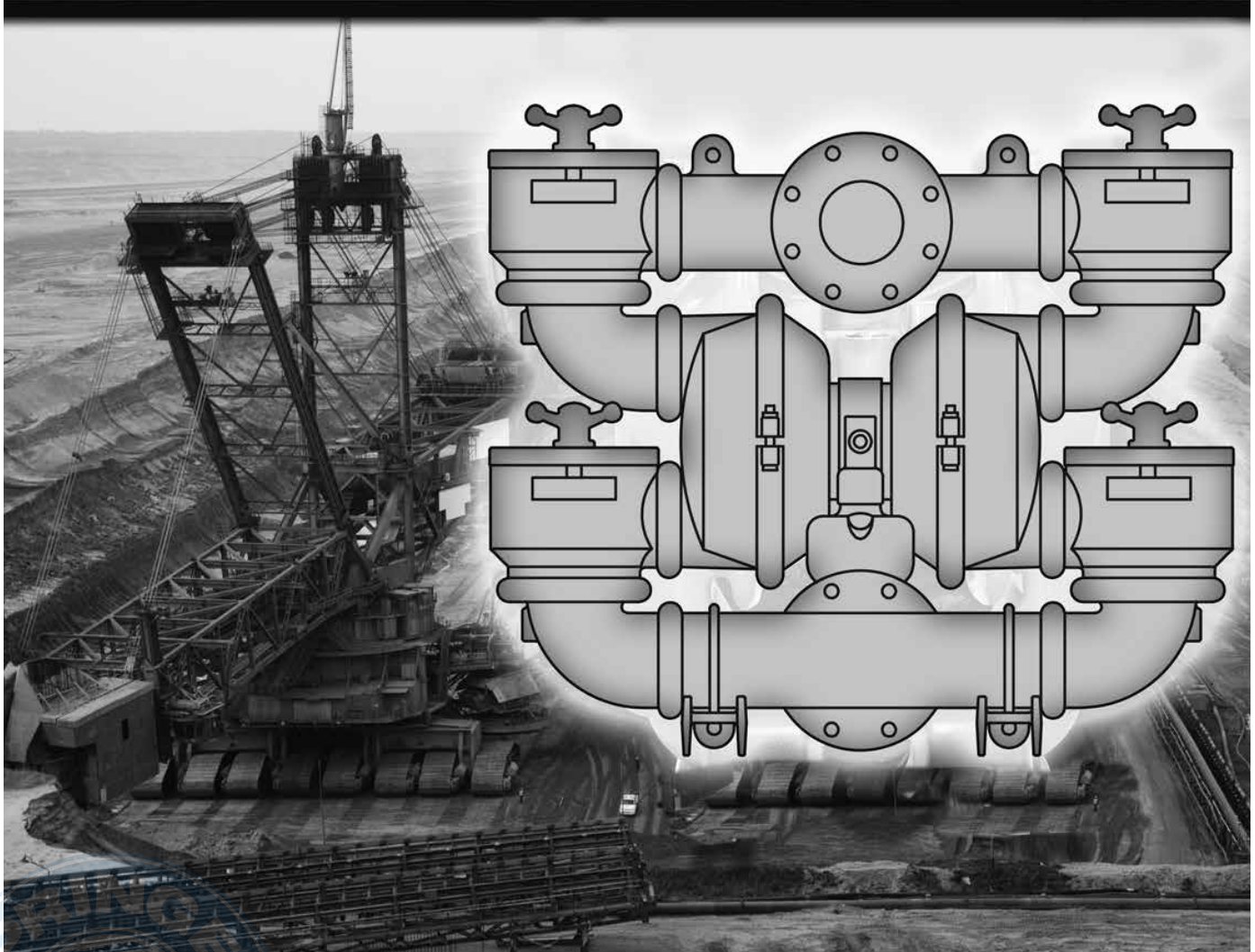




# NOMAD™

## OPERATION MANUAL

### NT100 NOMAD TRANS-FLO™



AIR-OPERATED  DOUBLE DIAPHRAGM  PUMPS

DUCTILE Models



A JDA Global Company

5/13 rev.2

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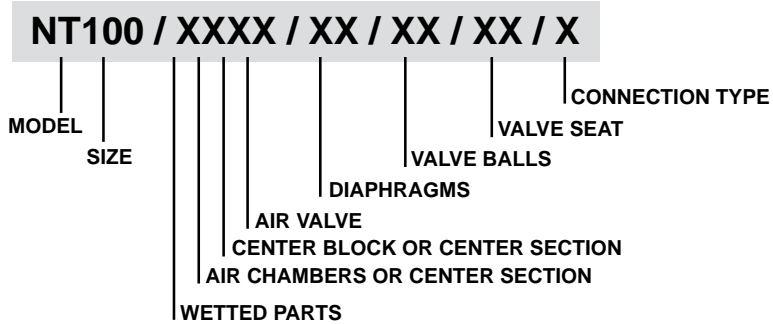
**CAUTION – SAFETY POINTS****TEMPERATURE LIMITS:**

Neoprene	-17.8°C to 93.3°C	0°F to 200°F
Buna-N	-12.2°C to 82.2°C	10°F to 180°F
EPDM	-51.1°C to 137.8°C	-60°F to 280°F
Viton	-40°C to 176.7°C	-40°F to 350°F
Santoprene	-40°C to 107.2°C	-40°F to 225°F
Polyurethane	12.2°C to 65.6°C	10°F to 150°F
Hytrel	-28.9°C to 104.4°C	-20°F to 220°F
PTFE	4.4°C to 104.4°C	40°F to 220°F

1. Review the NOMAD Chemical Field Guide for all applications. The information provided is the “best thinking available” regarding chemical compatibility. The guide however, does not provide a recommendation.
2. Always wear safety glasses during pump operation. A diaphragm rupture may force liquid to exit via air exhaust.
3. When handling flammable fluids, prevent static sparking by properly grounding the pump.
4. Do not exceed 125 psig (8.6 bar).
5. Prior to maintenance, compressed air line should be disconnected to allow air pressure to bleed from pump.
6. Tighten all clamp bands and hardware parts prior to installation. Fittings may loosen during transportation.

## PUMP DESIGNATION SYSTEM

**102 mm (4") Pump**  
**Maximum Flow Rate:**  
**1041 lpm (275 gpm)**



## MATERIAL CODES

### MODEL

NT100= 102MM (4")

### WETTED PARTS & OUTER PISTON

AA = ALUMINUM / ALUMINUM  
 W = DUCTILE IRON

### AIR CHAMBERS

A = ALUMINUM  
 W = DUCTILE IRON

### CENTER BLOCK

A = ALUMINUM  
 P = POLY

### AIR VALVE

B = BRASS

### DIAPHRAGMS

BN = BUNA-N (Red Dot)  
 FG = HYTREL  
 ND = EPDM (Blue Dot)  
 NE = NEOPRENE (Green Dot)  
 SN = SANTOPRENE  
 TF = PTFE  
 VT = VITON (White Dot)

### VALVE BALL

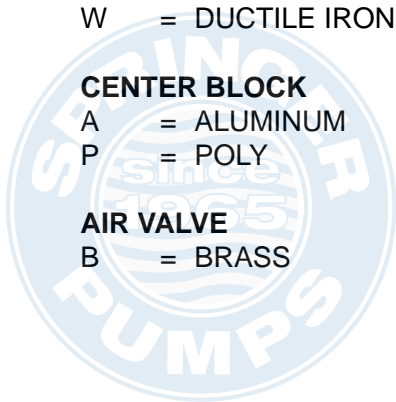
BN = BUNA-N (Red Dot)  
 FG = HYTREL  
 ND = EPDM (Blue Dot)  
 NE = NEOPRENE (Green Dot)  
 SN = SANTOPRENE  
 TF = PTFE (White)  
 VT = VITON (White Dot)

### VALVE SEAT

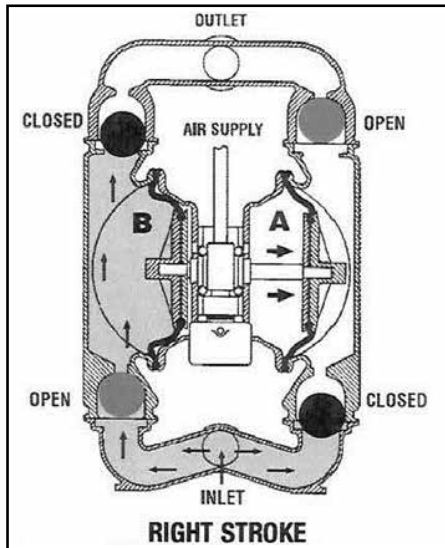
A = ALUMINUM\*  
 BN = BUNA-N (Red Dot)  
 FG = HYTREL  
 ND = EPDM (Blue Dot)  
 NE = NEOPRENE (Green Dot)  
 SN = SANTOPRENE  
 VT = VITON  
 PU = POLYURETHANE  
 \*Valve seat o-ring required.

### VALVE SEAT O-RING

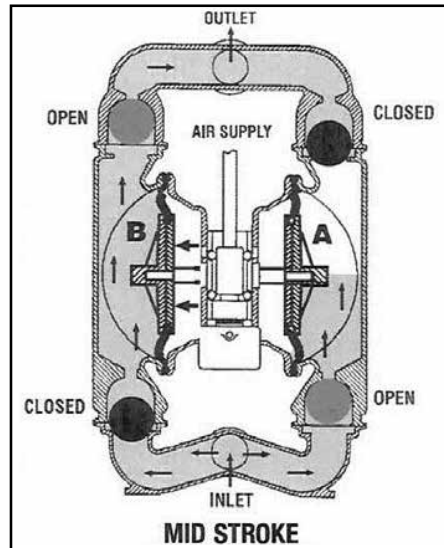
TF = PTFE (White)  
 NE = NEOPRENE  
 VT = VITON  
 PU = POLYURETHANE



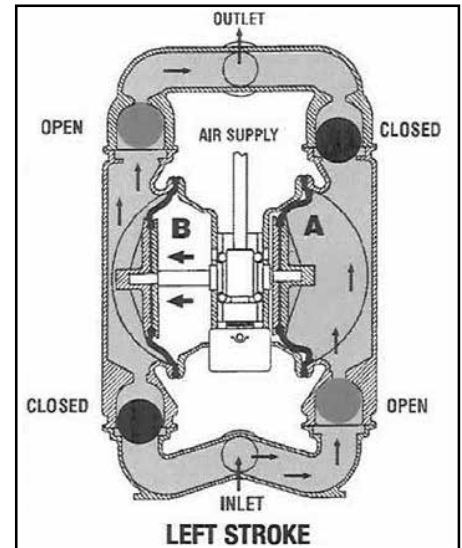
## AIR OPERATED DOUBLE DIAPHRAGM PUMPS FUNCTIONALITY AND FLOW PATTERN



**Figure 1:** Air valve directs pressurized air to the back side of diaphragm A. Compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber (see shaded area).

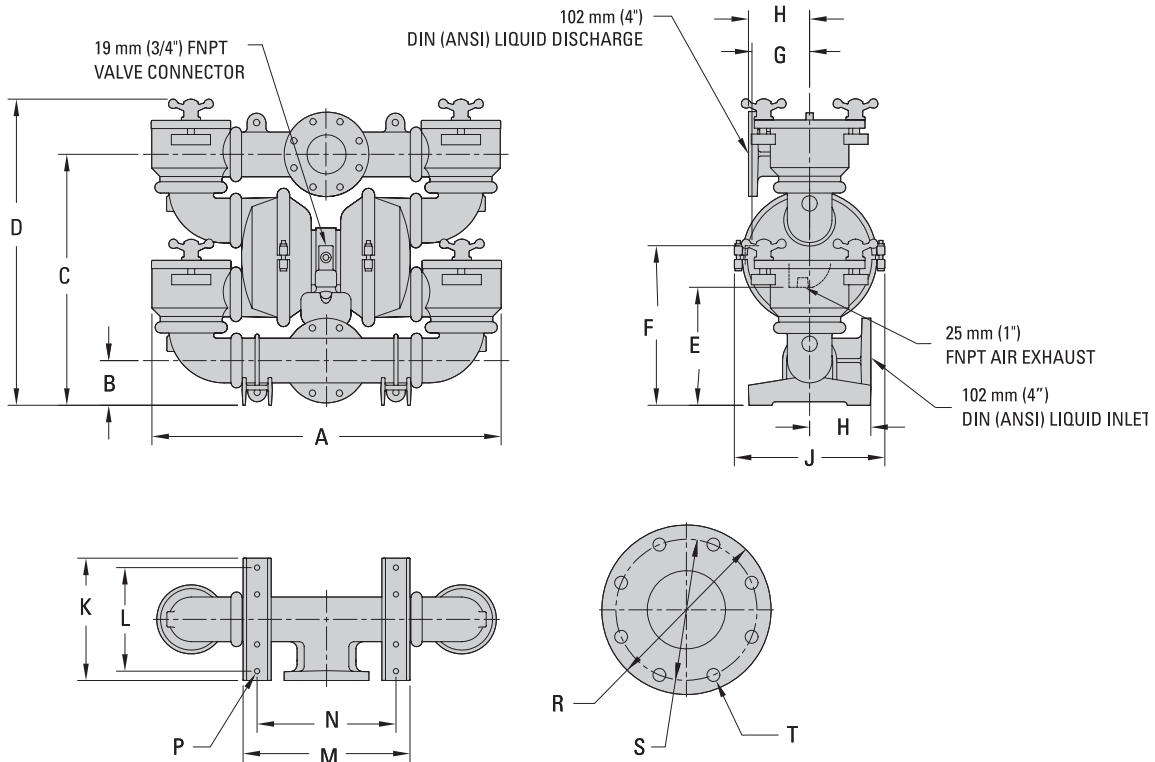


**Figure 2:** When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of the diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. These same hydraulic forces lift the discharge valve ball off its seat, forcing fluid to flow through the pump discharge. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.



**Figure 3:** At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

## DIMENSIONAL DRAWINGS



### DIMENSIONS

ITEM	METRIC (mm)	STANDARD (inch)
A	950	37.4
B	119	4.7
C	680	26.8
D	826	32.5
E	330	13.0
F	439	17.3
G	155	6.1
H	168	6.6
J	424	16.7

### DIMENSIONS

ITEM	METRIC (mm)	STANDARD (inch)
K	333	13.1
L	279	11.0
M	455	17.9
N	376	14.8
P	15 DIA.	.6 DIA.
R	231	9.1
S	191	7.5
T	18 DIA.	.7 DIA.

Rev. B

**NOTE:** Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber, as well as a line from the liquid chamber to its corresponding discharge elbow and ball pot. These lines will assist in proper alignment during reassembly.

**CAUTION:** When removing the end cap using compressed air, the air valve end cap may come out with considerable force. Hand protection such as a padded glove or a rag should be used to capture the end cap.

**CAUTION:** When choosing pump materials, be sure to check the temperature limits for all wetted components.

**WARNING:** Tighten all clamp bands prior to installation. Fixing bolts may loosen during transportation.

**CAUTION:** Verify the chemical compatibility of the process and cleaning to the pump's component materials in the Chemical Resistance Guide.

**CAUTION:** Only explosion proof solenoid valves should be used in areas where explosion proof equipment is required.

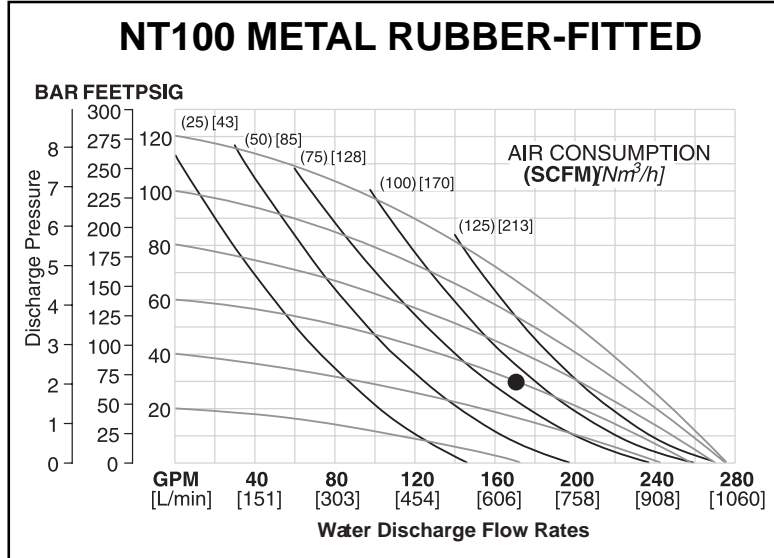
## NT100 METAL RUBBER-FITTED

Height.....826 mm (32.5")  
 Width.....940 mm (37.0")  
 Depth.....330 mm (13.0")  
 Est. Ship Weight.....Aluminum 231 kg (500 lbs)  
 Air Inlet.....19 mm (3/4")  
 Inlet.....102 mm (4")  
 Outlet.....102 mm (4")  
 Suction Lift.....3.66 m Dry (12')  
                                           9.14 m Wet (30')  
 Displacement/Stroke.....4.62 l (1.22 gal.)<sup>1</sup>  
 Max. Flow Rate.....1041 lpm (275 gpm)  
 Max. Size Solids.....35 mm (1-3/8")

<sup>1</sup>Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.

**Example:** To pump 140 gpm against a discharge head of 20 psig required 40psig and 75 scfm air consumption. (See dot on curve)

**Caution:** Donot exceed 8.6bar (125psig) air supply pressure.



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

## SUGGESTED INSTALLATION

The Model NT100 has a 102 mm (4") inlet and 102 mm (4") outlet and is designed for flows to 1041 lpm (275 gpm). The NT100 pump is manufactured with wetted parts of Cast Iron. The center block of the NT100 is constructed of polypropylene. A variety of diaphragms, valve balls, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 102 mm (4") diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the NT100 is capable of pulling a high vacuum. Discharge piping should be at least 102 mm (4"); larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

The NT100 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. See pump performance data.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 0.5–0.7 bar (7–10 psig). Premature diaphragm failure may occur if positive suction is 0.8 bar (11 psig) and higher.

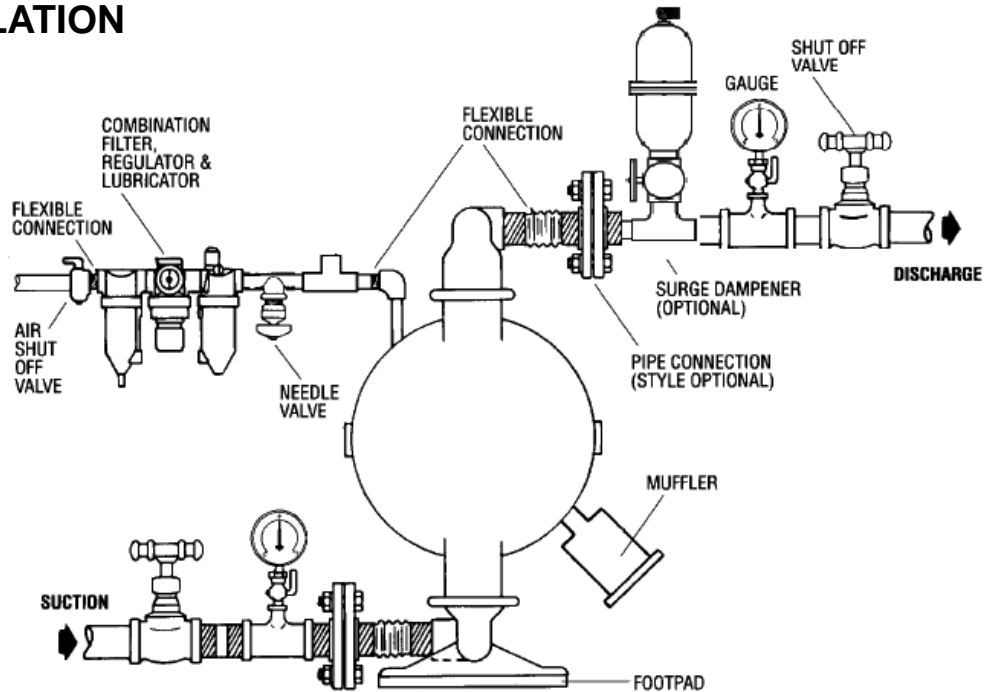
THE MODEL NT100 WILL PASS 35 mm (1-3/8") SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 8.6 BAR (125 PSIG) AIR SUPPLY PRESSURE.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE FILTER.

PUMPS SHOULD BE THOROUGHLY FLUSHED WITH WATER BEFORE INSTALLING INTO PROCESS LINES. FDA AND USDA APPROVED PUMPS SHOULD BE CLEANED AND/OR SANITIZED BEFORE BEING USED ON EDIBLE PRODUCTS.

## SUGGESTED INSTALLATION



Note: In the event of a power failure, the shutoff valve should be closed, if the restarting of the pump is not desirable once power is regained.

## TROUBLESHOOTING

### ***Pump will not run or runs slowly.***

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is worn beyond working tolerances and must be replaced.
4. Check center block rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust.
5. Check type of lubricant being used. ISO 15-5 wt. recommended.

### ***Pump runs but little or no product flows.***

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Check for sticking ball valves. If material being pumped is not compatible with pump elastomers, swelling may occur.
3. Make sure all suction connections are air tight.

### ***Pump air valve freezes.***

Check for excessive moisture in compressed air.

### ***Air bubbles in pump discharge.***

1. Check for ruptured diaphragm.
2. Check for tightness for clamp bands, especially at intake manifold.

### ***Product comes out air exhaust.***

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

### ***Pump rattles.***

Create false discharge head or suction lift.

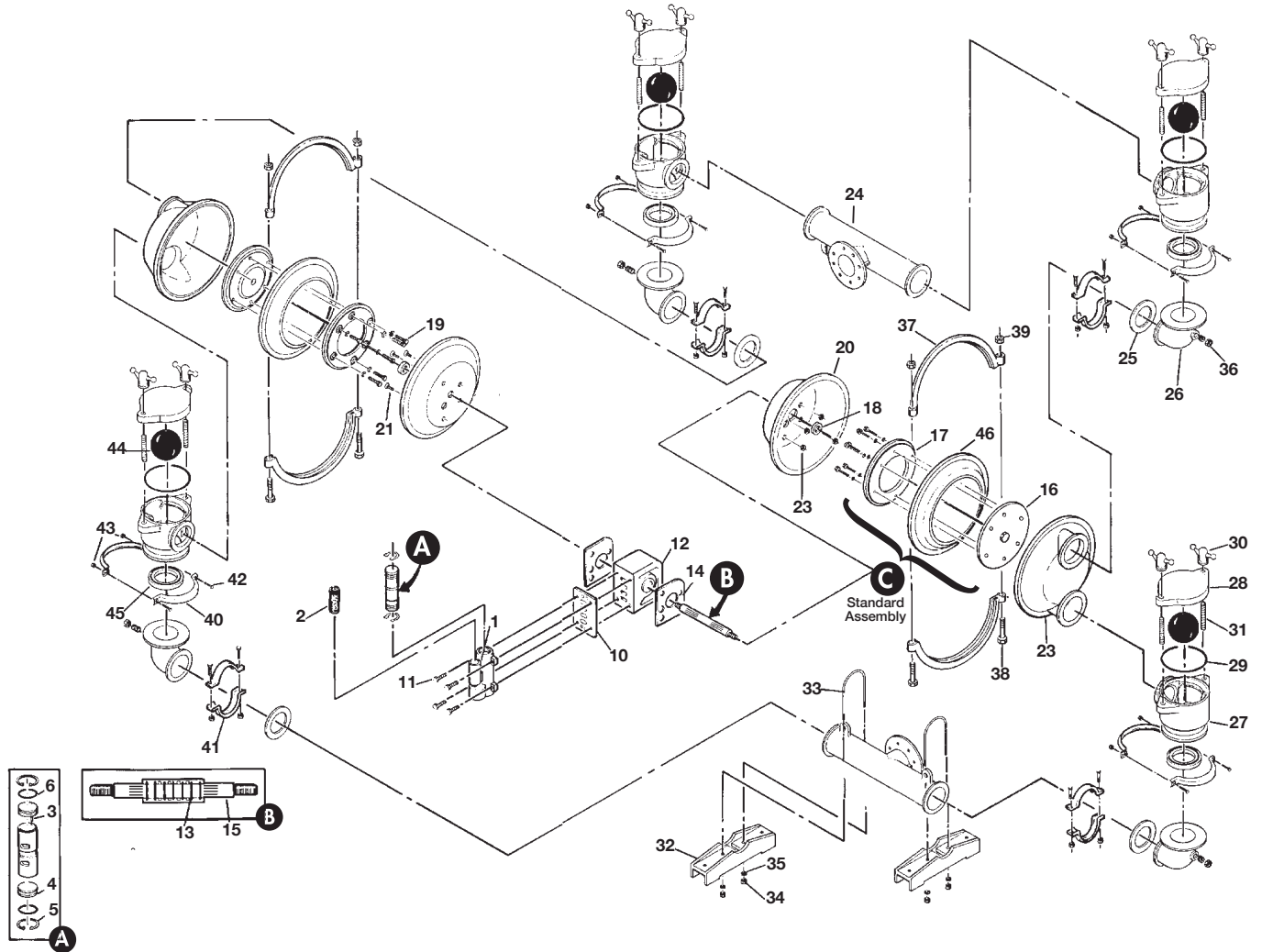
**NT100 RUBBER-FITTED**

Item	Description	Qty.	Part Number
1	Air Valve Assembly	1	N15-2000-07
2	Air Valve Screen	1	N08-2500-07
3	Air Valve End Cap with Guide	1	N15-2300-23
4	Air Valve End Cap without Guide	1	N15-2330-23
5	Air Valve Snap Ring	2	N15-2650-03
6	Air Valve Cap O-Ring	2	N15-2390-52
10	Air Valve Basket - Buna-N	1	N15-2600-52
11	Air Valve Screws	4	N08-6000-08
12	Center Block	1	N15-3100-20-225
13	Center Block Glyd™ Ring	7	N15-3210-77-225
14	Block Gasket - Buna-N	2	N15-3520-52
15	Shaft	1	N20-3800-09-07
16	Piston, Outer	2	N20-4550-02
17	Piston, Inner	2	N15-3700-01
18	Washer, Inner Piston Back-Up	2	N15-6850-08
19	Piston Assembly - Bolt & Washer	12	N15-6130-08/N15-6720-08
20	Air Chamber	2	N15-3650-02
21	Air Chamber Screw	4	N15-6200-08
22	Air Chamber Nut	4	N08-6550-08
23	Liquid Chamber	2	N20-5000-02
24	Tee Manifold	2	N20-5160-02
25	Manifold Gaskets	8	N20-1400-51
26	Elbow	4	N20-5220-02
27	Pot	4	N20-5460-02
28	Plate	4	N20-5480-02
29	Plate O-Ring	4	N20-1250-51
30	Wing Nut	8	N20-6690-02
31	Wing Nut Stud	8	N20-6160-08
32	Foot	2	N20-5540-02
33	U-Bolt	2	N20-6300-08
34	U-Bolt Nut	4	N15-6420-08
35	U-Bolt Lock Washer	4	N20-6750-08
36	Pipe Plug - 3/4"	4	N20-7010-07
37	Large Clamp Band Assembly	2	N15-7300-03
38	Large Carriage Bolt	4	N15-6120-03
39	Large Hex Nut	4	N15-6420-03
40	Medium Clamp Band Assembly	4	N20-7200-03
41	Small Clamp Band <sup>1</sup>	8	N20-7100-03
42	Medium Carriage Bolt	24	N04-6070-03
43	Medium Hex Nut	24	N08-6400-03
44	Valve Ball	4	N20-1080-51
45	Valve Ball Seat	4	N20-1120-51
46	Diaphragm	2	N15-1010-51
	Muffler (Not Shown)	1	N15-3510-99

<sup>1</sup> Small clamp band uses medium carriage bolt (04-6070-03) and medium hex-nut (08-6400-03)



## NT100 RUBBER-FITTED





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N  M A D <sup>TM</sup>



NO BOUNDARIES <sup>TM</sup>

