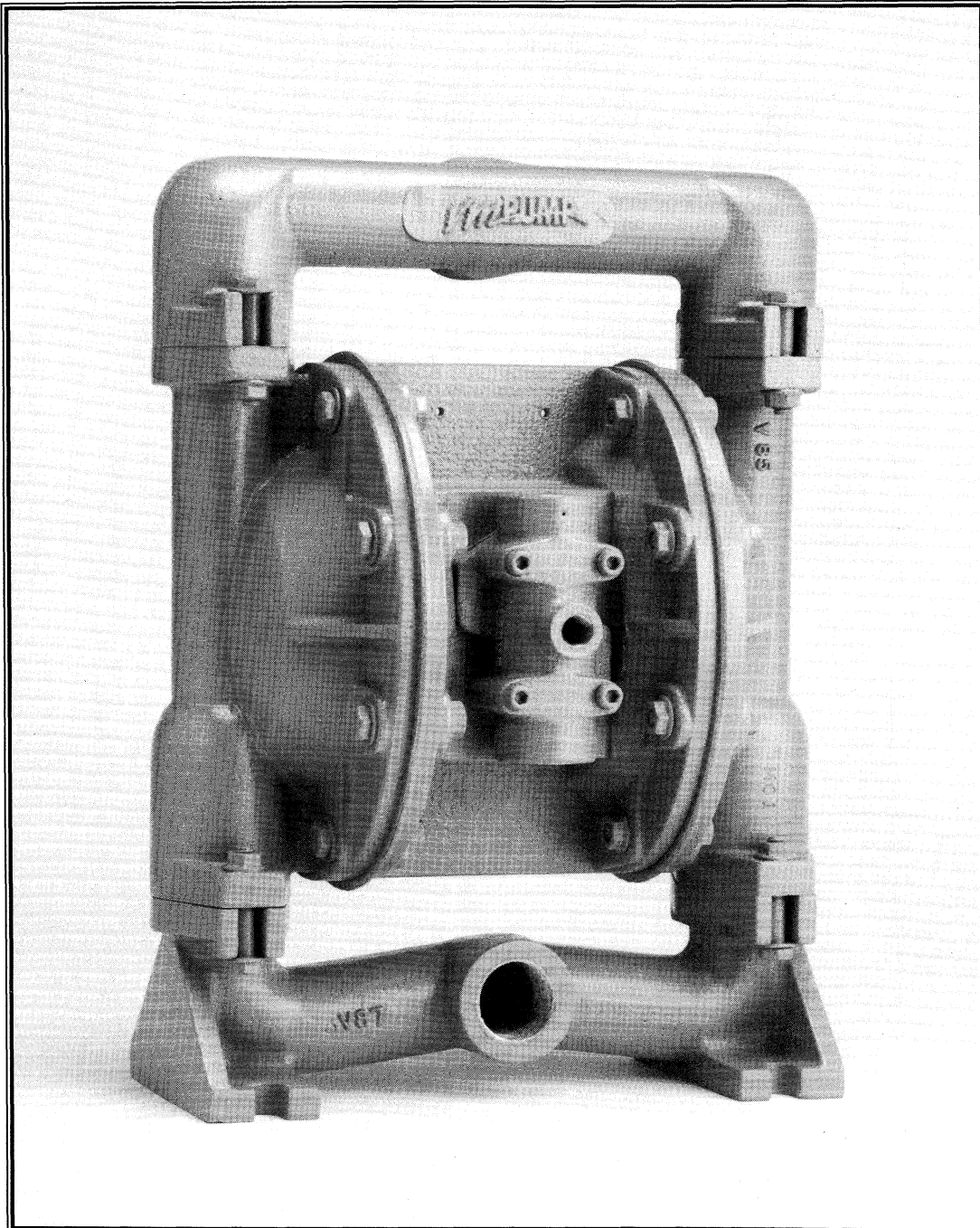


PUMP™

VERSA-MATIC® PUMP

Member of
Hydraulic
INSTITUTE

Operating Instructions



**Model
V1**

Specifications and Performance

Volumes indicated on chart were determined by actual flow meter tests.

Versa-Matic Model V1

Flow Rate Adjustable To0-35 gpm
(132 lpm)

Port Size

Inlet1.0" Female NPT (BSP)

Discharge1.0" Female NPT (BSP)

Air Inlet0.25" NPT

Air Exhaust0.50" NPT

Suction Lift15' (4.57m) Dry/
25' (7.62m) Wet

Teflon10' (3.048m) Dry/
20' (6.096m) Wet

Max. Particle Size

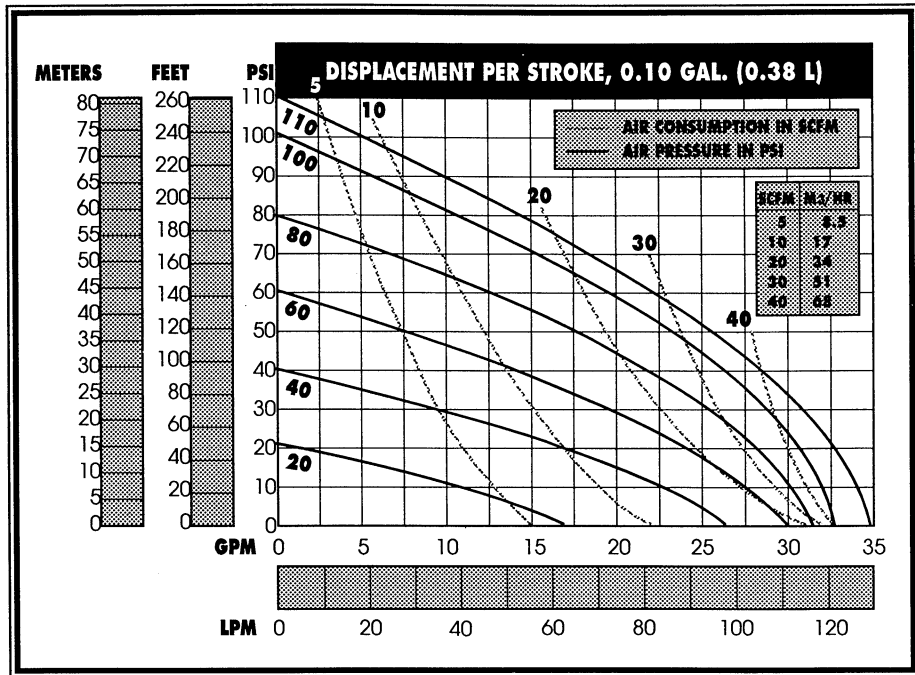
(Diameter)0.125" (3.17mm)

Shipping Weights

Aluminum31 lbs (14.07 kg)

Hastelloy C,

Stainless42 lbs (19.07 kg)

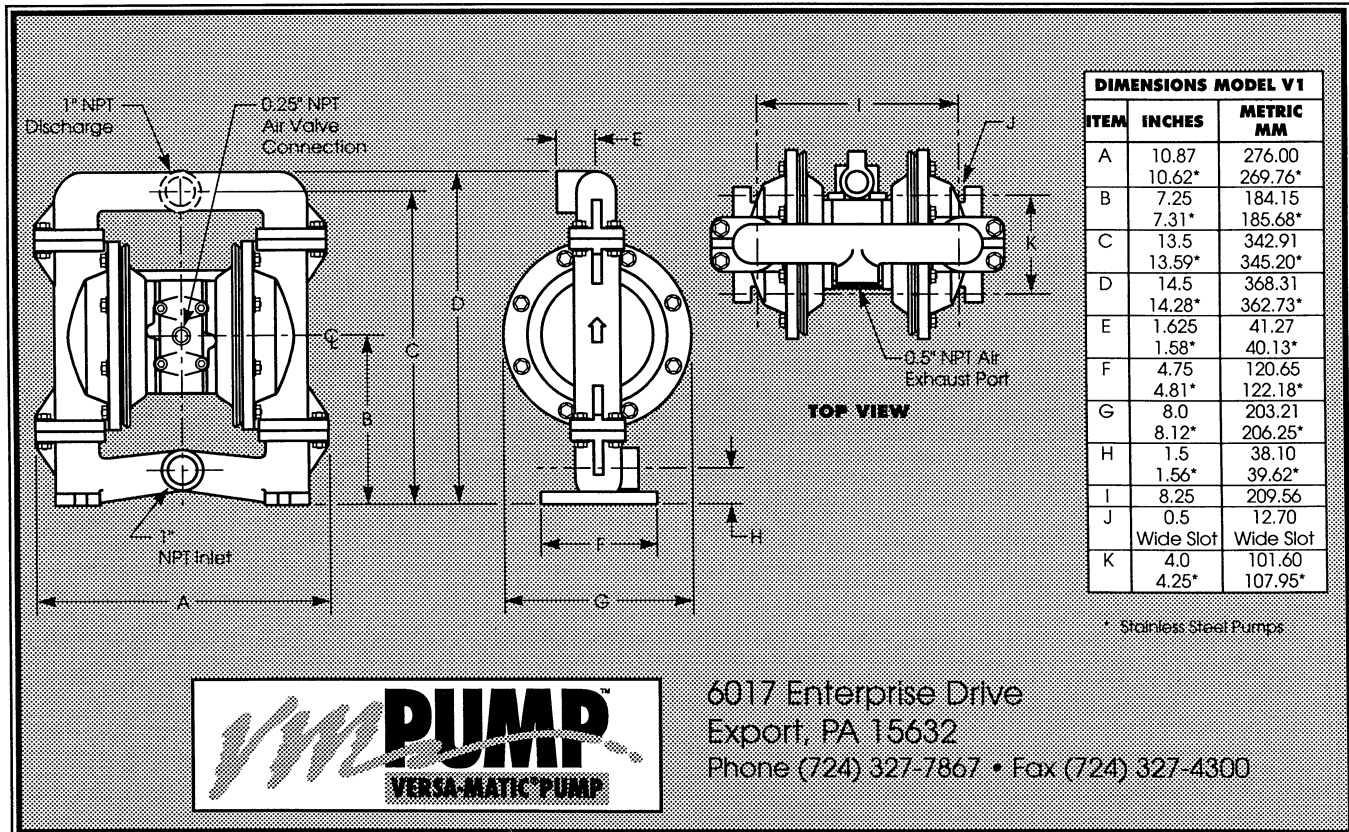


Caution: Do not exceed 125 psig (8.5 bars) air supply pressure.

Note:

For V1 pumps fitted with Tef-Matic™ diaphragms, reduce water discharge figures by 20%. Suction lift is reduced to 10' (3.048m) dry and 20' (6.096m) wet.

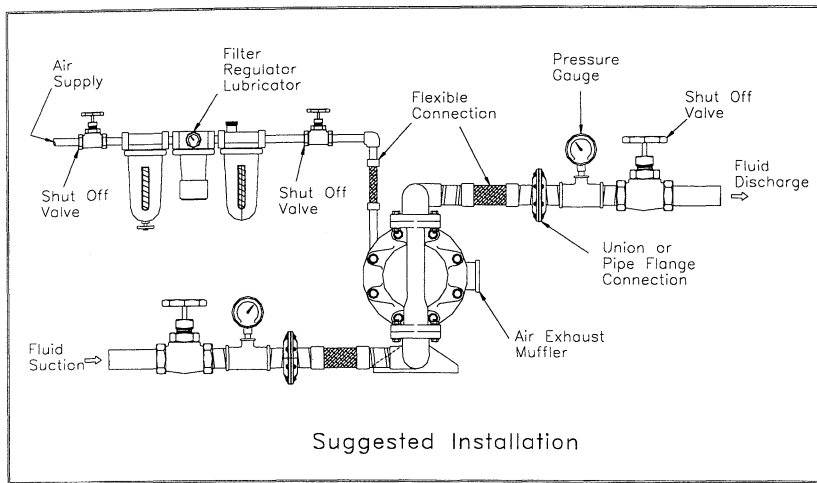
Teflon® is a registered trademark of E.I. DuPont.



6017 Enterprise Drive
Export, PA 15632
Phone (724) 327-7867 • Fax (724) 327-4300

Consult factory for certified drawings

Revised 5/98



Caution
Do Not Exceed
125 psig air supply
pressure

Installation

The V1 pump comes with a footed base for easy mounting in permanent installations. The pump should be mounted in a vertical position. In permanent installations, the pump should be attached to plant piping using a flexible coupling on both the intake and discharge connections to reduce vibration to the pump and piping. To further reduce vibration, a surge suppresser next to the pump may be used.

Suction pipe size should be at least 1 inches in diameter or even larger if highly viscous fluid is to be pumped. If suction hose is used, it must be of a non-collapsible reinforced type. Discharge piping should be of at least 1 inches. It is critical, especially on the suction side of the pump, that all fittings and connections are air tight or pumping efficiency will be reduced and priming will be difficult.

The air supply line should be at least ½" in diameter. Make certain the supplying line and compressor are capable of supplying the required pressure and volume of air to operate the pump at the desired flow rate. The quality of the compressed air source should be considered. Air that is contaminated with moisture and dirt may result in erratic pump performance and increased maintenance cost as well as frequent process "down time" when the pump fails to operate properly.

Pump Operation

The pump is powered by compressed air. Compressed air is directed to the pump air chamber by the main air valve. The compressed air is separated from the fluid by a membrane called a diaphragm. The diaphragm in turn applies pressure on the fluid and forces it out of the pump discharge. While this is occurring, the opposite air chamber is de-pressurized and exhausted to atmosphere and fluid is drawn into the pump suction. The cycle again repeats, thus creating a constant reciprocating action which maintains flow through the pump. The flow is always in through the bottom suction connection and out through the top discharge connection. Since the air pressure acts directly on the diaphragms, the pressure applied to the fluid roughly approximates the air supply pressure supplied to the main air valve.

Trouble Shooting

The pump will not run, or runs slowly:

1. Examine the air inlet screen for dirt.
2. Check for a sticking air valve. Remove air valve from the pump and flush with solvent to remove dirt and debris. Check the Air Valve Piston for nicks and scratches. If the Piston is shiny instead of dull black, the Piston and Valve may be worn out and may need replaced. Clean all ports and airways and replace worn out gaskets and O-Rings.
3. Check the Main Shaft for scoring and scratches; replace if needed. Check the Bushing O-Rings. If they are worn, flat or torn this will cause the pump to operate erratically. Versa-Matic recommends replacing the O-rings whenever servicing the main shaft or diaphragms.

The pump runs, but little or no material flows:

1. Check for pump cavitation, slow the pump speed down to match the thickness of the material being pumped.
2. Look for sticking ball checks. If the material being pumped is not compatible with the ball material, the elastomer may swell. Replace the balls and seats with a compatible elastomer type.
3. Make sure all the suction line fittings and connections are air tight.

Air bubbles in pump discharge:

1. Look for ruptured diaphragm.
2. Check for suction leaks in pump manifolds and piping.

Material comes out of the pump air exhaust:

1. Inspect the diaphragm for rupture.
2. Check the tightness of the diaphragm plates to the pump shaft.

Safety Warnings

This equipment should only be used by experienced professional mechanics. Observe all safety warnings. Read all safety warnings and operating manuals before using or repairing this Air Operated Diaphragm Pump. (A.O.D. pump)

General Safety

This equipment may generate fluid pressures equal to the air supply pressure. Therefore DO NOT exceed the recommended air supply pressure. 100 psi (6.8 bar) for plastic pumps, 125 psi (8.5 bar) for metallic pumps.

ALWAYS wear safety glasses when using power tools to repair this equipment.

When the pumping system contains dangerous fluids wear protective gloves, glasses etc. when working on or around this equipment.

ALWAYS shut off the air supply and disconnect it from the pump before performing maintenance or repair to the pump.

Do Not put your face or body near the pump air exhaust while the pump is operating.

Bleed all pressure from discharge and suction lines before disconnecting the fluid suction or fluid discharge lines from the pump.

DO NOT operate a pump that is leaking, damaged, corroded or otherwise unable to contain the internal fluid pressure.

ALWAYS make sure safety shut off valves, regulators, pressure relief valves, gauges etc. are working properly before starting the pump.

DO NOT pump incompatible fluids through the pump. Consult your distributor or the factory if you are not sure of compatibility of fluids with the castings and elastomers.

Versa-Matic pumps are designed to operate on compressed air. Other compressed gases have not been tested and may be unsafe to use in A.O.D. pumps.

Before starting a pump make certain the discharge point of the piping system is clear and safe and all person have been warned to stand clear.

Equipment Misuse Hazard

General Safety

Any misuse of this equipment such as over pressurization, modifying parts, pumping incompatible chemicals and fluids, using worn or damaged parts or using gasses other than compressed air to power the pump is not recommended. Any of these circumstance could result in splashing or spraying into the eyes, skin or possible serious bodily injury, fire, explosion or property damage.

Over pressurization

Never exceed the operating pressure recommended for the model pump being used.

Noise

Wear Proper Ear protection when working or standing near A.O.D. pumps. IT IS recommended that a Air Exhaust Muffler is used on this equipment at all time.

Installation Hazards

Do not submerge the pump in liquids that are incompatible with the wetted or non-wetted parts of the pump. If installing in a submerged location extend the air exhaust port above the liquid surface with suitable pipe or hose.

Route exhaust line to safe location away from people and install a Air Exhaust Muffler.

Pump Diaphragm Failure

A.O.D. pumps utilize a elastomeric membrane to separate the pumping liquid from the air supply. When this membrane ruptures pumping fluid may be expelled from the air exhaust port. Always pipe the air exhaust port to a safe location or suitable container if dangerous or volatile liquids are being pumped.

Installation

Never allow the piping system to be supported by the pump manifolds or valve housing. The manifolds and valve housings are not designed to support any structural weight and failure of the pump may result. The use of flexible piping connections is highly recommended.

Temperature limits

Do not exceed the recommended operating temperatures of the pump or pump failure may result.

Moving Parts Hazard

The diaphragm plates (sometimes referred to as piston plates) located inside the pump on either side of the main shaft move when air pressure is supplied to the pump. Therefore, Never attempt to operate the pump with the liquid chambers removed. Moving parts inside the pump can pinch or seriously injure your fingers or other body parts.

Fire or Explosion Hazard

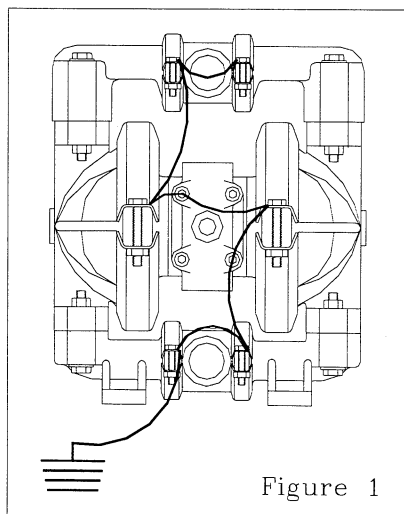
Static electricity can be created by the flow of fluid through the pump or by the reciprocating action of A.O.D. pumps. If the pump is not properly grounded, sparking may occur, and the system may become hazardous. Sparks can ignite fumes or vapor and cause an explosion.

If you experience static sparking or even a slight shock when using the pump do not continue to operate the pump until the pump is properly grounded.

Proper Grounding

Pump, Valves, Discharge and supply lines as well as containers must be grounded. These items must be grounded when handling flammable fluids and when static electricity discharge is a hazard.

1. To ground plastic pumps connect a ground wire to all metallic clamps as well as the air valve body & piston assembly. The ground wire should be connected to a suitable ground location. (figure 1)
2. To ground metallic pumps, connect a ground wire to any accessible point of attachment such as clamp band bolt or mounting base.



Sound Level Ratings, dB(A)

The following table lists the sound level ratings of Versa-Matic Pumps equipped with factory installed Air Exhaust Mufflers. The readings were obtained with a Pacer Industries model SL-120, sound level indicator "A" scale. Readings were made at a distance of 1 meter from the pump and a height of 1.6 meters above the floor. It is assumed the pumps will be installed at floor level.

Pump series	dB(A) reading
V5, 1/2" pump	71.7 dB(A)
V1, 1" pump	76.5 dB(A)
V4, 1-1/4" pump	78.0 dB(A)
V2, 2" pump	74.3 dB(A)
V3, 3" pump	67.1 dB(A)
E2, 2" pump	74.3 dB(A)
E3, 3" pump	67.1 dB(A)
E4, 1-1/4" pump	78.0 dB(A)

Temperature Limitations

Maximum Temperature limitation are based on mechanical stress only. Certain chemicals will reduce the maximum safe operating temperatures of A.O.D pumps. Consult your dealer or Chemical Resistance guide for compatibility and temperature limits.

Metallic Pumps

Metallic pumps can operate past 212°F (100°C). However if you are operating above these limits, consult the factory for assistance.*

Plastic Pumps

Plastic pumps can operate within the following limits:*

Polypropylene:	32°(0°C) to 175°F(79°C)
PVDF (Kynar):	10°F(-12°C) to 225°F(107°C)
Teflon PFA:	-20°F(-29°C) to 200°F(93°C)

*Do not exceed the maximum temperature limits of the elastomer type (diaphragms, balls, seats) that is used in your pump.

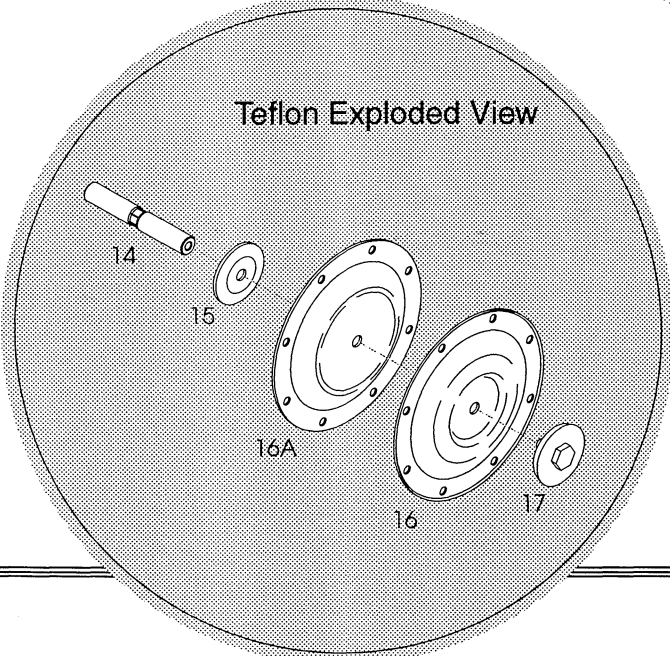
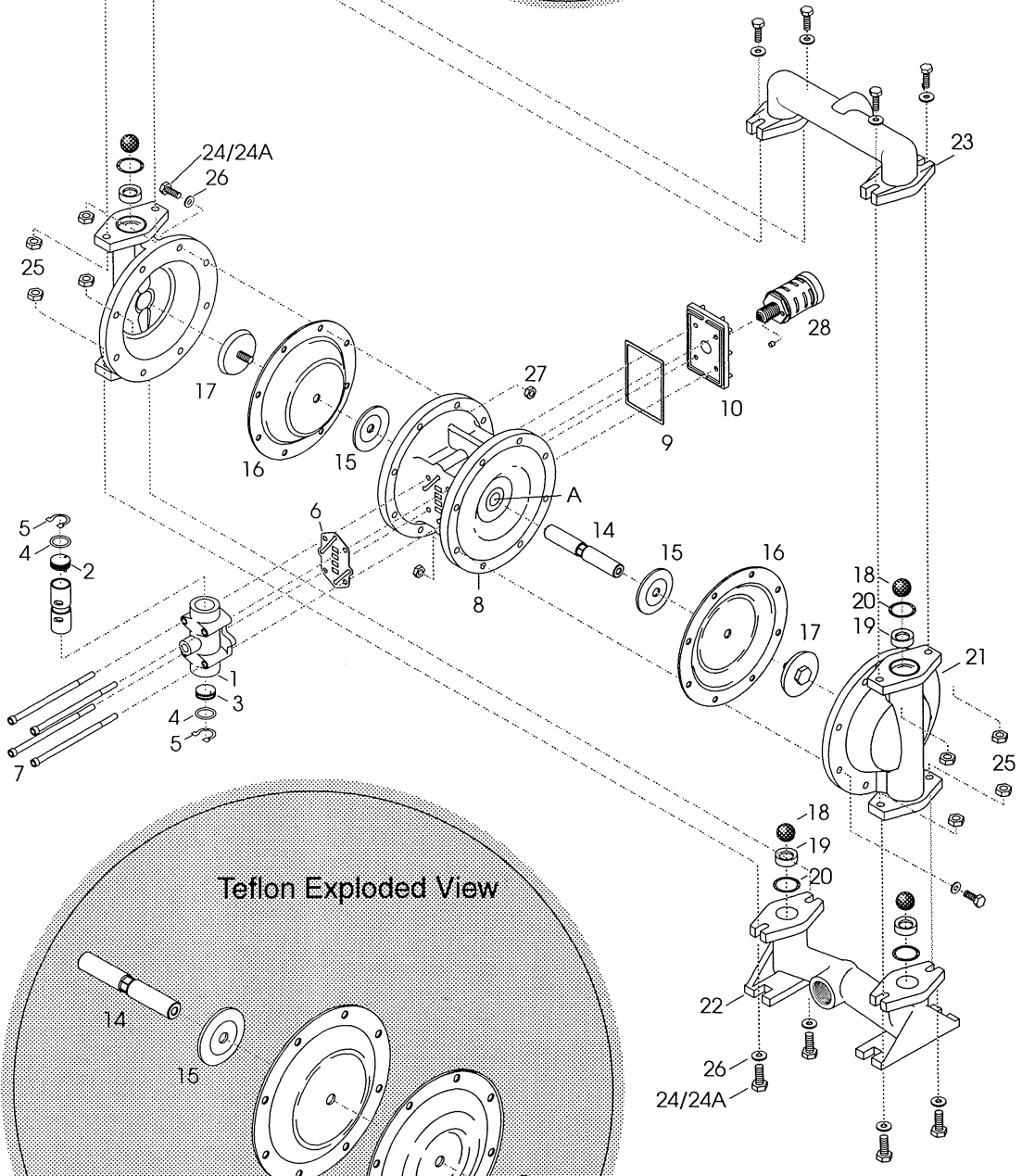
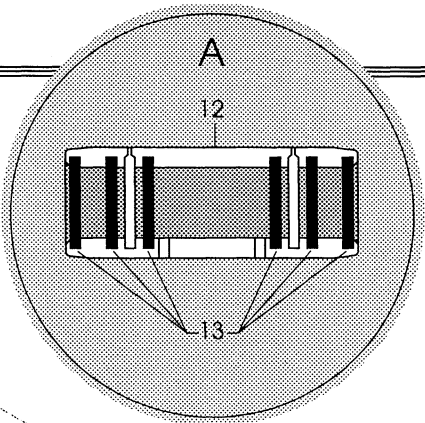
Temperature limits of various elastomer types

Neoprene:	0°F(-18°C) to 200°F(93°C)
Buna-N:	10°F(-12°C) to 180°F(82°C)
Nordel:	-60°F(-51°C) to 280°F(138°C)
Viton:	-40°F(-40°C) to 350°F(176°C)
Teflon:	40°F(4°C) to 220°F(105°C)
Polyurethane:	10°F(-12°C) to 170°F(77°C)
XL TPE:	-20°F(-29°C) to 300°F(149°C)
FDA Hytrel:	-20°F(-29°C) to 220°F(104°C)

Versa-Matic Pump Company
Model V1, 1" Metallic Pump Parts List (Revised 2/97)

			Pump Model Number					
			With Rubber & TPE Elastomers			With Teflon Elastomers		
			V1AA.. Foot Mount Aluminum	V1SA.. Foot Mount Stainless Steel	V1HA.. Foot Mount Hastelloy C	V1AA5.. Foot Mount Aluminum w/Teflon	V1SA5.. Foot Mount Stainless Steel w/Teflon	V1HA5.. Foot Mount Hastelloy C w/Teflon
Item	Description	Qty.	Applicable Part No.					
1	Valve Body & Piston	1	V180VB					
2	Air Valve Cap w/Guide	1	PV180R					
3	Air Valve Cap w/o Guide	1	PV180S					
4	Valve Cap O-Ring	2	V302D					
5	Snap Ring	2	V180T					
6	Air Valve Gasket	1	V180B					
7	Air Valve Screws	4	V180AS					
8	Center Section	1	V180CS					
9	Muffler Plate Gasket	1	V180MG					
10	Muffler Plate	1	V180M					
11								
12	Block Bushing	1	V180N					
13	Bushing O-Rings	6	V180J					
14	Shaft	1	AV181A			AV181AT		
15	Inner Diaphragm Plate	2	V181C			V181TI		
16	Diaphragm (see below for material selection)	2	V183xx-1			* V183TF-1 or V183GT Teflon®		
16A	Back-Up Diaphragm	2	N/R			V183TB (Hytrel®)		
17	Outer Diaphragm Plate	2	V181B	SV181B	HV181TO	SV181TO	HV181TO	
18	Valve Ball (see below for material selection)	4	V191xx			V191TF Teflon®		
19	Valve Seat	4	V90A	SV190	HV190	V90A	SV190	HV190
20	Valve Seat O-Ring (see below for material selection)	4	V90xx			SV190TF Teflon®		
21	Water Chamber	2	V85	SV185	HV185	V85	SV185	HV185
22	Inlet Manifold	1	V87	SV187	HV187	V87	SV187	HV187
23	Discharge Manifold	1	V86	SV186	HV186	V86	SV186	HV186
24	Connecting Bolt	24	N/R			SV189D	N/R	
24a	Connecting Bolt	16	V189A	N/R		V189A	N/R	
24b	Connecting Bolt	8	V187A	N/R		V187A	N/R	
25	Connecting Nut	8	V185B	SV185B	V185B		SV185B	V185B
26	Connecting Washer	24	V189C	SV189C	V189C		SV189C	V189C
27	Flange Nut	16	V185B	SV185B	V185B		SV185B	V185B
28	Air Exhaust Muffler	1	VM-0500					

Diaphragm Part Numbers & Material V183N-1, Neoprene V183BN-1, Buna-N V183ND-1, Nordel V183VT-1, Viton V183TPEXL-1, XL Thermo-Matic V183TPEFG Hytrel FDA *V183GT, One piece 1-UP Teflon diaphragm (no back-up required)	Valve Ball Part Numbers & Material V191N, Neoprene V191BN, Buna-N V191ND, Nordel V191VT, Viton V191TPEXL, XL Thermo-Matic V191TPEFG, Hytrel FDA	Valve Seat O-Ring Part Numbers & Material V90BN, Buna-N V90ND, Nordel V90VT, Viton
---	--	--



Revised 4/96



6017 Enterprise Drive
Export, PA 15632
Phone (724) 327-7867 • Fax (724) 327-4300
www.versamatic.com
© Copyright 1999 Versa-Matic Tool, Inc.