

# Displacement Pump

310662 Rev.B

**Used With HydraMix™ and UltraMix™ Pumps**

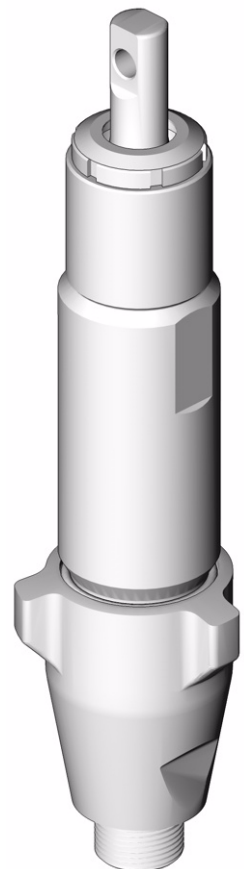
*See page 2 for models and maximum working pressures.*

**UltraMix™ Pump**



TI4568a

**HydraMix™ Pump**



TI4578a


**PROVEN QUALITY. LEADING TECHNOLOGY.**



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## Manual Conventions

### Warning


**WARNING**


A warning alerts you to possible serious injury or death if you do not follow instructions.

Symbols, such as fluid injection (shown), alert you to a specific hazard and direct you to read the indicated hazard warnings on pages 3-4.

### Caution

<b>CAUTION</b>
A caution alerts you to possible equipment damage or destruction if you do not follow instructions.

### Note

 A note indicates additional helpful information.

## Models

Pump Part No.	Series	Description	Maximum Working Pressure psi (MPa, bar)
248540	A	UltraMix, carbon steel, u-cup packings	300 (2.07, 20.7)
248541	A	UltraMix, stainless steel, u-cup packings	300 (2.07, 20.7)
248542	A	HydraMix, carbon steel, UHMWPE and leather v-packings	4700 (32.4, 324)
248543	A	HydraMix, stainless steel, UHMWPE and leather v-packings	4700 (32.4, 324)
249360	A	HydraMix, carbon steel, Tuff Stack v-packings	4700 (32.4, 324)



## WARNING



### INJECTION HAZARD

High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**



- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the gun fluid nozzle.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Follow **Pressure Relief Procedure** in your complete pump manual when you stop spraying and before cleaning, checking, or servicing equipment.
- Use lowest possible pressure when flushing, priming, or troubleshooting.
- Engage spray gun piston safety lock when not spraying.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. High pressure hose cannot be recoupled; replace the entire hose.



### FIRE AND EXPLOSION HAZARD

Solvent and fumes in work area can ignite or explode. To help prevent fire and explosion:





- Use equipment only in well ventilated area.
- Eliminate all ignition sources, such as pilot lights, cigarettes and plastic drop cloths (potential static arc).
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Keep the work area free of debris, including solvent, rags, and gasoline.
- Ground equipment and conductive objects. See **Grounding** in your complete pump manual.
- Hold gun firmly to side of grounded pail when triggering into pail.
- Use only grounded hoses.
- If there is static sparking or you feel a shock, **stop operation immediately.** Do not use equipment until you identify and correct the problem.



### EQUIPMENT MISUSE HAZARD

Misuse can cause serious injury or death.

- For professional use only.
- Use equipment only for its intended purpose. Call your Graco distributor for information.
- Read manuals, warnings, tags, and labels before operating equipment. Follow instructions.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not alter or modify equipment. Use only Graco parts and accessories.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not use hoses to pull equipment.
- Comply with all applicable safety regulations.

 <b>WARNING</b>	
	<p><b>BURN HAZARD</b></p> <p>This equipment is used with heated fluid, which can cause equipment surfaces to become very hot. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> <li>• Allow equipment to cool completely before touching it.</li> <li>• Wear gloves if fluid temperature exceeds 110°F (43°C).</li> </ul>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read Material Safety Data Sheet (MSDS) to know the specific hazards of the fluids you are using.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>You must wear proper protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury; inhalation of toxic fumes; and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear</li> <li>• Gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer</li> <li>• Hearing protection.</li> </ul>

## Tools Needed

- Vise with flat jaws
- 12 in. adjustable, open end wrench (2)
- Non-sparking hammer, 20 oz maximum
- Small screwdriver
- Throat Seal Liquid (TSL), Graco Part No. 206995
- O-ring Pick (wood, plastic, or brass)

## Repair Kits

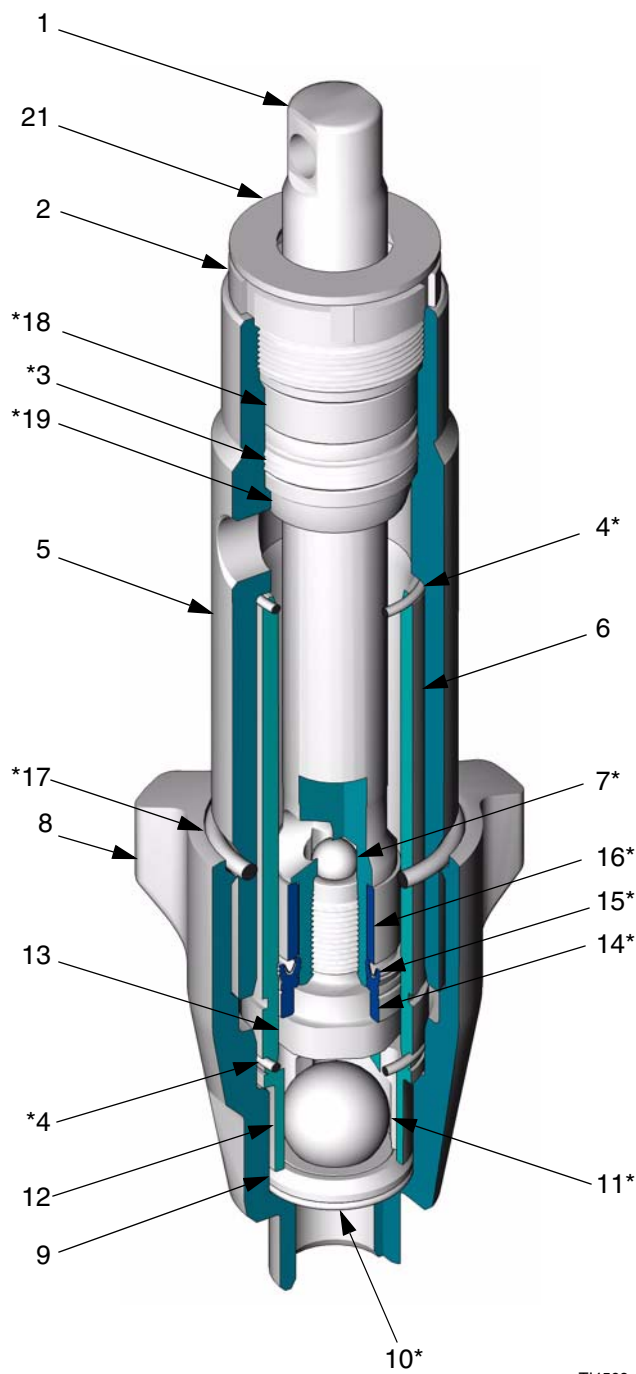
Repair kits are available for your pump. Kit parts are marked with an asterisk, for example (3\*). See pages 12 and 13. Kits must be purchased separately. For best results, use all parts in the kit.

## Clean and Inspect Parts

- 1.** Clean and inspect all parts. Intake and piston ball seats, sleeve, and displacement rod must not be worn, scratched, or damaged.
- 2.** Remove and clean sleeve when repacking pump.

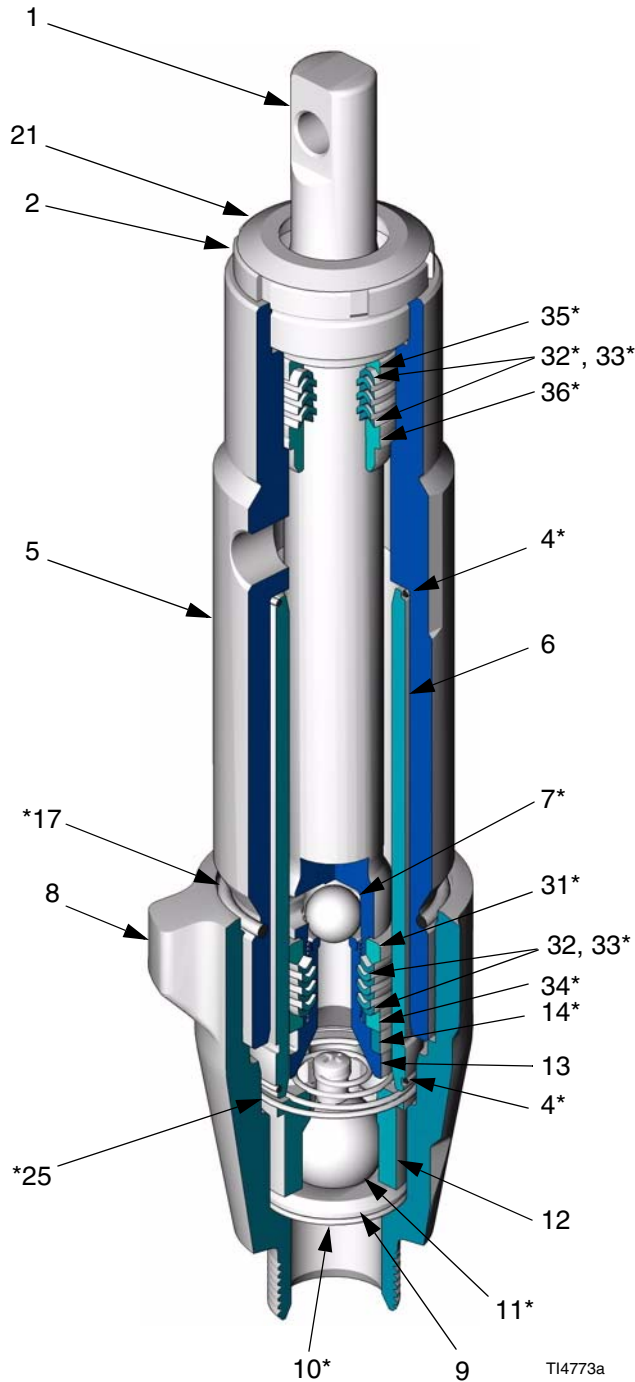
# Cutaway Views

## UltraMix Pump



TI4569a

## HydraMix Pump



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# Disassembly

## ⚠ WARNING

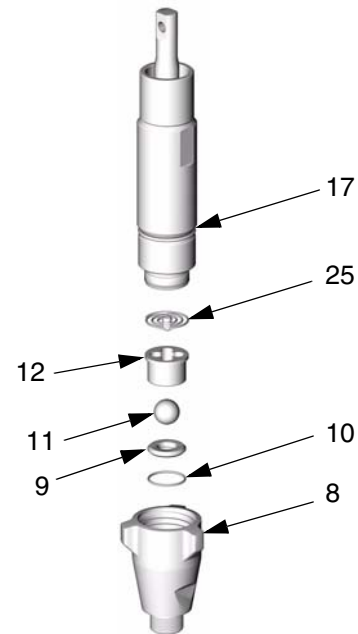


Pump rod and connecting rod move during operation. Moving parts can cause serious injury such as pinching or amputation. Keep hands and fingers away from connecting rod during operation.

1. Flush pump. See complete pump manual.
2. Relieve pressure. See complete pump manual.
3. Disconnect hoses from fluid inlet and outlet.
4. Disconnect displacement pump from air motor. See complete pump manual. Take displacement pump to a workbench.
5. Remove throat seal plug (21). Unscrew packing nut (2).

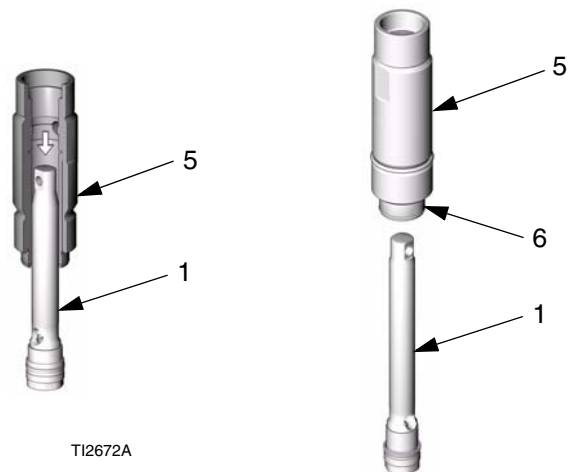


6. Loosen intake valve housing (8) with non-sparking hammer, then unscrew. Remove o-ring (17). Disassemble intake valve; spring (25) is on Models 248542 and 248543 only. Remove o-ring (10) with wood, plastic, or brass o-ring pick, to prevent damage to sealing surfaces.



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7. Tap rod (1) with non-sparking hammer to drive it out of cylinder (5).

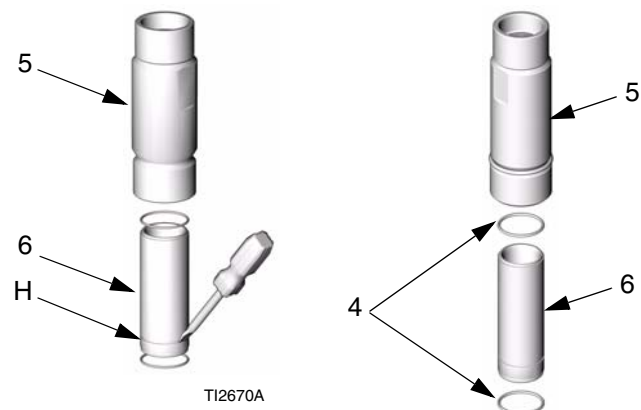


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Sleeve (6) may come out with rod.

- 8.** Using screwdriver in groove (H), remove sleeve (6) from cylinder (5), or pull it off rod. Remove o-rings (4).

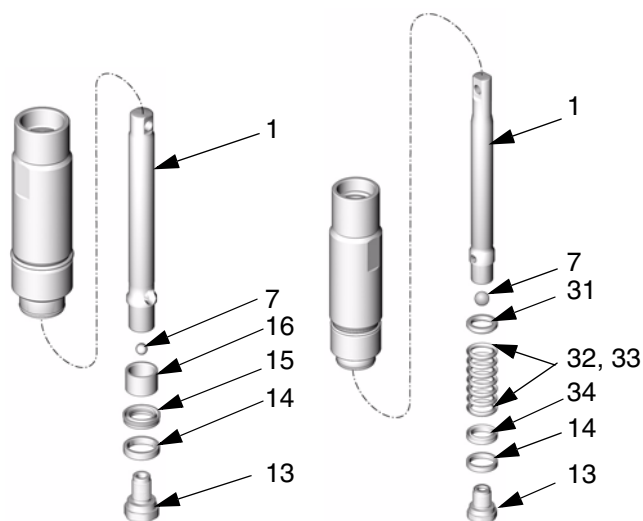


Be sure top o-ring (4) comes out.

- 9.** Unscrew piston (13) from rod (1). Remove ball (7) and disassemble piston parts. Clean and inspect all parts. Do not remove sealing patch from piston threads.

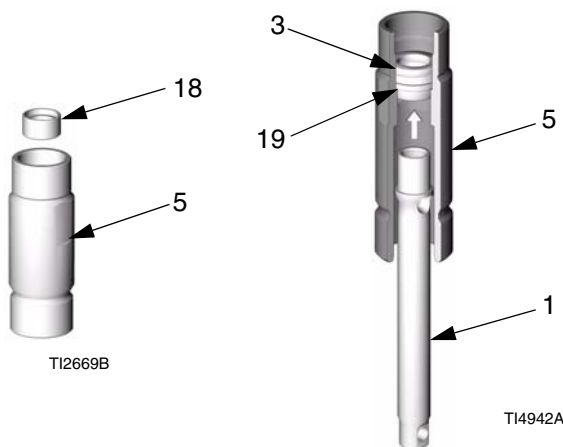
#### UltraMix Pumps

#### HydraMix Pumps

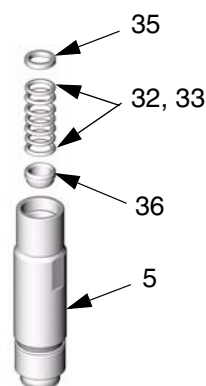


- 10.** Remove throat packings as follows:

- a. UltraMix Models:** Remove spacer (18). Insert piston end of rod (1) into cylinder (5) and push u-cup (3) and spacer (19) out.





- b. HydraMix Models:** Remove throat packings and glands from cylinder (5).






# Reassembly

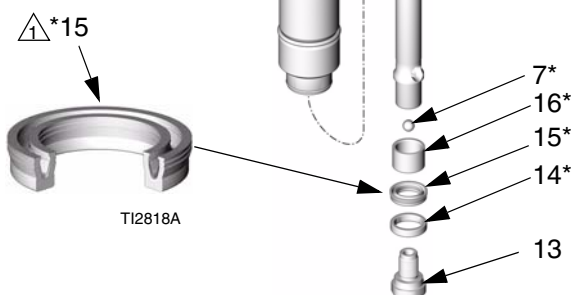
 To protect sealing surfaces during assembly and break-in, coat all non-Loctited parts with oil before reassembly. Soak leather packings (33) in oil for 1 hour before assembling.

 Sealing patch on piston threads is good for four repackings. Use Loctite® on piston threads after four repackings; be sure none gets on ball.


## 1. Assemble piston as follows:

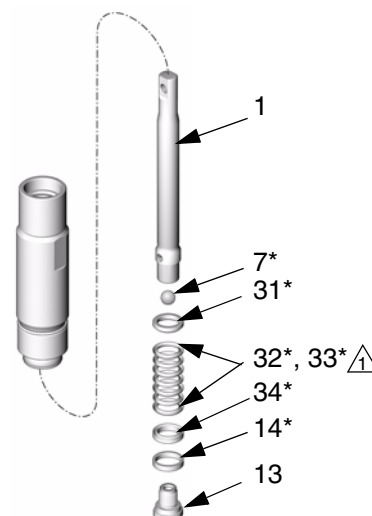
**a. UltraMix Models:** Install spacer (16\*) and u-cup (15\*) on rod (1). Lips of u-cup must face up. Use piston (13) to evenly push u-cup onto rod, then remove piston. Install guide (14\*) on piston. Place ball (7\*) on piston seat and screw piston into rod. Torque to 52-58 ft-lb (70-78 N•m).

 Lips face up.



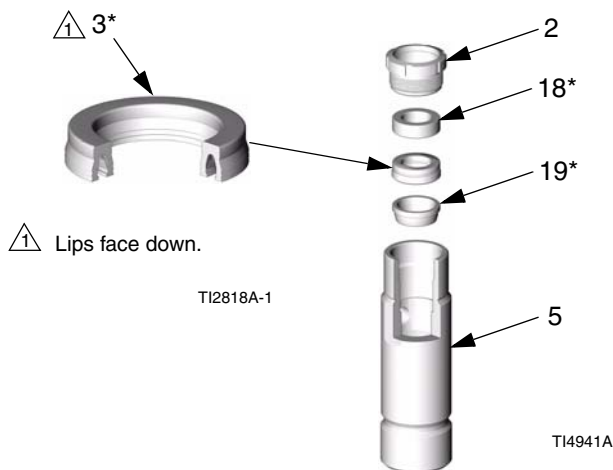
**b. HydraMix Models:** Lubricate packings with oil. Install male gland (31\*) on rod (1). Insert v-packings one at a time, with lips facing up, alternating UHMWPE (32\*) and leather (33\*). Be careful not to damage sealing edges of packings. Install female gland (34\*). Install guide (14\*) on piston. Place ball (7\*) on piston seat and screw piston into rod. Torque to 65-75 ft-lb (88-101 N•m).

 Lips face up.

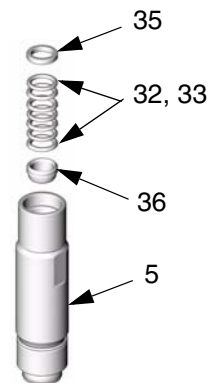


## 2. Install throat packings as follows:

- a. UltraMix Models:** Apply oil to throat seal spacer (19\*), u-cup (3\*), throat spacer (18\*), and cylinder (5). Drop spacer (19\*) fully into cylinder throat, with wide side facing up. Place u-cup in cylinder with lips facing down. Be careful not to damage sealing edges of u-cup. Use packing nut (2) to drive u-cup into position. Remove packing nut and insert spacer (18\*). Install plug (21) in packing nut (2), then install packing nut handtight.

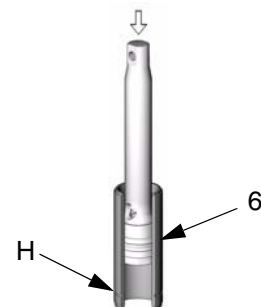


- b. HydraMix Models:** Apply oil to v-packings (32\*, 33\*), glands (35\*, 36\*), and cylinder (5). Place male gland (36\*) in cylinder with wide side facing up. Insert v-packings one at a time, with lips facing down, alternating UHMWPE (32\*) and leather (33\*). Be careful not to damage sealing edges of packings. Install female gland (35\*). Install plug (21) in packing nut (2), then install packing nut handtight.



Groove (H) in sleeve outer surface must be toward bottom.

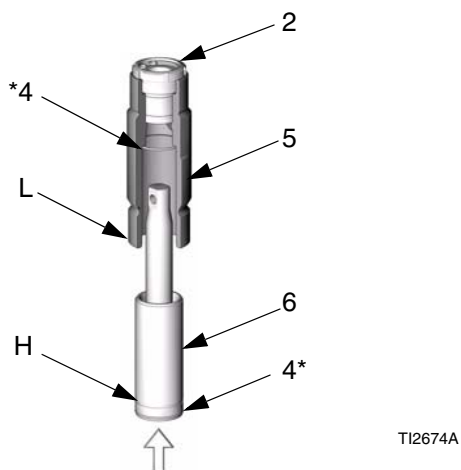
- 3.** Apply oil to piston packings and sleeve top edge. Push piston assembly into top of sleeve (6). Drive in with non-sparking hammer.



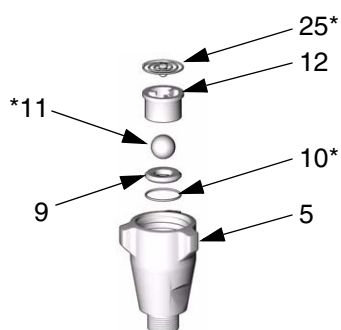
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- 4.** Apply oil to top 1-2 in. (25-50 mm) of displacement rod (1) and outside of sleeve (6). Apply oil to o-rings (4\*) and place one in cylinder and other on bottom of sleeve.

- 5.** Slide sleeve/rod assembly into bottom of cylinder (5), wiggling as necessary to assist rod through throat packings. Drive in with hammer until top of groove (H) nearly aligns with bottom of cylinder (L). Use plastic rod to drive displacement rod until 1/2 in. (13 mm) of its greatest diameter is visible above packing nut (2).

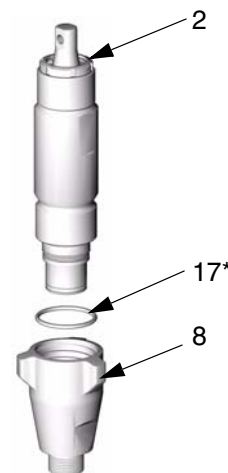


- 6.** Reassemble intake valve with o-ring (10\*), seat (9), and ball (11\*). Install ball guide (12). *Hydra-Mix Models only:* Install spring (25\*) with screw at top.



Seat may be flipped over and used on other side. Clean seat thoroughly. No scratches permitted on sealing edge.

- 7.** Replace o-ring (17\*). Install intake valve. Torque housing (8) to 75-85 ft-lb (101-114 N•m), or be sure intake valve is snug against cylinder.



- 8.** Torque packing nut/wet-cup (2) to 90-110 in-lb (10-12 N•m).



Do not overtighten packing nut/wet-cup. Throat packings are not adjustable.



#### WARNING



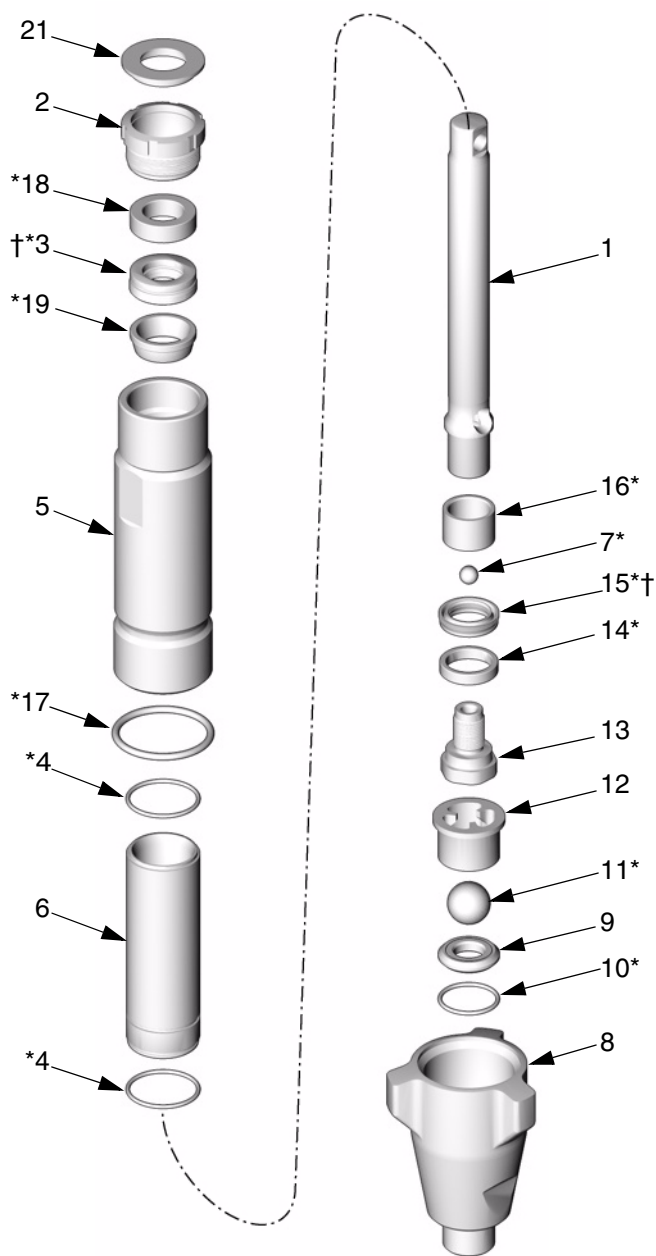
Pump rod and connecting rod move during operation. Moving parts can cause serious injury such as pinching or amputation. Keep hands and fingers away from connecting rod during operation.

- 9.** Reconnect displacement pump to air motor. See complete pump manual.

# Parts

## Part No. 248540 UltraMix Carbon Steel Pump, Series A

## Part No. 248541 UltraMix Stainless Steel Pump, Series A



TI4570a

Ref No.	Part No.	Description	Qty
1	248537	ROD, displacement; sst	1
2	193032	NUT, packing	1
3†	118674	SEAL, u-cup, throat; UHMWPE	1
4*	107098	O-RING; PTFE	2
5	243347	CYLINDER, pump (248540)	1
	248582	CYLINDER, pump (248541)	1
6	240525	SLEEVE, cylinder; sst	1
7*	101947	BALL, piston; sst; 0.375 in. (10 mm)	1
8	195894	HOUSING, valve, intake (248540)	1
	15D489	HOUSING, valve, intake (248541)	1
9	244199	SEAT, intake; carbide; includes items 10 and 11	1
10*	108526	O-RING; PTFE	1
11*	102972	BALL, intake; sst; 0.875 in. (22 mm)	1
12	193027	GUIDE, ball	1
13	240150	VALVE, piston (248540)	1
	287268	VALVE, piston (248541)	1
14*	15D101	GUIDE, piston	1
15*†	118673	SEAL, u-cup, piston; UHMWPE	1
16*	15D267	SPACER, piston	1
17*	106556	O-RING; Viton	1
18*	15D268	SPACER, throat	1
19*	15D487	SPACER, throat seal	1
21	183171	PLUG, throat seal	1
22	165198	NIPPLE, reducing; 3/8 npt x 1/4 npt; carbon steel (248540)	1
	166863	NIPPLE, reducing; 3/8 npt x 1/4 npt; stainless steel (248541)	1

\* These parts are included in Repair Kit 248438, which may be purchased separately.

† These parts are included in Packing Kit 248437, which may be purchased separately.

**Part No. 248542 HydraMix Carbon Steel Pump, Series A****Part No. 248543 HydraMix Stainless Steel Pump, Series A****Part No. 249360 HydraMix Carbon Steel Tuff Stack Pump, Series A**

The diagram shows an exploded view of the HydraMix pump assembly. Components are labeled with part numbers and quantities. The assembly includes a rod, nut, O-ring, PTFE, cylinder, sleeve, ball, housing, valve, seat, O-ring, ball, guide, valve, guide, O-ring, plug, spring, gland, V-packing, V-packing, gland, gland, and gland.

Ref No.	Part No.	Description	Qty
1	248538	ROD, displacement; sst	1
2	189589	NUT, packing	1
4*	108822	O-RING; PTFE	2
5	244974	CYLINDER, pump (248542)	1
	15D490	CYLINDER, pump (248543)	1
6	244975	SLEEVE, cylinder; sst	1
7*	107203	BALL, piston; sst; 0.5625 in. (14 mm)	1
8	198219	HOUSING, valve, intake (248542)	1
	15D491	HOUSING, valve, intake (248543)	1
9	240918	SEAT, intake; carbide; includes items 10 and 11	1
10*	107098	O-RING; PTFE	1
11*	107167	BALL, intake; sst; 1 in. (25 mm)	1
12	198505	GUIDE, ball	1
13	240580	VALVE, piston (248542)	1
	287267	VALVE, piston (248543)	1
14*	198303	GUIDE, piston	1
17*	107306	O-RING; Viton	1
21	112590	PLUG, throat seal	1
25*	245256	SPRING, intake ball	1
31*	189585	GLAND, male, piston	1
32*†	198701	V-PACKING; UHMWPE	8
33*†	198718	V-PACKING; leather	6
34*	198765	GLAND, female, piston	1
35*	15E009	GLAND, female, throat	1
36*	198768	GLAND, male, throat	1

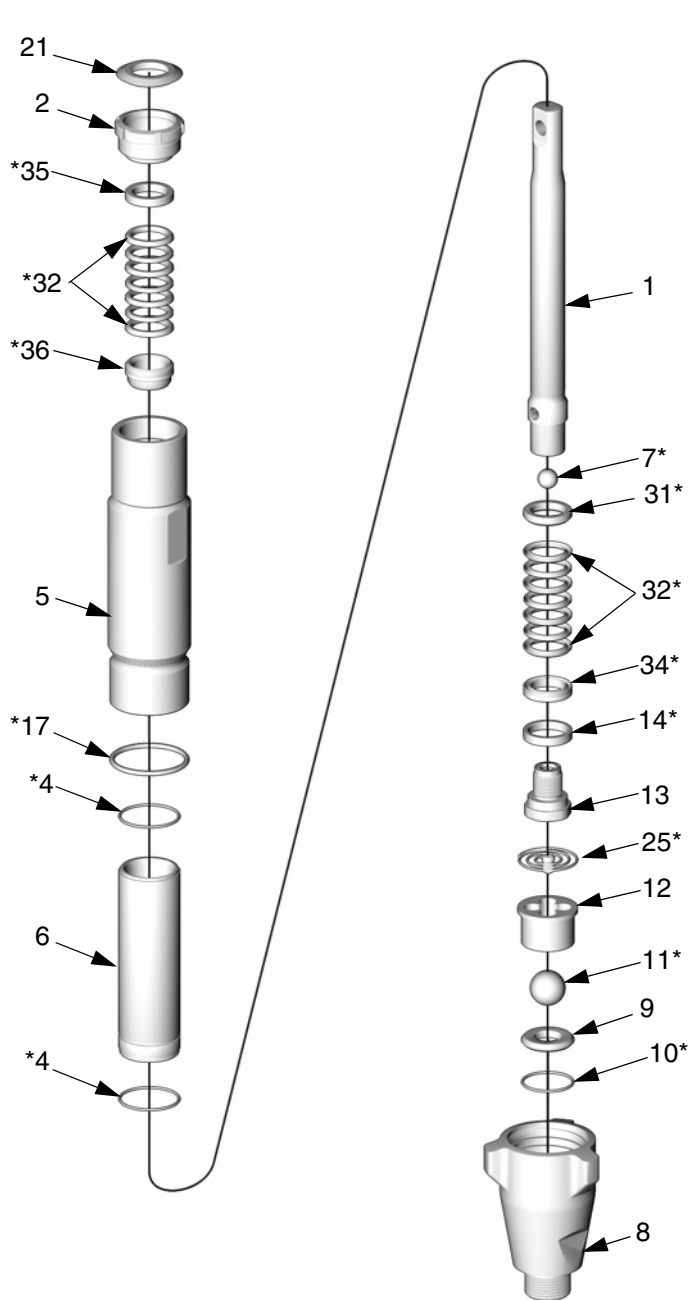
\* These parts are included in Repair Kit 248440, which may be purchased separately.

† These parts are included in Packing Kit 248439, which may be purchased separately.

To convert to Tuff-Stack carbon-filled PTFE v-packings, order Part No. 248441 (14 v-packings only) or 248442 (pump repair kit including 14 v-packings).

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# Part No. 249360 HydraMix Carbon Steel Tuff Stack Pump, Series A



Ref No.	Part No.	Description	Qty
1	248538	ROD, displacement; sst	1
2	189589	NUT, packing	1
4*	108822	O-RING; PTFE	2
5	244974	CYLINDER, pump (248542)	1
	15D490	CYLINDER, pump (248543)	1
6	244975	SLEEVE, cylinder; sst	1
7*	107203	BALL, piston; sst; 0.5625 in. (14 mm)	1
8	198219	HOUSING, valve, intake (248542)	1
	15D491	HOUSING, valve, intake (248543)	1
9	240918	SEAT, intake; carbide; includes items 10 and 11	1
10*	107098	O-RING; PTFE	1
11*	107167	BALL, intake; sst; 1 in. (25 mm)	1
12	198505	GUIDE, ball	1
13	240580	VALVE, piston (248542)	1
	287267	VALVE, piston (248543)	1
14*	198303	GUIDE, piston	1
17*	107306	O-RING; Viton	1
21	112590	PLUG, throat seal	1
25*	245256	SPRING, intake ball	1
31*	189585	GLAND, male, piston	1
32*	15D910	V-PACKING; Tuff-Stack, carbon-filled PTFE	14
34*	198765	GLAND, female, piston	1
35*	15E009	GLAND, female, throat	1
36*	198768	GLAND, male, throat	1

\* These parts are included in Repair Kit 248442, which may be purchased separately.

To convert to Tuff-Stack carbon-filled PTFE v-packings, order Part No. 248441 (14 v-packings only) or 248442 (pump repair kit including 14 v-packings).

TI4579a

# Technical Data

Category	Data
Maximum working pressure	<i>UltraMix Pumps:</i> 300 psi (2.07 MPa, 20.7 bar) <i>HydraMix Pumps:</i> 4700 psi (32 MPa, 324 bar)
Fluid inlet size	<i>UltraMix Pumps:</i> 3/4 npt(m) <i>HydraMix Pumps:</i> 1 npsm(m)
Fluid outlet size	<i>UltraMix Pumps:</i> 1/4 npt(f) <i>HydraMix Pumps:</i> 3/8 npt(f)
Wetted parts	stainless steel, PTFE, zinc-plated carbon steel, acetal, tungsten carbide, chrome plating, ultra-high molecular weight polyethylene

Loctite® is a registered trademark of the Loctite Company.

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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# Graco Information

**TO PLACE AN ORDER**, contact your Graco distributor, or call this number to identify the distributor closest to you:

**1-800-328-0211 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

*All written and visual data contained in this document reflects the latest product information available at the time of publication.  
Graco reserves the right to make changes at any time without notice. (SRC309577)*

MM 310662

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[www.graco.com](http://www.graco.com)

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