

## User Guide

# Chemical Duty Vacuum/Pressure Pump

WP6111560

WP6122050

WP6110060



### Introduction

The vacuum/pressure pump is a continuously running constant air flow type unit for use with laboratory equipment. This vacuum/pressure pump combines all the advantages of lower pressure pumps with the perfect uniformity of diaphragm type operation. It compresses air by means of a long-life diaphragm, which flexes within the compressor. This pump is intended for filtration of liquids or gases, or for other continuous or intermittent use, with all types of filter holders.

**CAUTION:** Always use the supplied hydrophobic vent filter or a vacuum-flask water trap in conjunction with the pump (see Figures 1 and 2). Never pump or draw liquids through the pump, as this will damage it.

The pump has these features:

- The motor and pump are permanently lubricated.
- A thermal overload switch with automatic reset protects the motor.
- Low operating noise is further minimized by rubber feet.
- All internal surfaces (except the stainless steel leaf valves) are coated with PTFE polymer, to prevent corrosion.
- The diaphragm is PTFE-lined to prevent attack by chemicals or solvent vapors.
- A Millex®-FA<sub>50</sub> hydrophobic vent filter and 27 in. (69 cm) of 1/4 in. (6 mm) I.D. silicone vacuum tubing are supplied with the pump.

### Rules for Safe Operation



**The motor is thermally protected and will automatically restart unexpectedly when the overload device resets.**

**Do NOT pump flammable or explosive gases or vapors or operate this pump in an atmosphere containing flammable or explosive gases or vapors.**

**Use of this pump in a manner not specifically stated in this user guide may result in severe bodily injury.**

Read and understand the information in this owner's manual before operating the vacuum/pressure pump.

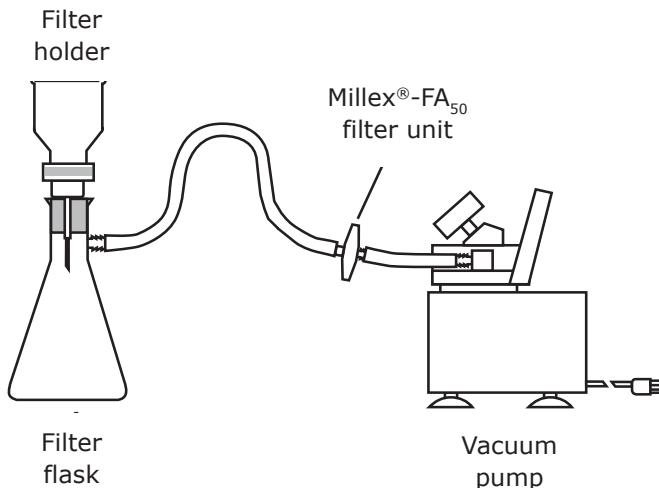
- The vacuum/pressure pump should be operated in a dry, clean, and well ventilated area.
- **NOTE:** To ensure proper cooling, the vacuum/pressure pump cooling fan must not be blocked and should be a minimum of 1 in. (2.5 cm) away from any wall or obstruction.
- When the unit is not in use, wrap the power cord around the vacuum/pressure pump and store in a dry place. Do not abuse the cord.
- Replace the Millex®-FA<sub>50</sub> vent filter (SLFA05010) if necessary.
- Inspect hose, plug, and cord for signs of damage before use. Do not use if a deficiency is found. Never operate a damaged unit. For replacement parts, see Technical Assistance section for details.
- This vacuum/pressure pump needs no lubrication. Applying oil to any part may result in polluted air delivery to the air-handling equipment and will damage the pump.
- To operate at maximum efficiency, the pump system must be thoroughly clean. Refer to the Maintenance section for details on properly cleaning the pump.
- Compressed air blast must never be aimed at anyone because it can cause serious injury. Keep children away.

- All vacuum/pressure pumps generate heat, even under normal operating conditions. To avoid serious burns, never touch the head parts or tubing during and immediately after operation.
- If higher vacuum or pressure is required, use the High Output Vacuum/Pressure Pump (WP6211560, WP6222050, WP6210060).

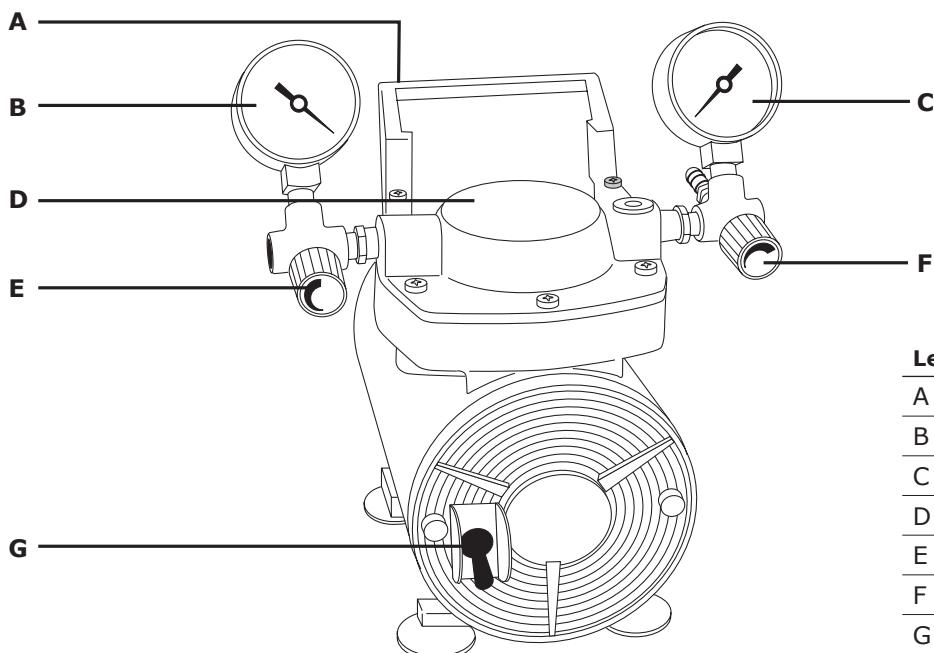
## Usage Guidelines

- Always use the Millex®-FA<sub>50</sub> vent filter and 1/4 inch silicone tubing included with the pump when applying vacuum. This will prevent liquids or vapors from entering the pump. A properly attached Millex®-FA<sub>50</sub> vent filter is illustrated in Figure 1.

**Figure 1. Proper use of Millex®-FA<sub>50</sub> filter**



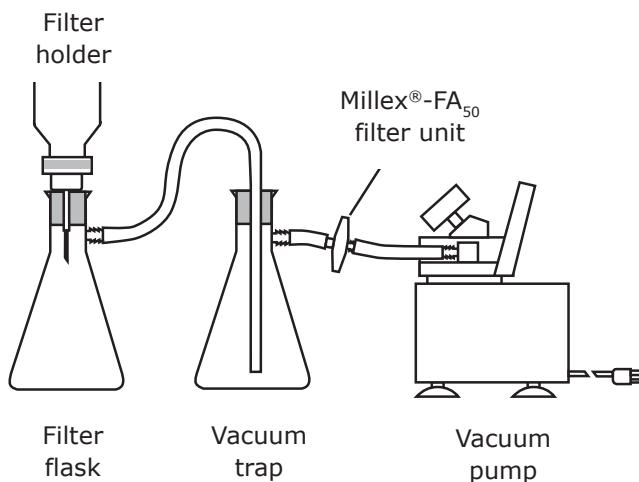
## Pump Components



- For maximum protection of the pump, use the Millex®-FA<sub>50</sub> vent filter AND a vacuum trap to protect the pump from vapors and gases. The vacuum trap consists of a 1 liter filtering flask (Cat. No. XX1014705), No. 8 stopper (XX1014708) and silicone tubing. Additional tubing is available as Cat. No. XX7100004. This assembly is illustrated in Figure 2.

- Never pump or draw liquids through the pump. This will damage the pump. The filter flask and vacuum trap should be emptied after each use.

**Figure 2. Proper use of vacuum trap and Millex®-FA<sub>50</sub> filter**



## Product Labeling Symbols



**WARNING**



**Direction of Pressure Control**  
(Valves)



**ON** (Power)



**Hot Surface**



**OFF** (Power)



**Protective Conductor Terminal**

## How to Use the Chemical Duty Vacuum/Pressure Pump

The Vacuum/Pressure Pump is shipped ready for use. See the Specifications section for required operating conditions.

**CAUTION:** The pump is rated for indoor use only.

**CAUTION:** Be sure available power matches unit requirements. A grounded three-conductor AC electrical source is required. Units are available for 115 V~ 60 Hz, 100 V~ 50/60 Hz, or 230 V~ 50 Hz. See the Specifications section for details of electrical supply options available.

1. Unpack the unit and retain all packing material until you verify proper product operation.
2. The unit rests on four vibration isolator pads. Place the unit on a suitable surface, such as a bench, desk, or table. Be sure not to block the ventilation holes located on the motor housing.
3. Select appropriately-sized tubing, according to your application. Use approximately  $\frac{1}{4}$  in. I.D. tubing to withstand the anticipated pressure or vacuum.
4. Prepare the necessary equipment or filter holder and connect the tubing to the equipment. Do not connect the tubing to the pump.
5. Plug the power cord into an appropriate electrical source.

**CAUTION:** Do not turn the pump on with equipment or filter holder already attached.

If the pump is inadvertently turned on with the tubing fully connected and it does not run, turn off the pump and disconnect the tubing. Restart the pump and then reconnect the tubing. If the pump's thermal overload switch automatically shuts off the motor, disconnect the tubing and allow the pump to cool for at least 10 minutes before restarting. Reconnect the tubing only after the pump is operating.

6. Turn on the pump, using the toggle switch located on the front of the pump.
7. Connect the tubing from the filter holder or other equipment to the pump and begin your procedure.
8. **If using the pump for vacuum:** Adjust the vacuum by closing the pressure regulator and opening the vacuum regulator fully (counterclockwise). Slowly tighten down (clockwise) the vacuum regulator until you obtain the desired vacuum reading on the vacuum gauge.
9. **If using the pump for pressure:** Adjust the pressure by turning the vacuum regulator down fully and opening the pressure fully (turn counter clockwise). Slowly tighten down (turn clockwise) the pressure regulator until you obtain the desired pressure reading on the pressure gauge.
9. Turn off the pump when you are finished. Disconnect the tubing first from the pump and then from the filter holder or other equipment.

## Maintenance

Under normal operating conditions, and using proper handling procedures, the chemical duty vacuum/pressure pump should provide many hours of trouble-free operation.

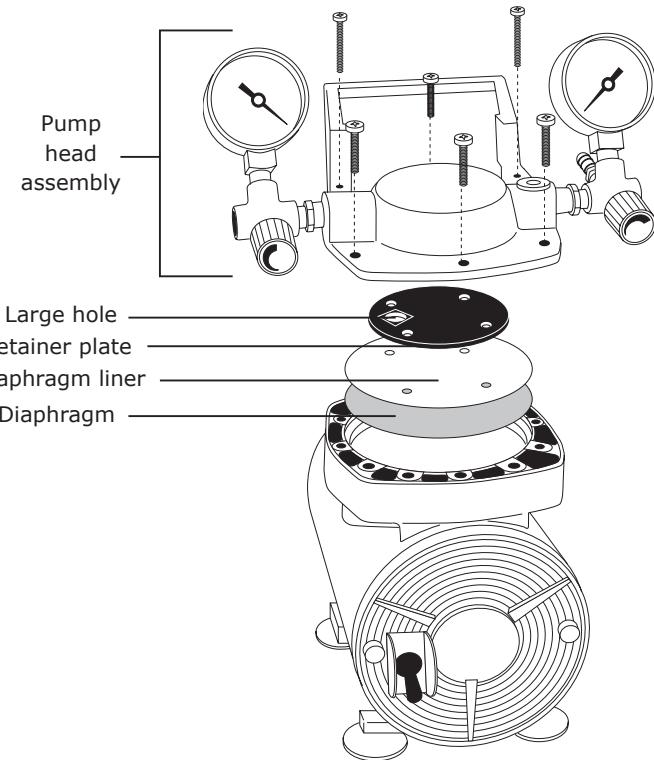
Dry vacuum/pressure pumps are 100% oil-free. The pump employs a non-lube piston and cylinder. No maintenance is necessary for the bearings. All bearings are sealed and permanently lubricated. Lubrication should not be attempted. The units are built for continuous duty operation with quietness and durability.

**CAUTION:** Do not lubricate any of the parts with oil, grease or petroleum products. Do not clean with acids, caustics, or chlorinated solvents. Do not replace the connecting rod or motor bearings.

**Disconnect the pump from power before performing any maintenance.**

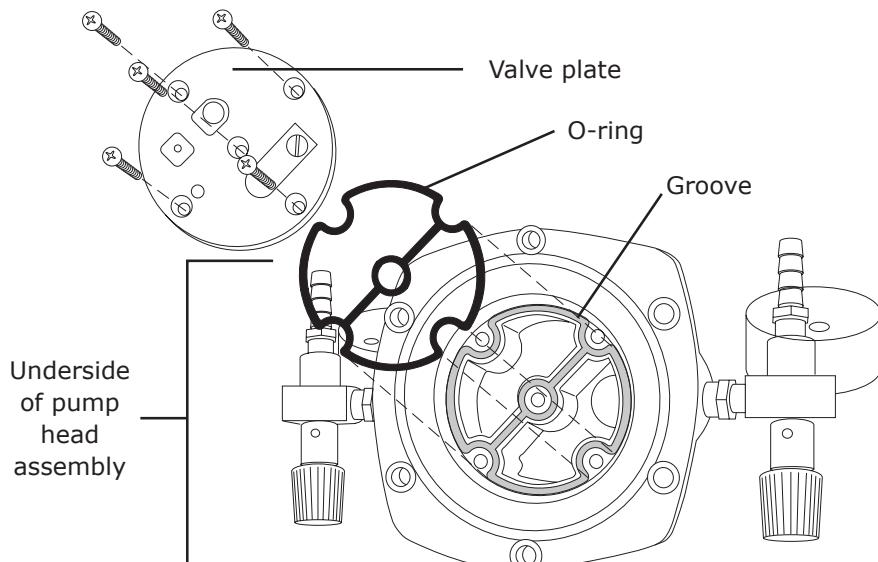
## Replacing the Diaphragm

1. Unscrew the four socket-cap screws from the pump head and unscrew the two screws from the pump handle. Remove the pump head assembly from the top of the pump.
2. Unscrew the four Phillips-head screws, then remove the retainer plate, the diaphragm liner, and the diaphragm.
3. Replace the diaphragm (the number printed on it should be facing up), aligning the holes in the diaphragm with the screw holes in the top of the pump.
4. Replace the diaphragm liner, lining up holes in the liner with the screw holes in the top of the pump.
5. Replace the retainer plate, aligning the four small holes with the screw holes and orienting the large hole to the left as shown. Replace and tighten the Phillips-head screws.
- CAUTION:** Take care not to nick the heads of the screws; burrs can damage the inlet valve.
6. Replace the pump head assembly and tighten the six screws to hold it in place.



## Replacing the O-ring

1. Unscrew the four socket-cap screws from the pump head and unscrew the two screws from the pump handle. Remove the pump head assembly from the top of the pump.
2. Remove the five Phillips-head screws that hold the valve plate assembly to the underside of the pump head assembly.
3. Remove the O-ring and replace it by pressing the new O-ring into the groove.
4. Replace the valve plate assembly with the recessed screw holes facing out and tighten the five Phillips-head screws.
5. Replace the pump head assembly and tighten the socket head screws.



# Troubleshooting

## Vacuum Problems

Leakage, contamination, and unusual out-gassing are the general causes of problems associated with poor vacuum. To operate at maximum efficiency, a system must be thoroughly clean. If the system is completely clean and free from leaks, and unwarranted vacuum problems still exist, the pump should be checked. A simple criterion for the condition of the pump is the determination of its maximum vacuum capability. This can be accomplished by blocking the intake and reading the vacuum level on the gauge.

## Pressure Problems

Leakage and contamination are the general causes of problems associated with poor pressure. To operate at maximum efficiency, a system must be thoroughly clean. If the system is completely clean and free from leaks, and unwarranted pressure problems still exist, the pump/compressor should be checked by a service technician.

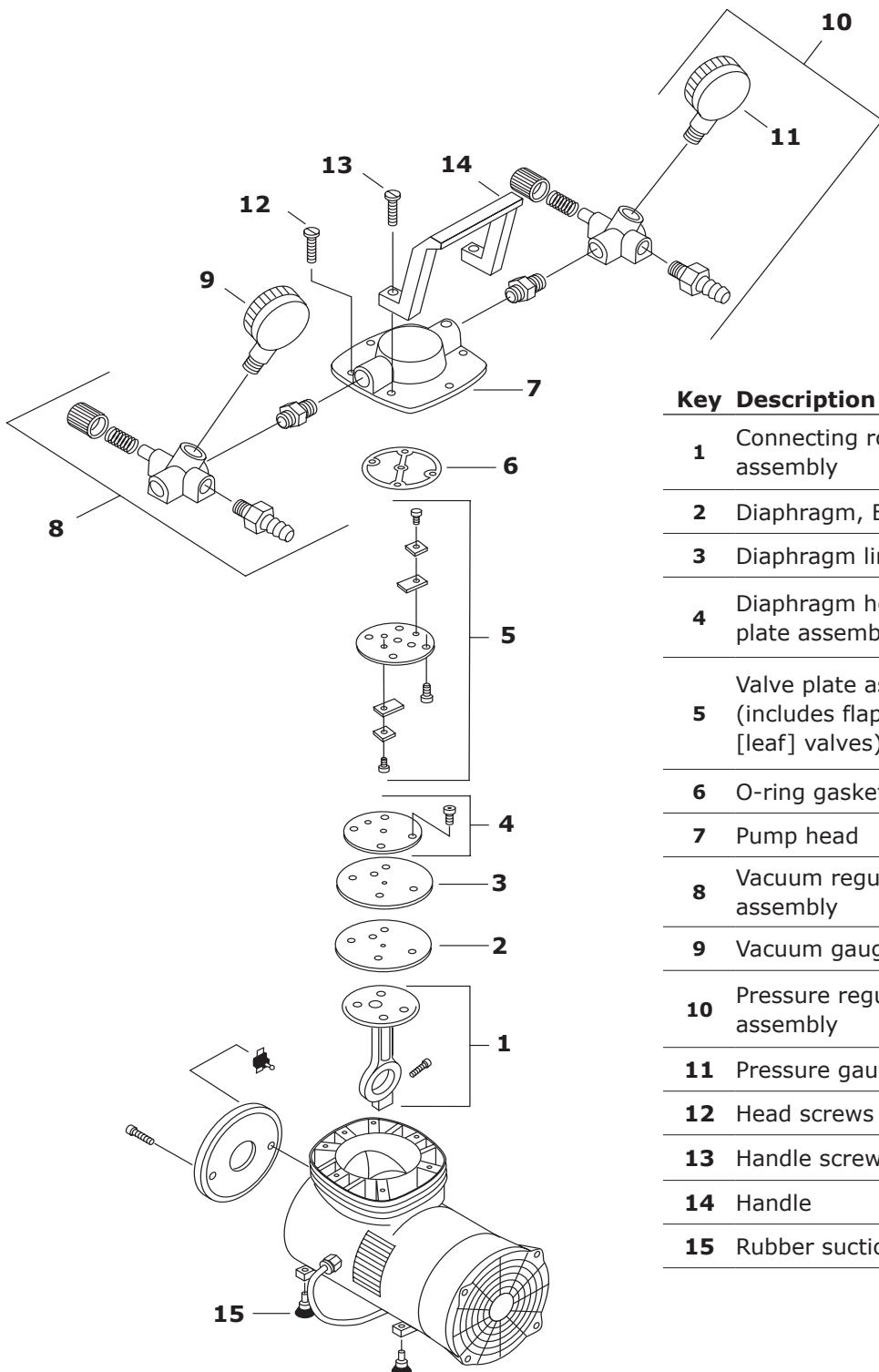
Low Flow	Low Pressure	Unit Will Not Start	Motor Overheats	Loud Unit	Possible Cause	Corrective Action
•	•			•	Damaged valves	Replace flapper valves
•	•			•	Debris in valves	Remove debris and check for valve damage
•	•			•	Worn diaphragm	Replace diaphragm and/or liner
•	•			•	Loose head screws	Tighten head screws
		•	•	•	Bent motor shaft	Replace entire unit
•			•		Loose fittings	Tighten fittings
		•			Insufficient ventilation in enclosure	Increase air circulation in enclosure
		•		•	Loose rod clamping screw	Apply Loctite® 242 and re-tighten
•	•			•	Damaged O-rings	Replace O-rings

## Repair

Two replacement part kits are available for the chemical duty vacuum/pressure pump.

The accompanying drawing outlines the contents of each of the kits. We recommend trained service technicians perform repairs. For further information and help ordering the correct kit, please contact Technical Service.

**Disconnect the pump from power before performing any maintenance.**



Key	Description	Maintenance Kit	Rebuild Kit
1	Connecting rod assembly	—	—
2	Diaphragm, Buna-N	1	—
3	Diaphragm liner, PTFE	1	—
4	Diaphragm hold-down plate assembly	—	1
5	Valve plate assembly (includes flapper [leaf] valves)	—	1
6	O-ring gasket, head	1	—
7	Pump head	—	1
8	Vacuum regulator assembly	—	—
9	Vacuum gauge	—	1
10	Pressure regulator assembly	—	—
11	Pressure gauge	—	1
12	Head screws	4	4
13	Handle screws	2	2
14	Handle	—	—
15	Rubber suction feet	—	—

## Specifications

### Performance

Vacuum	24.0 inches of Hg (inHg)	
Maximum Free Air Displacement	37 L/min	
Pressure	20 psi continuous, 35 psi intermittent  (230 V~ pump duty cycle: 15 minutes on, 15 minutes off)	
Sound Level	Less than 60 dB(A)	
<b>Dimensions</b>	<b>WP6111560, WP6110060</b>	<b>WP6122050</b>
Length	7.5 in. (19.1 cm)	10.5 in. (26.7 cm)
Width	7 in. (17.8 cm)	9.4 in. (23.9 cm)
Height	8 in. (20.3 cm)	9.7 in. (24.6 cm)
Weight (approximate)	9 lbs (4.1 kg)	12 lbs (5.4 kg)
Tubing connectors	Stepped 1/4 in. hose barb	

### Materials of Construction

Body and pump head	Die cast aluminum
Diaphragm	Buna-N with PTFE lining
Head gasket	Buna-N
Leaf valves	High grade stainless steel
Internal pump surfaces	PTFE-coated

### Electrical Specifications

115 V~, 60 Hz, 3.5 A or 100 V~, 50/60 Hz, 4.0 A	Shaded-pole, single phase, 1/15 HP motor 3-pronged, grounded cord and plug
230 V~, 50 Hz, 1.7/1.1 A	HAR cordage, CEE 7/7 (Schuko) plug
Line voltage limits	±10% of supply voltage

### Environmental Conditions

Temperature	5 °C (41 °F) to 40 °C (104 °F)
Relative Humidity, Max.	80% for temperatures up to 31 °C, decreasing to 50% at 40 °C
Altitude, Max.	2,000 meters
Pollution Degree	2, per IEC 664 (indoor usage: lab, office, etc.)
Installation Category	II, per IEC 624 (local level: appliances, portable equipment, etc.)

## Product Ordering Information

Purchase products online at [SigmaAldrich.com](https://SigmaAldrich.com).

### Catalogue Number

#### Chemical Duty

#### Vacuum/Pressure Pump

115 V~, 60 Hz	WP6111560
230 V~, 50 Hz	WP6122050
100 V~, 50/60 Hz	WP6110060

#### Replacement Parts

Pump Maintenance Kit	WP61MNT00
Includes diaphragm, diaphragm liner, O-ring gasket, head screws, and handle screws	

Pump Rebuild Kit	WP61RBD00
Includes hold-down plate assembly, valve plate assembly, pump head, vacuum gauge, pressure gauge, head screws, and handle screws	
Millex®-FA <sub>50</sub> filter unit, 10/pk	SLFA05010

Pressure tubing, silicone, 25 ft	XX8000025
Vacuum tubing, silicone, 4 ft	XX7100004

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