

SERIES 500 TUBULAR “dia-PUMP” INSTRUCTIONS

**MODELS 515 to 547
MODELS 560, 562, 565 and 567
MATERIAL CODES N3, N5 and N7**

ADDENDUM TO OPERATING AND INSTRUCTION MANUAL FOR 500 dia-PUMPS and FOR 560 dia-PUMPS

These Instructions are to be used in conjunction with the Standard Instruction Manual furnished with every Series 500/500-A or Series 560 Neptune Pump.

- 1) Item numbers (#) refer to assembly drawings in this booklet.
- 2) Item letters refer to fill kit drawing #002171 in this booklet.
- 3) Fig. numbers refer to the Standard Instruction Manuals #105638 and #105645.

WARNING

**LOCKOUTS ARE REQUIRED BEFORE
SERVICING THIS EQUIPMENT.**

SAFETY INSTRUCTIONS:

**Shut off/Lockout pump Power before Servicing.
Be certain pump isolation valves are
closed—chemical is shut off.
Bleed pressure before servicing.**

LIMITED WARRANTY

All Neptune Pumps are tested at the factory prior to shipment. Each part used in their construction has been carefully checked for workmanship.

If the pump is installed properly, Neptune Chemical Pump Company warrants to the purchaser of this product for a period of twelve months from the date of first use or eighteen months from shipment, whichever occurs first, this product shall be free of defects in material and/or workmanship, as follows:

1. Neptune Chemical Pump Company will replace, at no charge, any part that fails due to a defect in material and/or workmanship during the warranty period, FOB our factory, Lansdale, Pennsylvania. To obtain warranty service, you must forward the defective parts to the factory for examination, freight pre-paid.¹
2. This warranty period does not cover any product or product part which has been subject to accident, misuse, abuse or negligence. Neptune Chemical Pump Company shall only be liable under this warranty if the product is used in the manner intended by the manufacturer as specified in the written instructions furnished with this product.

Any express warranty not provided in this warranty document, and any remedy for breach of contract that, but for this provision, might arise by implication or operation of law, is hereby excluded and disclaimed. Under no circumstances shall Neptune Chemical Pump Company be liable to purchaser or any other person for any charge for labor, repairs, or parts, performed or furnished by others, nor for any incidental consequential damages, whether arising out of breach of warranty, express or implied, a breach of contract or otherwise. Except to the extent prohibited by applicable law, any implied warranty of merchantability and fitness for a particular purpose are expressly limited in duration to the duration of this limited warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long any implied warranty lasts, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may have other rights which may vary from state to state.

IMPORTANT

SHOULD IT BE NECESSARY TO SEND THE PUMP TO THE FACTORY FOR REPAIR OR MAINTENANCE REBUILDING, DRAIN ALL OIL AND CHEMICAL FROM PUMP BEFORE SHIPPING. FAILURE TO DO SO CAN CAUSE EXTENSIVE DAMAGE TO THE MOTOR.

¹ SEE IMPORTANT NOTICE — RETURN GOODS AUTHORIZATION

IMPORTANT NOTICE RETURN GOODS AUTHORIZATION

- (1) All equipment returned to Neptune Chemical Pump Company requires proper Returned Goods Authorization Number (RGA) and tags.
- (2) All equipment returned to the factory for repair or service must first be thoroughly flushed and have all chemical contact areas neutralized.
- (3) All equipment which has been in contact with chemicals must be accompanied by a copy of the Chemical Product Material Safety Data Sheet (MSDS).
- (4) Failure to comply with the above instructions, will result in equipment being returned to sender, freight collect, without service.

ADDENDUM

TUBULAR DIAPHRAGM CHAMBER FIELD FILLING PROCEDURE

THEORY OF OPERATION

The Neptune tubular "dia-Pump" is a double diaphragm pump employing the basic drive unit of the Neptune Series 500 "dia-Pump".

All drive and stroke control parts are common to the original flat diaphragm models. The 500 pump oil head (Item #17) and all parts in the liquid handling side of the tubular "dia-Pump" are different from the basic pump.

Hydraulic oil displaces a flat diaphragm which displaces an intermediate fluid* which, in turn, flexes the tubular viton diaphragm.

- NOTE: (1) Valves may be removed for cleaning or replacement without disturbing the sealed portion containing the intermediate fluid. Do not remove upper or lower seal retainers, #3, held by cap screws, #21, when working on valves.
- (2) All Neptune tubular diaphragm pumps are furnished with the intermediate fluid installed and factory sealed. Do not attempt to add additional fluid or to drain fluid. Follow the instructions below only if the head has lost fluid due to diaphragm failure.

DISASSEMBLY OF TUBULAR HEAD

- 1.0.0 Shut pump off and disconnect suction and discharge piping. Remove drain plug in lower right hand side of gear box (P/N 510, drawing HP-1102, Page 21, of the operating manual), and drain hydraulic fluid from gear box.
- 1.0.1 Remove 8 screws, #10, and washers, #15, (plastic heads only), and remove valve heads, #4, and valve extensions, #16. Ball checks #14, ball seats #5, ball retainers #6, O-rings #9, and O-ring #8 will then be easily removed.
- 1.0.2 Remove the 4 screws #21; the seal retainers #3 and O-rings #24 can then be removed.
- 1.0.3 Remove 6 screws #22 and 2 screws #23. This will free tubular head #1, from pump body #17, with viton diaphragm #20, diaphragm back-up plates #18, and O-rings #19 (500 pump only). The intermediate fluid and some hydraulic oil will spill out when head is removed.
- 1.0.4 You now have access to the tubular diaphragm #2, which can be removed by folding the ends double and sliding out of the chamber from either top or bottom.
- 1.0.5 The tubular head is now completely drained. All parts, particularly O-rings, valve seats, and ball checks, should be inspected for any deficiency or wear and replaced as necessary. Both diaphragms should be replaced with new diaphragms regardless of condition.
- 1.0.6 To reassemble, reverse above procedure. Be certain that parts align properly and that one of the outermost holes in the diaphragm plates, #18, is oriented in the topmost position. Reassembly is facilitated by initially placing the pump on its side to install flat diaphragm and lower valves.

*Ethylene glycol with water and additives is standard. Other fluids available for sanitary or other special services.

REFILLING TUBULAR HEAD

- 1.0.7 Remove fill plug #12.
- 1.0.8 Slowly pour contents of premeasured intermediate fluid into fill hole.* Fill to within 3/8" of top of fill opening. Pour slowly and gently rock pump to help air escape from chamber during filling.
- 1.0.9 Refer to Fill Kit drawing #A-002171.
- 1.0.10 Attach calibrated fill column, Item D, to fill hole with red fill line at the bottom. Pour in balance of the fluid. The bottle contains a measured amount**. Do not overfill the Intermediate Liquid Chamber, collapse of the Tubular Diaphragm is not acceptable and could result in difficult Start-up and in lost Pump capacity.
- 1.0.11 Entrapped air in the intermediate liquid chamber results in lost pump capacity. To remove air, attach the vacuum pump (Item C) supplied in the fill kit and draw a vacuum causing the fluid to rise in the column. Do not draw liquid higher than top of column. Be careful not to allow any of the fluid to enter the vacuum pump. Agitate and tip pump to help dispel air until bubbles no longer appear from the head.
- 1.0.12 Release vacuum and remove vacuum pump. Observe level of fluid in column.
- 1.0.13 If the solution rests below the fill line on the column, plug the 3/4" NPT discharge using plug from the fill kit, Item B, and slowly pressurize the 3/4" NPT suction using the reducer-adapter from the fill kit, Item A, causing fluid to rise to fill line. Maintain a constant pressure on the head until after step 1.0.15.
- 1.0.14 If the solution rests above the fill line on the column, plug the 3/4" NPT suction using plug from the fill kit, Item B. For PVC head pumps attach the vacuum pump to the 3/4" NPT discharge using the reducer-adapter from the fill kit, Item A. For metal head pumps with the anti-siphon spring installed, it will be necessary to attach the vacuum pump to the bleed hole in the discharge valve (see Plug 13 on Dwg. D-002166-A). An adapter is included in the kit to fit this 1/8" NPT connection. Draw the liquid level down to the fill line by evacuating with the vacuum pump. Maintain constant vacuum until after Step 1.0.15.
- 1.0.15 When the solution is at the fill line on the column and all air is evacuated, remove the column and install fill plug #12. The remaining fluid in the column can be disposed of using some of the excess fluid to "top off" the threaded opening from which the column was removed. Release pressure/vacuum after fill plug #12 has been tightly installed.
- 1.0.16 Re-install pump.
- 1.0.17 Follow procedure in Neptune Standard operating and instruction manual for initial pump start up. Note on tubular "dia-Pumps", the 1/8" NPT plug #13 on the side of valve extension #26, assists in bleeding air during start up. On PVC (Code N5) models without anti-siphon spring #28 use 1/4" NPT plug #7 on the valve body #4 to bleed air.

NOTE: More viscous chemicals may be handled by modifying the pump to have only a single ball in the suction valve. The pump may have been furnished in this fashion. You may make this modification by removing one each of #5, #6, #8, #9, #14, and #16 and bolting part #4 (still containing one each of these parts) directly to the head, #1, seating against seal retainer, #3, and O-ring, #8. The lower four bolts #10 are shorter, as shown on the parts list, when a single ball suction valve is used.

*Or other fluid if pump is used in sanitary or other special service.

**Exactly 150ml for Models 515 to 535; exactly 305ml for Models 560, 562, 565 and 567.

- 3.1 The following is a list of parts that are unique to Tubular Models 515-T to 547-T, material codes N3 and N7, Refer to Drawing No. D-002166-A. Material code N5, Refer to Drawing No. 002167-A.

ITEM NO.	DESCRIPTION	QTY.	PART NO.
1	Tubular Diaphragm Head	1	001231
2	Tubular Diaphragm	1	109716
3	Seal Retainer N3, N7	2	001281
	Seal Retainer N5		001370
4	Valve Body N3, N7	2	001208
	Valve Body N5		001371
5	Valve Seat N3, N7	4	001432
	Valve Seat N5		001360
6	Ball Guide N3, N7	3	002154
	Ball Guide N5	4	002142
7	1/4 NPT Pipe Plug N3, N7	2	103138
	1/4 NPT Pipe Plug N5		101971
8	O-Ring (Stack Seal)	4	105461
9	O-Ring (Valve Seat)	4	100327
10	1/4 - 20 NC x 2 1/4" LG. SHCS N3, N7	8	100259
	1/4 - 20 NC x 1" LG. SHCS (Single Ball)	As Req'd.	100293
	1/4 - 20 NC x 4 1/2" LG. HHCS N5	8	105810
	1/4 - 20 NC x 3 1/2" LG. HHCS (Single Ball)	As Req'd.	105467
11	1/8 NPT Hex Socket Plug	1	100196
12	1/4 NPT Hex Socket Plug	1	100332
13	1/8 NPT Pipe Plug N3, N7	1	101859
14	Valve Ball N3	4	100078
	Valve Ball N5	4	105456
*	Valve Ball N7	3	105880
	(Ball Located At Top Against Spring)	1	100078
15	Washer N5	8	105811
16	Valve Extension N3, N7	1	001283
	Valve Extension N5	2	001372
17	Pump Body, 1.062	1	001285
	Pump Body, .500		001286
	Pump Body, .687		001287
18	Back-Up Plate	2	000194
19	O-Ring (Diaphragm Seal)	2	101105
20	Viton Diaphragm	1	000285
21	#8 - 32 NC x 3/8" LG. SHCS	4	100606
22	5/16 - 18 NC x 1 1/2" LG. SHCS	6	101170
23	1/4 - 20 NC x 1 1/2" LG. SHCS	2	101246
24	O-Ring (Tube Seal)	2	105460
25	Intermediate Fluid 150ml Bottle	1	002214
26	Vented Valve Extension N3, N7	1	002824
27	Tubular Spacer N3, N7	1	002815
28	Anti-Siphon Spring N3, N7	1	106285

* "N7" slurry pumps use (3) P/N 105880 polyurethane balls and (1) P/N 100078 316SS ball.
316SS ball located at top against spring.

PARTS ORDERING INSTRUCTIONS

Note: For prompt entry of parts orders; your order must include both model number and serial number.

- 3.2 The following is a list of parts that are unique to Tubular Models 560-T to 567-T, material codes N3 and N7, Refer to Drawing No. D-002168-B. Material code N5, Refer to Drawing No. 002169-B.

ITEM NO.	DESCRIPTION	QTY.	PART NO.
1	Tubular Diaphragm Head	1	001279
2	Tubular Diaphragm	1	109717
3	Seal Retainer N3, N7	2	001271
	Seal Retainer N5		001378
4	Valve Body N3, N7	2	001210
	Valve Body N5		001379
5	Valve Seat N3, N7	4	001275
	Valve Seat N5		001348
6	Ball Guide N3, N7	3	002156
	Ball Guide N5	4	002144
7	1/4 NPT Pipe Plug N3, N7	2	103138
	1/4 NPT Pipe Plug N5		101971
8	O-Ring (Stack Seal)	4	105461
9	O-Ring (Valve Seat)	4	100273
10	1/4 - 20 NC x 2 1/4" LG. SHCS N3, N7	8	100259
	1/4 - 20 NC x 1" LG. SHCS (Single Ball)	As Req'd.	100293
	1/4 - 20 NC x 5" LG. HHCS N5	8	105839
	1/4 - 20 NC x 3 1/2" LG. HHCS (Single Ball)	As Req'd.	105467
11	1/8 NPT Hex Socket Plug	1	100196
12	1/4 NPT Hex Socket Plug	1	100332
13	1/8 NPT Pipe Plug N3, N7	1	101859
14	Valve Ball N3	4	105458
	Valve Ball N5	4	100275
*	Valve Ball N7	3	105881
	(Ball Located At Top Against Spring)	1	105458
15	Washer N5	8	105811
16	Valve Extension N3, N7	1	001273
	Valve Extension N5	2	001380
17	Pump Body	1	000297
18	Back-Up Plate	2	000387
20	Diaphragm	1	000388
21	#8 - 32 NC x 3/8" LG. SHCS	4	100606
22	5/16 - 18 NC x 1 1/4" LG. SHCS	8	100205
25	Intermediate Fluid 305ml Bottle	1	002215
26	Vented Valve Extension N3, N7	1	002823
27	Tubular Spacer N3, N7	1	002816
28	Anti-Siphon Spring N3, N7	1	106286

* "N7" slurry pumps use (3) P/N 105881 polyurethane balls and (1) P/N 105458 316SS ball. 316SS ball located at top against spring.

PARTS ORDERING INSTRUCTIONS

Note: For prompt entry of parts orders; your order must include both model number and serial number.

4.1 SPARE PARTS

IMPORTANT: When ordering spare parts, please show MODEL NUMBER and SERIAL NUMBER of pump for which parts are being ordered. This information can be found on a stainless steel nameplate riveted to the side of the pump.

RECOMMENDED SPARE PARTS

MODELS 515-T to 547-T

MATERIAL CODES N3, N5 and N7

ITEM	P/N	DESCRIPTION	QUANTITY
2	109716	Tubular diaphragm	1
5	001432	Valve seat - N3, N7	4
	001360	Valve seat - N5	
8	105461	O-ring, stack seal	4
9	100327	O-ring, valve seat	8
14	100078	Valve ball - N3	4
	105456	Valve ball - N5	
		*Valve ball - N7	
19	101105	O-ring, diaphragm seal	2
20	A-000285	Viton diaphragm	1
24	105460	O-ring, tube seal	2
25	002214	150ml premeasured bottle of intermediate fluid	1

* "N7" slurry pumps use (3) P/N 105880 polyurethane balls and (1) P/N 100078 316SS ball.
316SS ball located at top against spring.

4.2 SPARE PARTS

IMPORTANT: When ordering spare parts, please show MODEL NUMBER and SERIAL NUMBER of pump for which parts are being ordered. This information can be found on a stainless steel nameplate riveted to the side of the pump.

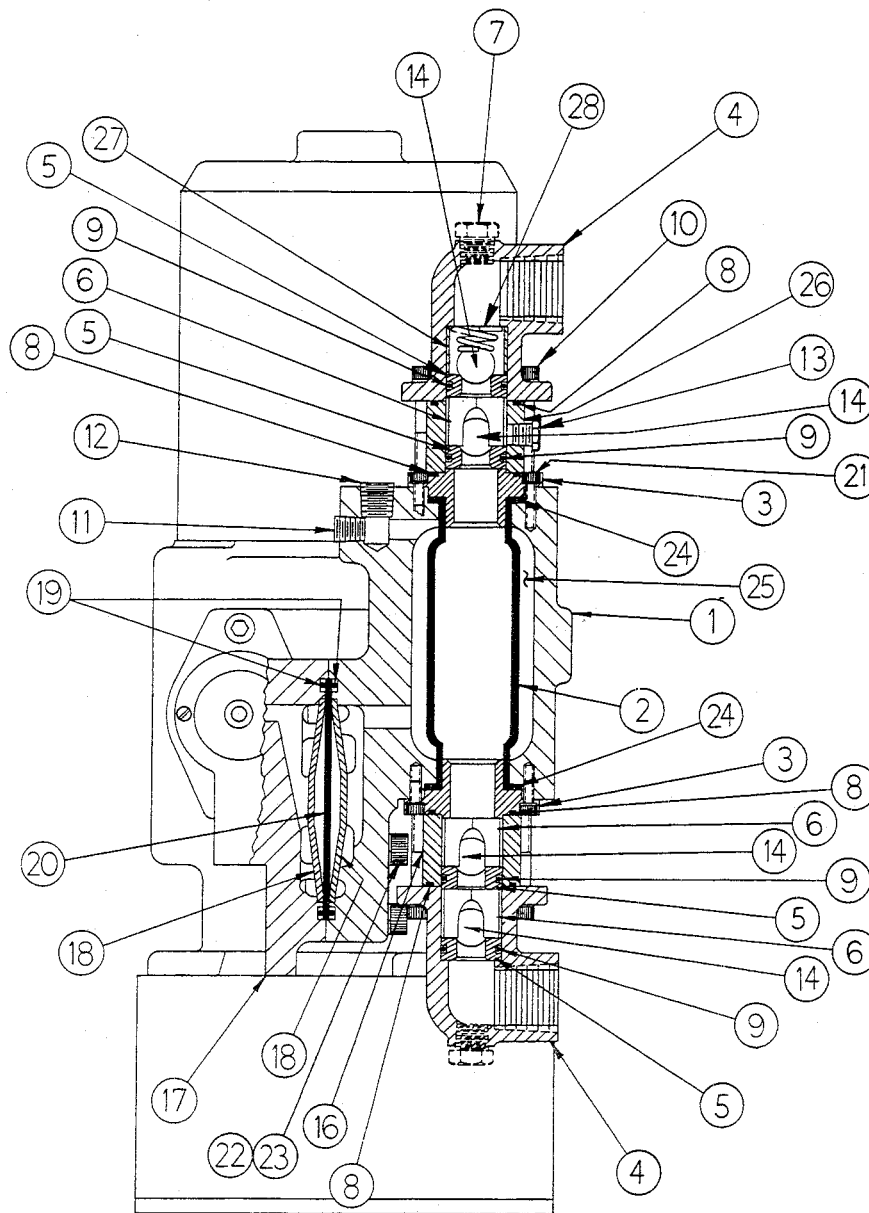
RECOMMENDED SPARE PARTS

MODELS 560-T to 567-T

MATERIAL CODES N3, N5 and N7

ITEM	P/N	DESCRIPTION	QUANTITY
2	109717	Tubular diaphragm	1
5	001275	Valve seat - N3, N7	4
	001348	Valve seat - N5	
8	105461	O-ring, stack seal	4
9	100273	O-ring, valve seat	8
14	105458	Valve ball - N3	4
	100275	Valve ball - N5	
		*Valve ball - N7	
20	000388	Diaphragm	1
25	002215	305ml premeasured bottle of intermediate fluid	1

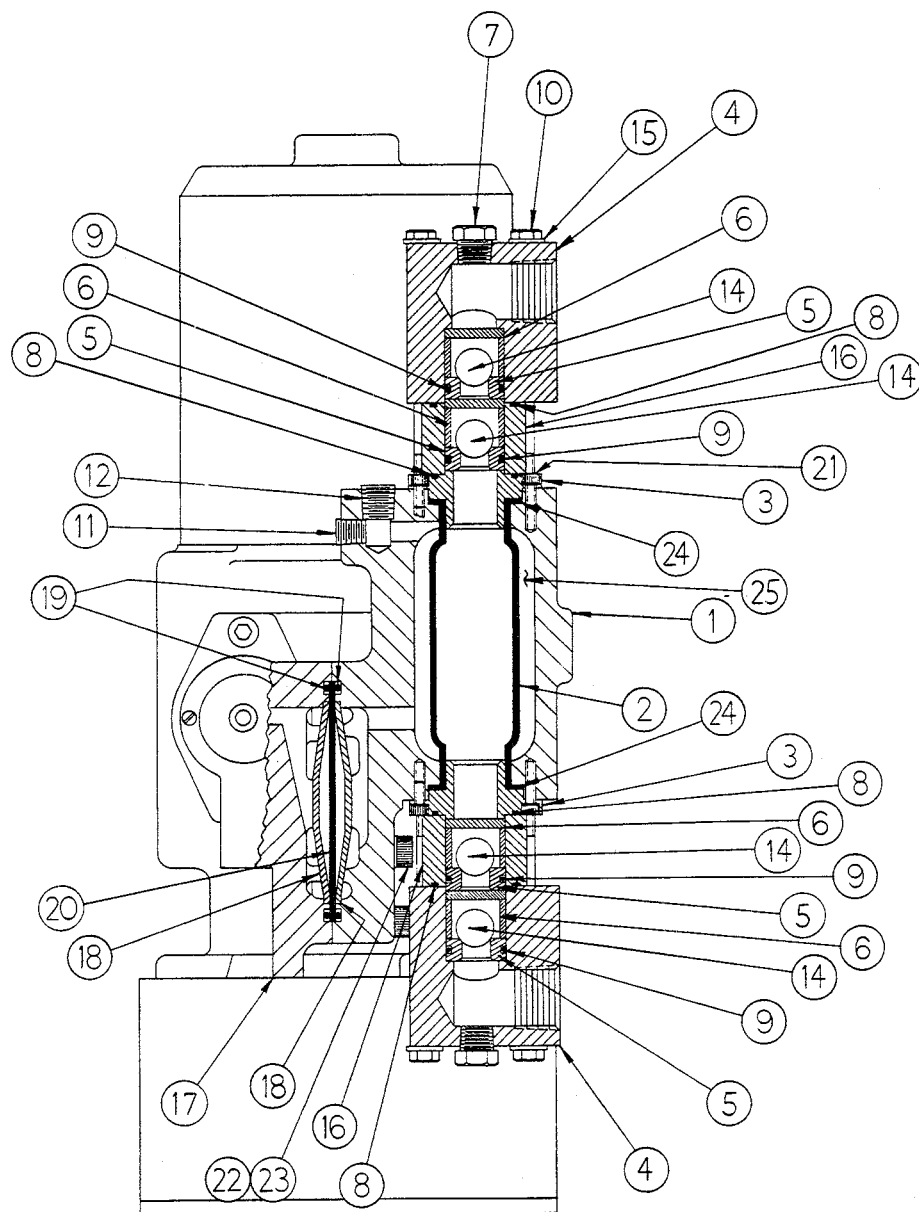
* "N7" slurry pumps use (3) P/N 105881 polyurethane balls and (1) P/N 105458 316SS ball.
316SS ball located at top against spring.



NOTE:

ALL PUMPS FURNISHED WITH 4" RISER BASE (PT. NO. 001415) TO INSURE ACCESS TO SUCTION VALVES.

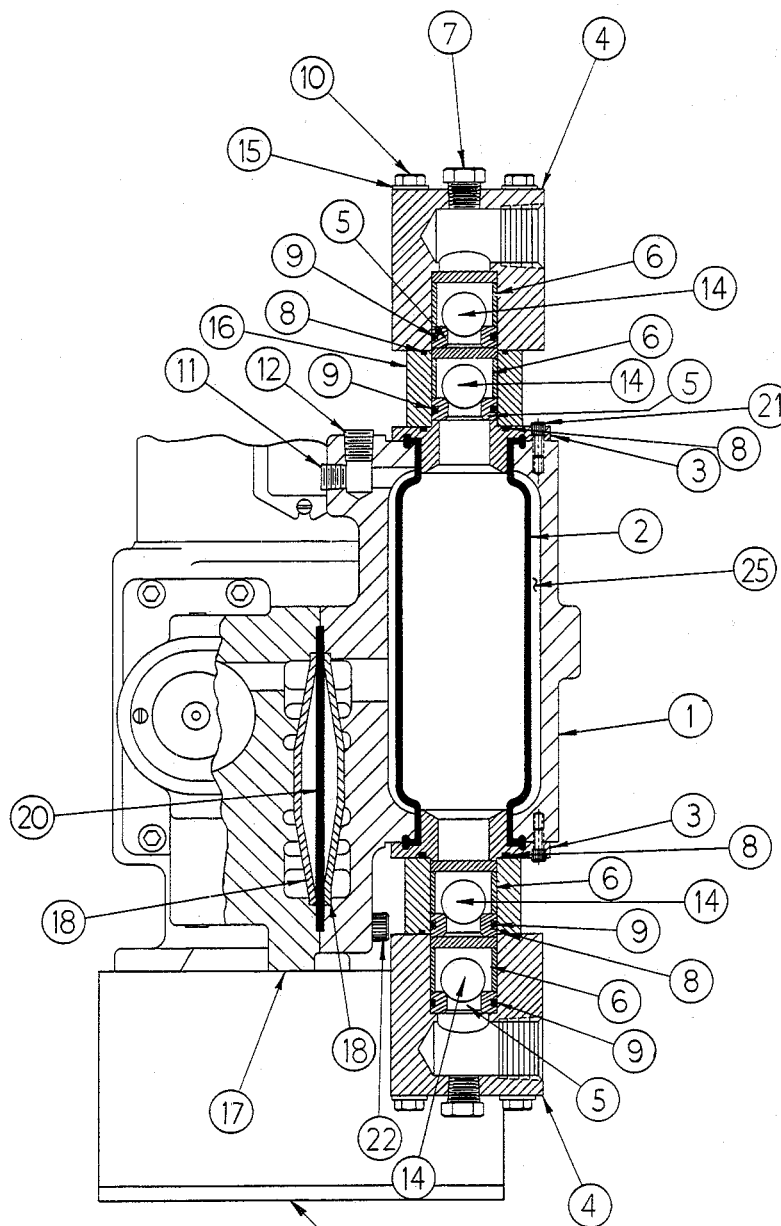
A	ECA-1145 12-14-83 REVISIONS	NEPTUNE CHEMICAL PUMP CO.	
		LANSDALE	PENNA. 19446
		500 TUBULAR DIA. PUMP METAL HEAD PARTS DWG.	
		DRAWN 4-4-85 J.C.R.	APPROVED DWG. NO. D-002166-A



NOTE:

ALL PUMPS FURNISHED WITH 4" RISER BASE (PT. NO. 001415) TO INSURE ACCESS TO SUCTION VALVE.

A	ECR-1205 12-21-69	BR	NEPTUNE CHEMICAL PUMP CO.		
			LANSDALE PENNA. 19446		
REVISIONS	500 TUBULAR DIA. PUMP PLASTIC HEAD PARTS DWG.				
	DRAWN	4-4-85	APPROVED	DWG. NO.	
			JCR	REVISED	D-00267-A



NOTE:

ALL PUMPS FURNISHED WITH 4"
RISER BASE (PT. NO. 001415) TO
INSURE ACCESS TO SUCTION
VALVE.

E-N-775C E		NEPTUNE CHEMICAL PUMP CO.	
A 11-21-85 Bk		LANSDALE PENNA. 19446	
REVISIONS		500 TUBULAR DIA. PUMP	
DRAWN 4-4-85		PLASTIC HEAD PARTS DWG.	
J.C.R.		APPROVED	DWG. NO.
		REVISED	D-002169-B

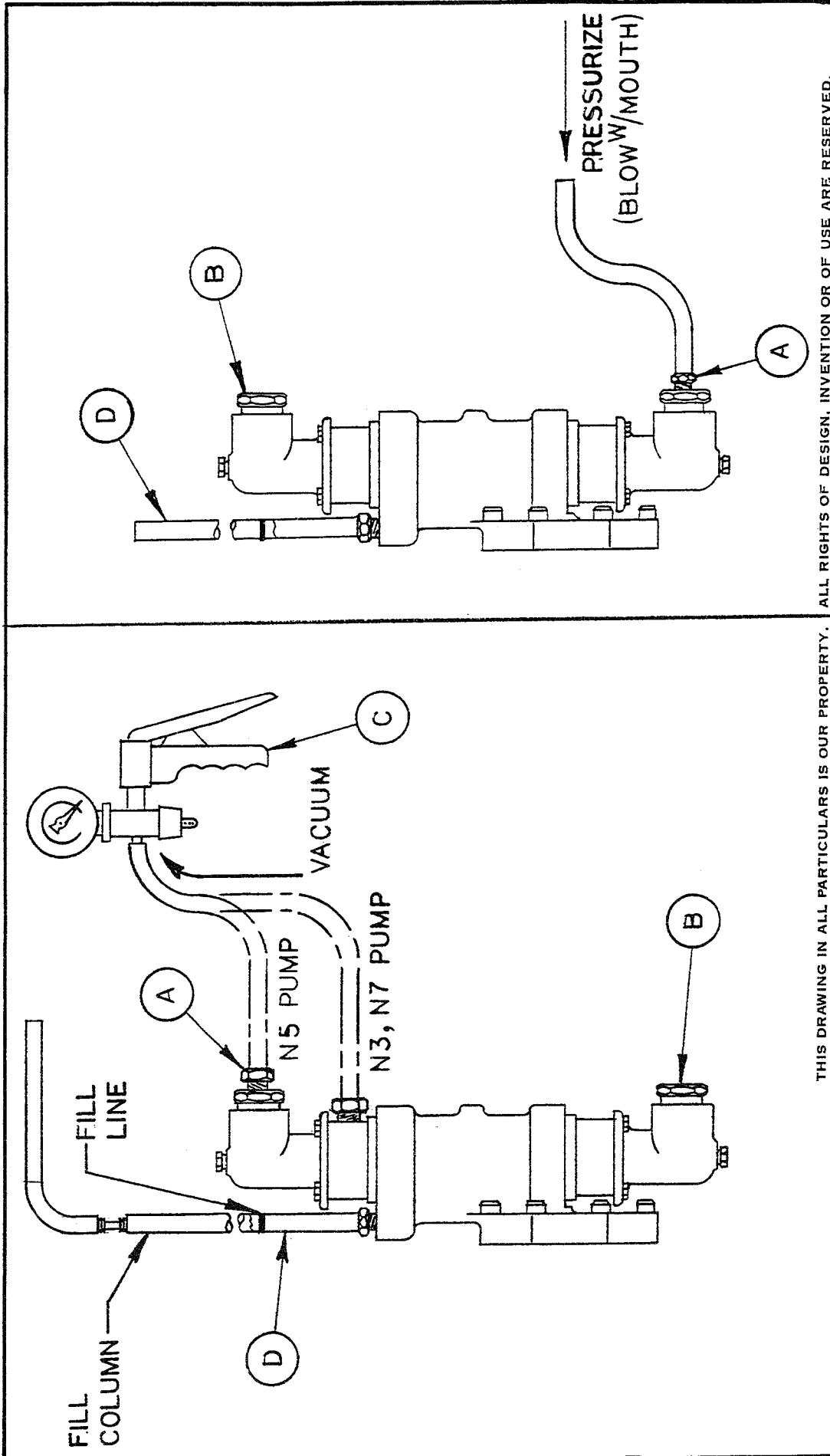
5.0 FILL ACCESSORY KIT

TUBULAR DIAPHRAGM PUMP

Refer to Drawing #A-002171

ITEM	P/N	DESCRIPTION
D	002170	Fill Column Assembly Tubular "dia-Pump"
	002214	Intermediate Fluid Kit 150 ml bottle (500 tube)
	002215	Intermediate Fluid Kit 305 ml bottle (560 tube)
	101932	3/4" x 1/4" Reducer Bush Scrd Schedule 80 PVC
B	101974	3/4" Pipe Plug PVC Threaded P/N 850-007
A	105023	1/4" x 1/4" MIPT Hose Polyethylene Adapter
C	108233	Vacuum Hand Pump*
	WA 170782	Male Ell Barb, Plastic 1/8" NPT x 1/4" ID

*Neptune furnishes a Mityvac® vacuum pump from a Mityvac® No. 6810 automotive test kit available at many automotive stores. (Unit furnished by Neptune is less gage and automotive adapters.)



REVISIONS		APP	NEPTUNE CHEMICAL PUMP CO. LANSDALE		PENNA. 19446		ISSUE CODE
REV.		PART NAME		DRAWN 4-8-85 JCR		R E V	
ECR & DATE		FILL KIT ASS'Y. 500 SERIES TUBE PUMP		CHECKED			
		TOLERANCES UNLESS OTHERWISE SPECIFIED		APP. DRAFT			
		FRACTION 3 PLACE DECIMAL 2 PLACE DECIMAL		APP. PROD. ENGR.			
		$\pm 1/64$ $\pm .005$ $\pm .01$					
		BREAK ALL SHARP EDGES AND REMOVE ALL BURRS		A-002171			
		ANGULAR $\pm 1-1/2^\circ$					