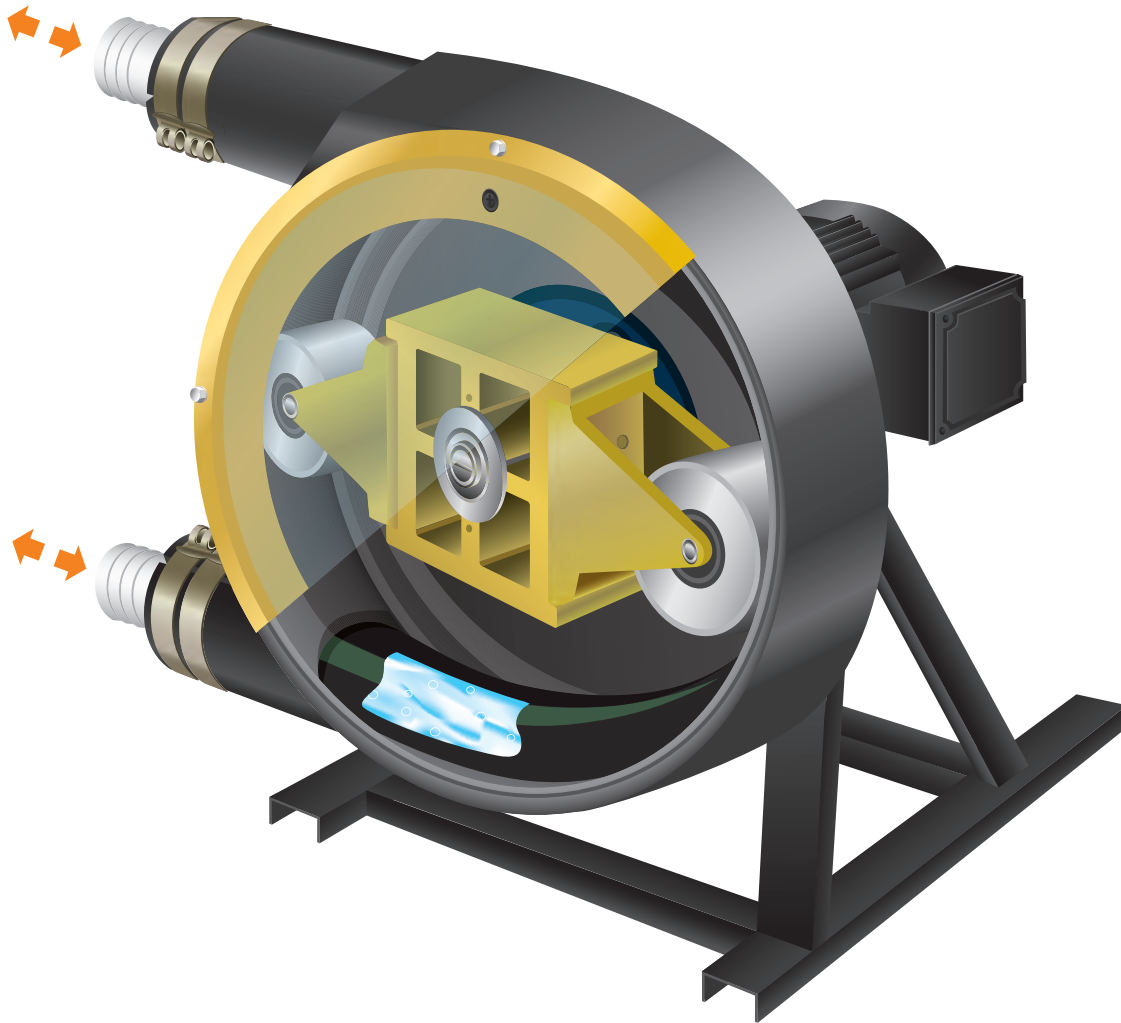


Vector Peristaltic Pump Operating Principle



Peristaltic pumps work by compressing and relaxing a hose positioned between a rotating device and a circular pump housing. Vector 2000 Series pumps use rotating rollers that provide the same “push” with far less hose wear.

The peristaltic method employed in Vector pumps can create 100% compression at all times. As a result, there is virtually no slipping. Metering is highly accurate. Up to 29-1/2 feet of suction lift is produced.

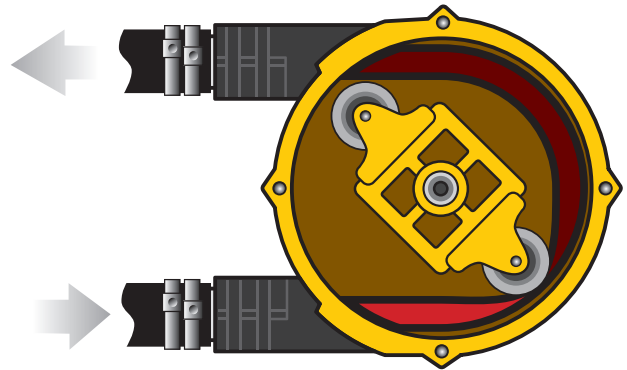
Despite this powerful pumping action, Vector pumps will not cause frothing or delicate emulsions to break up. Since fluids travel through a single hose, they never come into contact with moving valves, springs, or seals. This makes Vector pumps ideal for handling abrasive, shear-sensitive, or corrosive fluids. Dyes, thick fluids, and solids up to 3-1/2 inches (90 mm) are also readily pumped.

Superior Roller Design

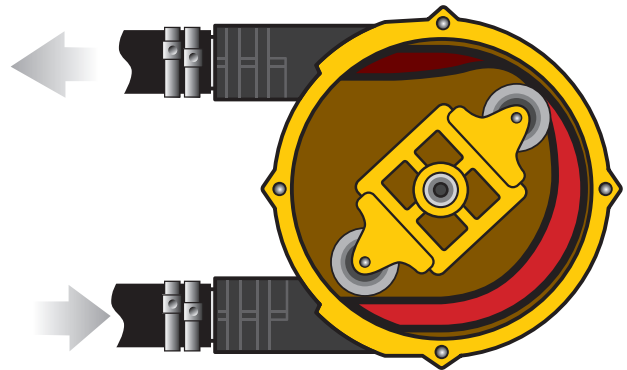


Vector uses an evolutionary roller mechanism instead of a rigid shoe to push fluids through its hose. This ensures longer working life with less downtime for maintenance.

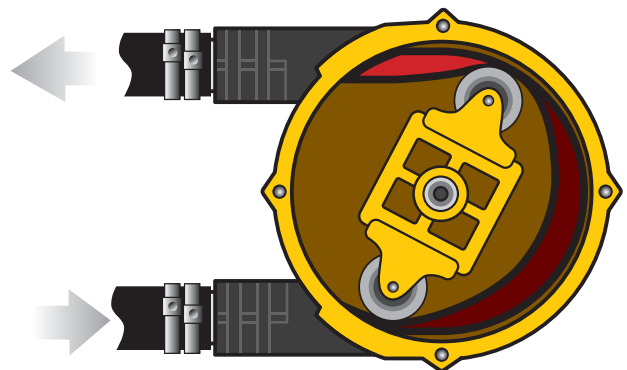
The rollers generate less friction than shoes, extending hose life and reducing downtime.



Fluid positioned ahead of the rollers gets pushed forward as the rollers rotate inside of the case.



Meanwhile, the portion of the hose just behind the rollers rebounds to create a vacuum.



The vacuum draws fluid into the pumping hose, which is then pushed forward by the rollers.

1. Collect application information

Fluid: _____

Discharge Press: _____ psig

Suction Condition:

Lift: _____ feet

or Vacuum: _____ inches of Hg

or Flooded: _____ feet of fluid above pump

or Pressurized: _____ psig

Flow or Flow Range: _____ gpm

Temperature (°F): Min: _____ Max: _____ Normal: _____

Solids?, describe: _____

Solid Size: _____

Solid Length: _____

Solids %: _____

Viscosity at Temp: _____

Vapor Pressure at Temp: _____

Specific Gravity: _____

Duty Cycle (hrs/day): _____

Motor Enclosure: _____

Hertz: 50 _____ 60 _____

Volts: _____

Phase: 1 _____ 3 _____

Motor eff: Std _____ High _____ Inverter Duty _____

Variable Frequency Drive: Yes _____ No _____

If yes, what environment will controller be mounted:

Inside another panel _____ Dry, fairly dust free _____

Dusty area _____ Wet area _____

Wash down area _____

Hazardous area _____ If yes, class and group _____

If Yes, input voltage: 120 _____ 230 _____ 460 _____

2. Determine the maximum roller speed

Duty Cycle (hours/day) of operation

- <8 hours/day: the pump can be run out of the gray shaded areas on the pump specification curves (minimum of 1 hour stop after 2 hours use).
- 8-12 hours/day: do not operate out of the gray shaded areas on the pump specification curves.
- >12 hours/day: 25-32 rpm is the maximum recommended speed.

Viscosity of the fluid

- <200 cps: no speed correction needed
- 200-1000 cps: max. speed 40 rpm
- 1,000-5000 cps: max. speed 30 rpm; use flooded/pressurized suction
- 5,000-10,000 cps: max. speed 20 rpm; use flooded/pressurized suction
- 10,000-15,000 cps: max. speed 10 rpm; use flooded/pressurized suction

Note: With viscosities over 200 cps it is very important to oversize the suction line 1-1/2 to 2 times the pump connector size and to keep suction lines as short as possible.

Temperature of the fluid: If the fluid temperature pumped is within 15° F (9.4°C) of the maximum temperature rating of the hose, contact factory and select a pump with a maximum speed of 20 rpm.

3. Pump Selection

- Select pump that can deliver the required flow based on the maximum roller speed and discharge pressure required by the application.

Note: It may be required to select a larger pump if solids are larger than the maximum size the pump can handle.

4. Hose Selection

- Hose selection based on chemical compatibility and temperature.
- For suction vacuum over 4.5" Hg, always use fiber braided hoses (extruded hoses may collapse)
- In general, fiber-braided hoses will last longer and withstand greater discharge pressures than extruded hoses.
- Maximum recommended motor speeds with extruded hoses 40 rpm.

Note: Maximum viscosity for Nitrile hose is 3000 cps.
(The inner white hose will separate from the outer black hose.)

5. Connector Type and Material Selection

6. Drive Selection

Construction

Extruded:

- 700-1000 hours Typical Life at 30 rpm
Preferred when:
- Pumping foods and pharmaceuticals
 - Clean fluids
 - Lower pressures required (max. 30 psig)

Fiber Braided:

- 1500-2000 hours Typical Life at 30 rpm
Preferred when:
- Pumping fluids with abrasives
 - The pump is required to create a strong vacuum
 - High pressures are required

Operating Duty

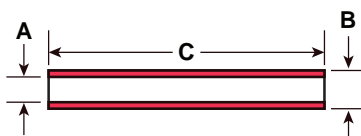
Intermittent: (One hour stop after 2 hours in use)

Higher pressures and higher pump speed

Continuous:

Low pressures and lower speed

Dimensions



(mm)	A	B	C
2002	9	16	330
2003	13	22	390
2004	17	31	590
2005	25	43	860
2006	30	55	1150
2007	45	75	1455
2008	53	88	1850
2009	75	120	2400
2010	100	144	3250
3005	25	44	850

Hose Identification

Extruded

Code

Hypalon	HE	Black color, shiny smooth surface
Neoprene	PE	Flat black color, rough surface, rubber smell
Varprene	VE	Cream, smooth surface
Silicone	SE	Rust color, smooth surface
Pharmed®	FE	Cream color, Pharmed® name on hose

Fiber Braided

Hypalon	HF	Black color, yellow or blue stripe, double braided
EPDM	EF	Black color, white stripe, double braided
Natural Rubber	NF	Black color, green stripe, double braided (standard duty)
Natural Rubber	MF	Black color, no stripes, thick double braids (heavy duty)
Nitrile Rubber	BF	Black color with white inner hose.
Nitrile Rubber, Oil-rated	OF	Black color with HBRF-HY-K stamped on hose.

Material	Operating Temperatures	Industry Approvals
EPDM	32° to 185° F (0° to 85°C)	
Hypalon	32° to 180° F (0° to 82.2°C)	
Neoprene	50° to 130° F (10° to 54.4°C)	
Silicone	14° to 185° F (-10° to 85°C)	
Varprene	14° to 185° F (-10° to 85°C)	Meets FDA Criteria
Natural Rubber ¹	14° to 185° F (-10° to 85°C)	Meets FDA Criteria ¹
Nitrile Rubber, Oil-rated	23° to 160° F (-5° to 71.1°C)	
Pharmed®	32° to 180° F (0° to 82.2°C)	Meets USP Class VI, FDA, and NSF Criteria

¹ Natural rubber heavy duty hose meets FDA criteria.

® Pharmed Reg. Saint-Gobain Performance Plastics

ATTENTION!

When operating within 15°F (9.4°C) of maximum hose temperature, do not exceed 20 rpm pump speed. In addition, metal inspection plate is required vs. clear plastic material.

Flow Capacities and Pressure Ratings

Model	Maximum Flow (gpm)	Maximum Discharge Pressure (psig)
2002	0.3	30
2003	0.94	30
2004	2.52	45
2005	5.9	50
3005	9.2	200
2006	14.1	60
2007	40.5	100
2008	50	100
2009	120	100
2010	211	116

Model	Maximum Flow (gpm)	Maximum Discharge Pressure (psig)
4003	0.79	110
4004	2.64	110
4006	12.33	218
4007	23.12	218
4009	41.83	218
4010	69.35	218
4014	154.10	218

Maximum Allowable Solids Guidelines

Pump Model	Hose I.D. (mm)	Non-Compressible Solids		Sharp Solids	Compressible Solids (mm)
		Size of solids, when percentage of solids is > 50% (mm)	Size of solids, when percentage is < 10% (mm)		
2002	9	1.35	2.25	AVOID	8.1
2003	13	1.95	3.25	AVOID	11.7
2004	17	2.55	4.25	AVOID	15.3
2005	25	3.75	6.25	AVOID	22.5
3005	25	3.75	6.25	AVOID	22.5
2006	30	4.50	7.50	AVOID	27.0
2007	45	6.75	11.25	AVOID	40.5
2008	53	7.95	13.25	AVOID	47.7
2009	75	11.25	18.75	AVOID	67.5
2010	100	15.00	25.00	AVOID	90.0
4003	10	1.35	2.25	AVOID	8.5
4004	15	2.10	3.90	AVOID	14.5
4006	25	3.75	6.25	AVOID	22.5
4007	32	4.50	7.50	AVOID	28.0
4009	40	6.10	10.90	AVOID	39.5
4010	51	7.50	12.90	AVOID	46.5
4014	80	12.10	19.50	AVOID	69.5

Design Features

- Dry pump cavity or lubricant-filled
- Self-priming operation
- Runs dry without damage
- Complete isolation of fluid pumped
- Heavy-duty roller bearings
- Variety of pump configurations, flows, and pressure ratings
- No seals, cups or packing to leak or wear
- Reversible flow
- Low maintenance

Materials of Construction

Non-wetted Parts

Casing: Aluminum Alloy

Rotor: Aluminum Alloy

Rollers: Steel

Wetted Parts

Hose:

BRAIDED – Hypalon, EPDM, Natural Rubber (regular and heavy-duty), Oil-rated Nitrile

Inlet/Outlet Connections:

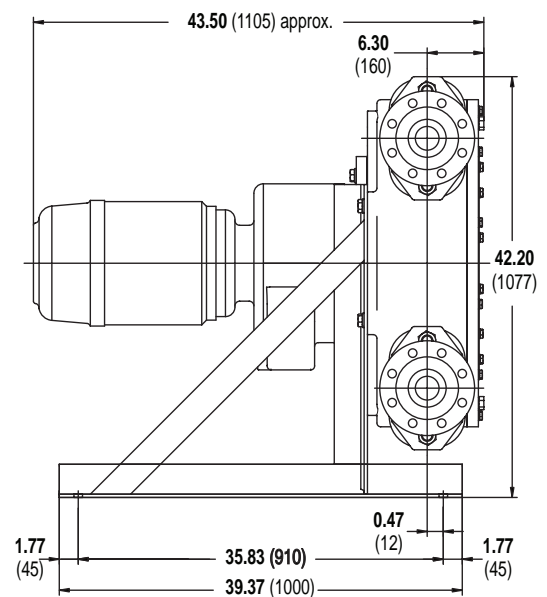
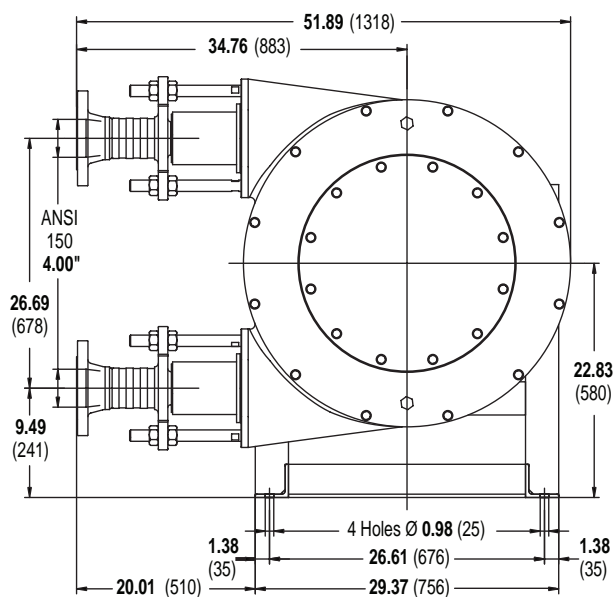
Stainless Steel Flange, Stainless Steel NPT, Carbon Steel NPT, Nylon NPT



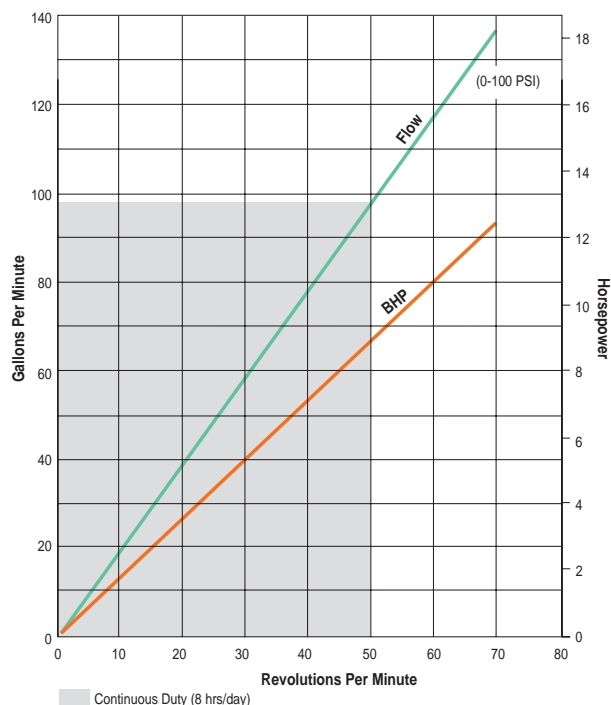
Dimensional Drawings

Inches (mm)

See Ordering Information for motor and gearbox sizes



Performance



Fluid Characteristics

Viscosity:	100,000 cps max.
Liquid Temperature:	180°F (82°C) max.
Solid Size:	(see page 4)
Fiber Length:	36 inch (914 mm) max.

Specifications

Discharge Pressure:	100 psig (7 bar) max.
Suction Lift:	24 ft. (7.3 m)
Suction Pressure:	21 psig (1.4 bar) max.
Horsepower:*	18 max.
Hose Size:	75 x 120 x 2400 mm
Displacement:	2.5 gal/rev
Lubrication Fluid:	8.5 gal max.
Weight (pump only):	881 lbs. (400 kg)
Weight (with drive):	1,213 lbs. (551 kg)

*Pumps are shaft driven and require a gearbox and motor.
See Ordering Information for details.

Model 2009 Ordering Information

A complete Vector pump order number uses a 10-character order code to identify the desired hose, fittings and drive. Select the appropriate items from the chart below and use the order code from each group to complete the pump assembly order number.

1	2	3	4	5	6	7	8	9	10
2	0	0	9	-		-		-	

Order Digit	Order Code	Description				
1-4		Pump Designation				
	2009	Model 2009 Shaft Drive Pump				
5-6		Hose Material/Type				
	EF	EPDM, fiber-braided (75 psig max.)				
	HF	Hypalon, fiber-braided (75 psig max.)				
	MF	Natural Rubber, fiber-braided, heavy-duty (100 psig max.)				
	NF	Natural Rubber, fiber-braided (75 psig max.)				
	OF	Oil-rated Nitrile, fiber-braided, heavy-duty (100 psig max.)				
7-8		Connector Material/Style				
	BB	316 SST, 4" ANSI flange				
	EE	Carbon Steel, 4" male NPT				
	NN	Nylon, 4" male NPT (200°F max)				
	TT	316 SST, 4" male NPT				
9-10		Drive				
		Flow				
		Gear				
		Pump				
		Max				
		GPM				
		Ratio				
		RPM				
		Psig				
		BHP				
		Three Phase, TEFC, 230-460 VAC, 60 Hz				
		4:1 Constant Torque Speed Range				
	B2	41	79:1	21	100 ⁽¹⁾	7.5
	D2	57	60:1	29	100 ⁽¹⁾	7.5
F2	73	48:1	37	100 ⁽¹⁾	7.5	
H2	84	41:1	43	100 ⁽¹⁾	10	
J2	97	35:1	49	100 ⁽¹⁾	10	
L2	120	28:1	63	90 ⁽¹⁾	15	
A	No Drive					

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