

# 4-Ball Repair and Conversion Kits

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To replace pump seals and throat packings in Enclosed Wet Cup Lowers, Sealed 4-Ball Lowers, and Open Wet Cup Lowers. For professional use only.



## Important Safety Instructions

Read all warnings and instructions in your 4-Ball Lower Instruction Manual. Save these instructions.

750cc, 1000cc, 1500cc, and 2000cc Lowers

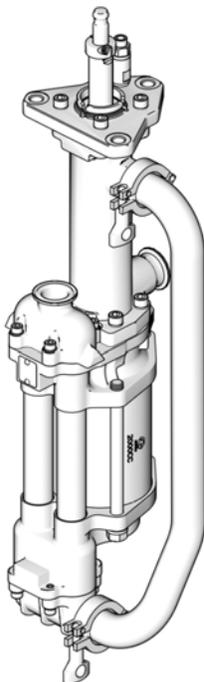
3000cc and 4000cc Lowers

Sealed

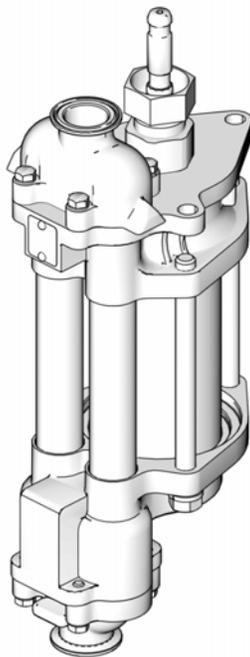
Open Wet Cup

Enclosed Wet Cup

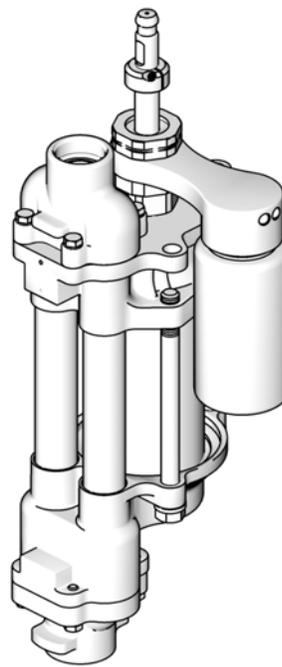
Enclosed Wet Cup



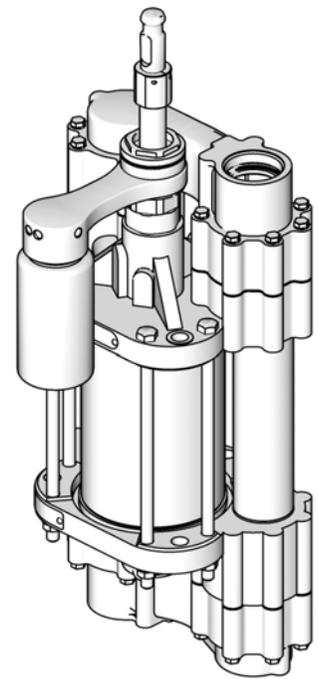
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# Complete Pump Repair Kits for 750cc, 1000cc, 1500cc, and 2000cc Lowers

## Enclosed Wet Cup Lowers

**NOTE:** The lowers listed in this manual **must** use the pump repair kits listed below. **Do not** use kits for older-style lowers (see manual 311690) with these lowers. The throat packing gland height has changed.

### Pump Repair Kit 24F660

**For 750cc Lowers:** Part Nos. 24F413, 24F414, 24F415, 24F416, 24F417, 24F418, 24F420, 24F421, 24F422, and 24F423.

| Ref. No. | Description                                  | Qty. |
|----------|--|------|
| 2*       | PACKING, o-ring; 1.25 in. (31 mm) OD; PTFE   | 6    |
| 4*       | SEAL, gasket, cylinder                       | 2    |
| 7*       | GASKET, seat, valve                          | 4    |
| 11*      | PACKING, piston; 2.5 in.; UHMWPE             | 1    |
| 19†      | GLAND, male                                  | 2    |
| 20†      | V-PACKING; UHMWPE                            | 5    |
| 25†      | V-PACKING; leather                           | 3    |
| 26†      | GLAND, female                                | 1    |
| 35†      | PACKING, o-ring; PTFE; 1.5 in. (38 mm) OD    | 1    |
| 42†      | PACKING, o-ring; PTFE; 1.63 in. (41 mm) OD   | 1    |
| 45◆      | SPRING, compression                          | 1    |
| 46◆      | SEAL, piston, TSL pump                       | 1    |
| 47◆      | O-RING; fluoroelastomer; 1.88 in. (48 mm) OD | 2    |

\* These parts are included in Seal Repair Kit 16E904.

† These parts are included in Throat Packing Repair Kit 24F245.

◆ These parts are included in TSL Pump Repair Kit 24F617.

### Pump Repair Kit 24F661

**For 1000cc Lowers:** Part Nos. 24F424, 24F425, 24F426, 24F427, 24F428, 24F429, and 24F431.

| Ref. No. | Description                                  | Qty. |
|----------|--|------|
| 2*       | PACKING, o-ring; 1.25 in. (31 mm) OD; PTFE   | 6    |
| 4*       | SEAL, gasket, cylinder                       | 2    |
| 7*       | GASKET, seat, valve                          | 4    |
| 11*      | PACKING, piston; 3.0 in., UHMWPE             | 1    |
| 19†      | GLAND, male                                  | 2    |
| 20†      | V-PACKING; UHMWPE                            | 5    |
| 25†      | V-PACKING; leather                           | 3    |
| 26†      | GLAND, female                                | 1    |
| 35†      | PACKING, o-ring; PTFE; 1.5 in. (38 mm) OD    | 1    |
| 42†      | PACKING, o-ring; PTFE; 1.63 in. (41 mm) OD   | 1    |
| 45◆      | SPRING, compression                          | 1    |
| 46◆      | SEAL, piston, TSL pump                       | 1    |
| 47◆      | O-RING; fluoroelastomer; 1.88 in. (48 mm) OD | 2    |

\* These parts are included in Seal Repair Kit 277360.

† These parts are included in Throat Packing Repair Kit 24F245.

◆ These parts are included in TSL Pump Repair Kit 24F617.

### Pump Repair Kit 24F662

**For 1500cc Lowers:** Part Nos. 24F432, 24F433, 24F434, 24F435, 24F436, 24F437, and 24F439.

| Ref. No. | Description                                  | Qty. |
|----------|--|------|
| 2*       | PACKING, o-ring; 1.25 in. (31 mm) OD; PTFE   | 6    |
| 4*       | SEAL, gasket, cylinder                       | 2    |
| 7*       | GASKET, seat, valve                          | 4    |
| 11*      | PACKING, piston; 3.5 in.; UHMWPE             | 1    |
| 19†      | GLAND, male                                  | 2    |
| 20†      | V-PACKING; UHMWPE                            | 5    |
| 25†      | V-PACKING; leather                           | 3    |
| 26†      | GLAND, female                                | 1    |
| 35†      | PACKING, o-ring; PTFE; 1.5 in. (38 mm) OD    | 1    |
| 42†      | PACKING, o-ring; PTFE; 1.63 in. (41 mm) OD   | 1    |
| 45◆      | SPRING, compression                          | 1    |
| 46◆      | SEAL, piston, TSL pump                       | 1    |
| 47◆      | O-RING; fluoroelastomer; 1.88 in. (48 mm) OD | 2    |

\* These parts are included in Seal Repair Kit 277362.

† These parts are included in Throat Packing Repair Kit 24F245.

◆ These parts are included in TSL Pump Repair Kit 24F617.

### Pump Repair Kit 24F663

**For 2000cc Lowers:** Part Nos. 24F440, 24F441, 24F442, 24F443, 24F444, 24F445, and 24F447.

| Ref. No. | Description                                  | Qty. |
|----------|--|------|
| 2*       | PACKING, o-ring; 1.25 in. (31 mm) OD; PTFE   | 6    |
| 4*       | SEAL, gasket, cylinder                       | 2    |
| 7*       | GASKET, seat, valve                          | 4    |
| 11*      | PACKING, piston; 4.0 in.; UHMWPE             | 1    |
| 19†      | GLAND, male                                  | 2    |
| 20†      | V-PACKING; UHMWPE                            | 5    |
| 25†      | V-PACKING; leather                           | 3    |
| 26†      | GLAND, female                                | 1    |
| 35†      | PACKING, o-ring; PTFE; 1.5 in. (38 mm) OD    | 1    |
| 42†      | PACKING, o-ring; PTFE; 1.63 in. (41 mm) OD   | 1    |
| 45◆      | SPRING, compression                          | 1    |
| 46◆      | SEAL, piston, TSL pump                       | 1    |
| 47◆      | O-RING; fluoroelastomer; 1.88 in. (48 mm) OD | 2    |

\* These parts are included in Seal Repair Kit 277358.

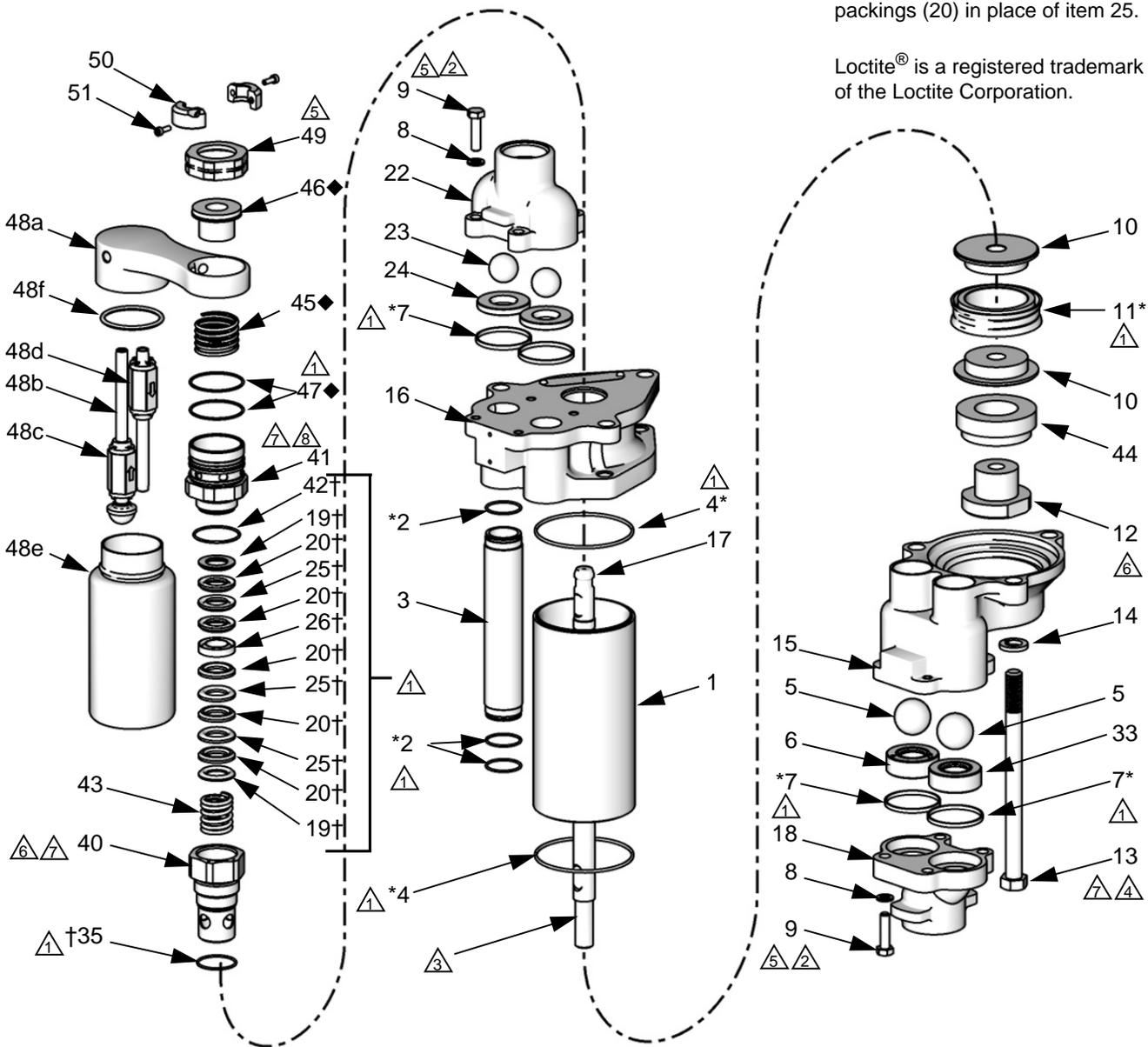
† These parts are included in Throat Packing Repair Kit 24F245.

◆ These parts are included in TSL Pump Repair Kit 24F617.

**NOTE:** Kit 24F243 uses all ptfе packings (20) in place of item 25.

**NOTE:** Kit 24F244 uses all leather packings (20) in place of item 25.

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△1 Apply lubricant to all packings and seals.

△2 Apply removable (blue) Loctite® 243 to entire length of threads.

△3 Apply high strength (red) Loctite® 263 or 2760 to entire length of threads. Sealant must be allowed to cure for a minimum of 12 hours before use.

△4 Tighten uniformly until cylinder (4) is seated. Torque to 25-30 ft-lb (34-40 N•m).

△5 Torque 25-30 ft-lb (34-40 N•m).

△6 Torque 95-100 ft-lb (129-135 N•m).

△7 Apply thread lubricant.

△8 Torque 70-75 ft-lb (95-102 N•m).

**FIG. 1. 750cc, 1000cc, 1500cc, and 2000cc Enclosed Wet Cup Lowers**

## Sealed 4-Ball Lowers

### Pump Repair Kit 17K758

For Sealed 750cc Lower: Part No. 17K656.

| Ref. No. | Description                               | Qty. |
|----------|---|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE         | 6    |
| 4*       | GASKET, cylinder                          | 2    |
| 7*       | GASKET, check valve                       | 4    |
| 11*      | SEAL, piston; ZXP                         | 1    |
| 20†      | O-RING; 1.25 in. (31 mm) OD; FX75 or CV75 | 2    |
| 21†      | SEAL, lip                                 | 1    |
| 25       | BEARING                                   | 1    |
| 35       | O-RING; 1.5 in. (38 mm) OD; PTFE          | 1    |
| 51       | SEAL, backup                              | 1    |
| 53       | BELLOWS                                   | 1    |
| 55       | O-RING, bellows; 2.55 in. (65 mm) OD      | 1    |
| 57       | O-RING; 0.7 in. (18 mm) OD; PTFE          | 1    |
| 58       | GASKET, sanitary                          | 2    |
| 61       | O-RING                                    | 1    |
| 62       | O-RING; 2.7 in. (69 mm) OD, PTFE          | 1    |

\* These parts are included in Piston Seal Kit 17K912.

† These parts are included in Lip Seal Kit 17K753

### Pump Repair Kit 17K760

For Sealed 1000cc Lower: Part No. 17K657.

| Ref. No. | Description                               | Qty. |
|----------|---|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE         | 6    |
| 4*       | GASKET, cylinder                          | 2    |
| 7*       | GASKET, check valve                       | 4    |
| 11*      | SEAL, piston; ZXP                         | 1    |
| 20†      | O-RING; 1.25 in. (31 mm) OD; FX75 or CV75 | 2    |
| 21†      | SEAL, lip                                 | 1    |
| 25       | BEARING                                   | 1    |
| 35       | O-RING; 1.5 in. (38 mm) OD; PTFE          | 1    |
| 51       | SEAL, backup                              | 1    |
| 53       | BELLOWS                                   | 1    |
| 55       | O-RING, bellows; 2.55 in. (65 mm) OD      | 1    |
| 57       | O-RING; 0.7 in. (18 mm) OD; PTFE          | 1    |
| 58       | GASKET, sanitary                          | 2    |
| 61       | O-RING                                    | 1    |
| 62       | O-RING; 2.7 in. (69 mm) OD, PTFE          | 1    |

\* These parts are included in Piston Seal Kit 17K913.

† These parts are included in Lip Seal Kit 17K753.

### Pump Repair Kit 17K762

For Sealed 1500cc Lowers: Part No. 17K658.

| Ref. No. | Description                               | Qty. |
|----------|---|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE         | 6    |
| 4*       | GASKET, cylinder                          | 2    |
| 7*       | GASKET, check valve                       | 4    |
| 11*      | SEAL, piston; ZXP                         | 1    |
| 20†      | O-RING; 1.25 in. (31 mm) OD; FX75 or CV75 | 2    |
| 21†      | SEAL, lip                                 | 1    |
| 25       | BEARING                                   | 1    |
| 35       | O-RING; 1.5 in. (38 mm) OD; PTFE          | 1    |
| 51       | SEAL, backup                              | 1    |
| 53       | BELLOWS                                   | 1    |
| 55       | O-RING, bellows; 2.55 in. (65 mm) OD      | 1    |
| 57       | O-RING; 0.7 in. (18 mm) OD; PTFE          | 1    |
| 58       | GASKET, sanitary                          | 2    |
| 61       | O-RING                                    | 1    |
| 62       | O-RING; 2.7 in. (69 mm) OD, PTFE          | 1    |

\* These parts are included in Piston Seal Kit 17K914.

† These parts are included in Lip Seal Kit 17K753.

### Pump Repair Kit 17K764

For Sealed 2000cc Lower: Part No. 17K659.

| Ref. No. | Description                               | Qty. |
|----------|---|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE         | 6    |
| 4*       | GASKET, cylinder                          | 2    |
| 7*       | GASKET, check valve                       | 4    |
| 11*      | SEAL, piston; ZXP                         | 1    |
| 20†      | O-RING; 1.25 in. (31 mm) OD; FX75 or CV75 | 2    |
| 21†      | SEAL, lip                                 | 1    |
| 25       | BEARING                                   | 1    |
| 35       | O-RING; 1.5 in. (38 mm) OD; PTFE          | 1    |
| 51       | SEAL, backup                              | 1    |
| 53       | BELLOWS                                   | 1    |
| 55       | O-RING, bellows; 2.55 in. (65 mm) OD      | 1    |
| 57       | O-RING; 0.7 in. (18 mm) OD; PTFE          | 1    |
| 58       | GASKET, sanitary                          | 2    |
| 61       | O-RING                                    | 1    |
| 62       | O-RING; 2.7 in. (69 mm) OD, PTFE          | 1    |

\* These parts are included in Piston Seal Kit 17K915.

† These parts are included in Lip Seal Kit 17K753.

### Pump Repair Kit 25U310

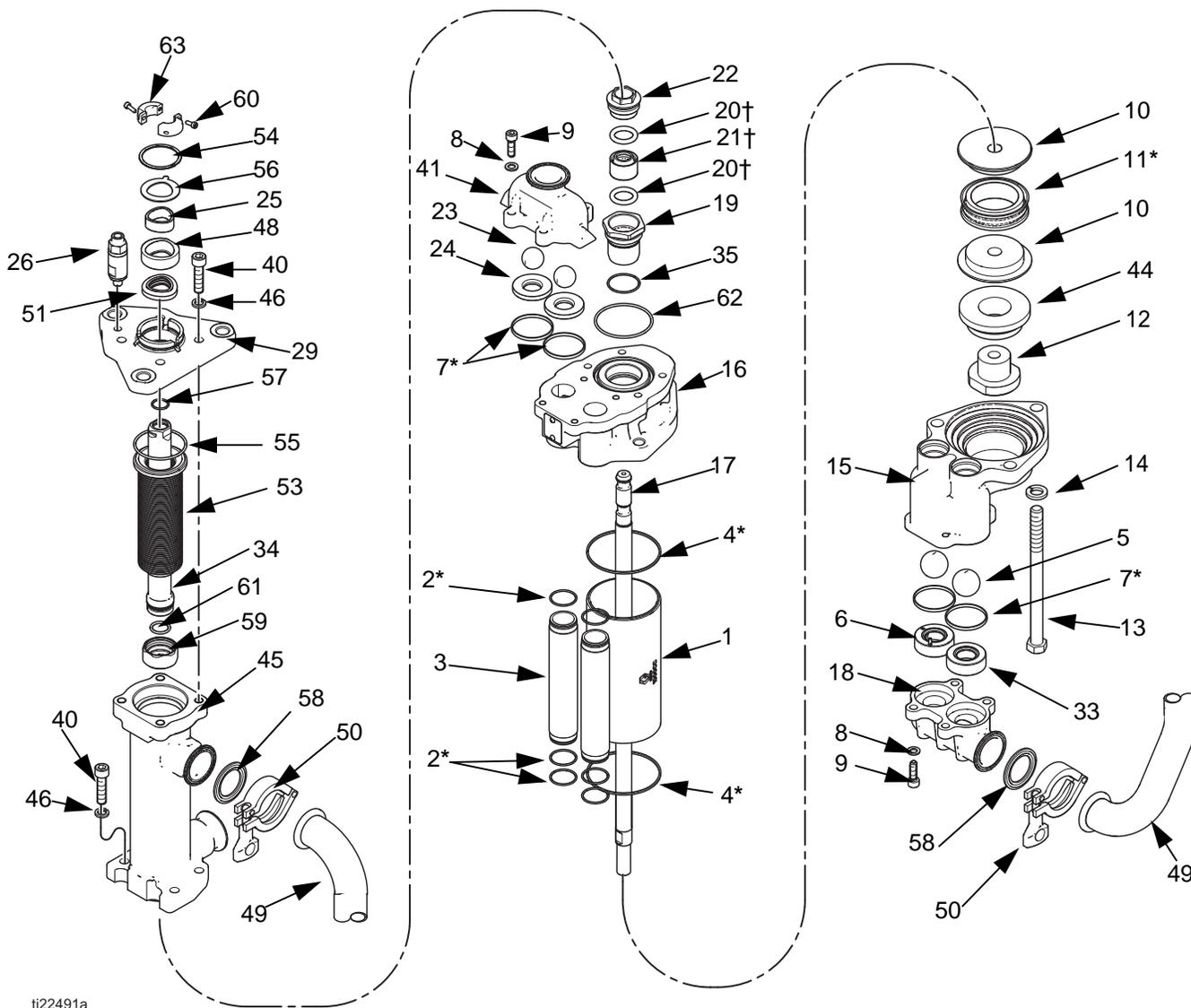
For Sealed HP 750cc Lower: Part No. 26B217 and 26B218.

| Ref. No. | Description                               | Qty. |
|----------|---|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE         | 6    |
| 4*       | GASKET, cylinder                          | 2    |
| 7*       | GASKET, check valve                       | 4    |
| 11*      | SEAL, piston; ZXP                         | 1    |
| 20†      | O-RING; 1.25 in. (31 mm) OD; FX75 or CV75 | 2    |
| 21†      | SEAL, lip                                 | 1    |
| 25       | BEARING                                   | 1    |
| 35       | O-RING; 1.5 in. (38 mm) OD; PTFE          | 1    |
| 51       | SEAL, backup                              | 1    |

| Ref. No. | Description                          | Qty. |
|----------|--------------------------------------|------|
| 53       | BELLOWS                              | 1    |
| 55       | O-RING, bellows; 2.55 in. (65 mm) OD | 1    |
| 57       | O-RING; 0.7 in. (18 mm) OD; PTFE     | 1    |
| 58       | GASKET, sanitary                     | 2    |
| 61       | O-RING                               | 1    |
| 62       | O-RING; 2.7 in. (69 mm) OD, PTFE     | 1    |

\* These parts are included in Piston Seal Kit 25U311.

† These parts are included in Lip Seal Kit 17K753.



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FIG. 2 750cc, 1000cc, 1500cc, and 2000cc Sealed 4-Ball Lowers

## Open Wet Cup Lowers

### Pump Repair Kit 17K759

**For Open Wet Cup 750cc Lowers:** Part Nos. 17K660, 17K664, and 17K668.

| Ref. | Description                       | Qty |
|------|-----------------------------------|-----|
| 2*   | O-RING; 1.25 in. (31 mm) OD, PTFE | 6   |
| 4*   | GASKET, cylinder                  | 2   |
| 7*   | GASKET, seat valve                | 4   |
| 11*  | SEAL, piston, ZXP                 | 1   |
| 19†  | GLAND, male                       | 2   |
| 20†  | V-PACKING, throat; ZX             | 5   |
| 25†  | V-PACKING, throat; leather        | 3   |
| 26†  | GLAND, female                     | 1   |
| 35†  | O-RING; 1.5 in. (38 mm) OD        | 1   |

\* Parts are included in Piston Seal Kit 17K912.

† Parts are included in Throat Repair Kit 17K754.

### Pump Repair Kit 17K761

**For Open Wet Cup 1000cc Lowers:** Part Nos. 17K661, 17K665, and 17K669.

| Ref. | Description                       | Qty |
|------|-----------------------------------|-----|
| 2*   | O-RING; 1.25 in. (31 mm) OD, PTFE | 6   |
| 4*   | GASKET, cylinder                  | 2   |
| 7*   | GASKET, seat valve                | 4   |
| 11*  | SEAL, piston, ZXP                 | 1   |
| 19†  | GLAND, male                       | 2   |
| 20†  | V-PACKING, throat; ZX             | 5   |
| 25†  | V-PACKING, throat; leather        | 3   |
| 26†  | GLAND, female                     | 1   |
| 35†  | O-RING; 1.5 in. (38 mm) OD        | 1   |

\* Parts are included in Piston Seal Kit 17K913.

† Parts are included in Throat Repair Kit 17K754.

### Pump Repair Kit 17K763

**For Open Wet Cup 1500cc Lower:** Part Nos. 17K662, 17K666, and 17K670.

| Ref. | Description                       | Qty |
|------|-----------------------------------|-----|
| 2*   | O-RING; 1.25 in. (31 mm) OD, PTFE | 6   |
| 4*   | GASKET, cylinder                  | 2   |
| 7*   | GASKET, seat valve                | 4   |
| 11*  | SEAL, piston, ZXP                 | 1   |
| 19†  | GLAND, male                       | 2   |
| 20†  | V-PACKING, throat; ZX             | 5   |
| 25†  | V-PACKING, throat; leather        | 3   |
| 26†  | GLAND, female                     | 1   |
| 35†  | O-RING; 1.5 in. (38 mm) OD        | 1   |

\* Parts are included in Piston Seal Kit 17K914.

† Parts are included in Throat Repair Kit 17K754.

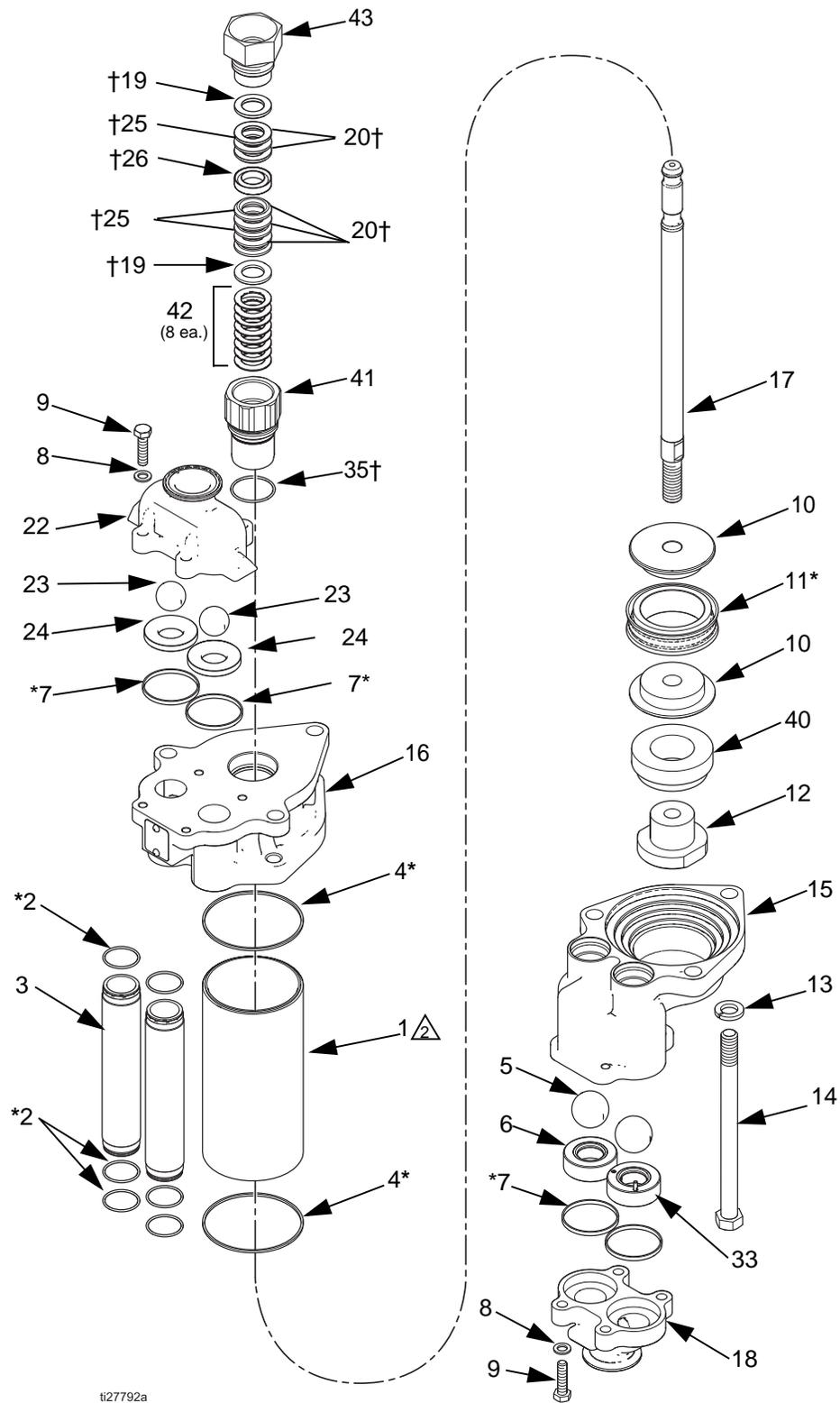
### Pump Repair Kit 17K765

**For Open Wet Cup 2000cc Lowers:** Part Nos. 17K663, 17K667, and 17K671.

| Ref. | Description                       | Qty |
|------|-----------------------------------|-----|
| 2*   | O-RING; 1.25 in. (31 mm) OD, PTFE | 6   |
| 4*   | GASKET, cylinder                  | 2   |
| 7*   | GASKET, seat valve                | 4   |
| 11*  | SEAL, piston, ZXP                 | 1   |
| 19†  | GLAND, male                       | 2   |
| 20†  | V-PACKING, throat; ZX             | 5   |
| 25†  | V-PACKING, throat; leather        | 3   |
| 26†  | GLAND, female                     | 1   |
| 35†  | O-RING; 1.5 in. (38 mm) OD        | 1   |

\* Parts are included in Piston Seal Kit 17K915.

† Parts are included in Throat Repair Kit 17K754.



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**FIG. 3 750cc, 1000cc, 1500cc, and 2000cc Open Wet Cup Lowers**

# Piston Seal Kits for All 750cc, 1000cc, 1500cc, and 2000cc Lowers

See FIG. 1 on page 3 for Enclosed Wet Cup Lowers.  
 See FIG. 2 on page 5 for Sealed 4-Ball Lowers.  
 See FIG. 3 on page 7 for Open Wet Cup Lowers.

NOTE: ★ Use PTFE seals only when required for chemical compatibility. PTFE seals may result in a reduced cycle life.

## Seal Repair Kit 16E904 Piston Seal Kit 17K912 PTFE Seal Conversion Kit 16E895

**For 750cc Lowers:** Part Nos. 24F413, 24F414, 24F415, 24F416, 24F417, 24F418, 24F420, 24F421, 24F422, 24F423, 17K656, 17K660, 17K664, and 17K668.

| Ref. No. | Description                                | Qty. |
|----------|--|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE          | 6    |
| 4*       | GASKET, cylinder                           | 2    |
| 7*       | GASKET, seat, valve                        | 4    |
| 11*      | SEAL, piston; 2.5 in.; UHMWPE (Kit 16E904) | 1    |
| 11*      | SEAL, piston; 2.5 in.; ZXP (Kit 17K912)    | 1    |
| 11*      | SEAL, piston; 2.5 in.; PTFE (Kit 16E895)★  | 1    |

## Seal Repair Kit 277360 Piston Seal Kit 17K913 PTFE Seal Conversion Kit 277361

**For 1000cc Lowers:** Part Nos. 24F424, 24F425, 24F426, 24F427, 24F428, 24F429, 24F431, 17K657, 17K661, 17K665, and 17K669.

| Ref. No. | Description                              | Qty. |
|----------|--|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE        | 6    |
| 4*       | GASKET, cylinder                         | 2    |
| 7*       | GASKET, seat, valve                      | 4    |
| 11*      | SEAL, piston; 3 in.; UHMWPE (Kit 277360) | 1    |
| 11*      | SEAL, piston; 3 in.; ZXP (Kit 17K913)    | 1    |
| 11*      | SEAL, piston; 3 in.; PTFE (Kit 277361)★  | 1    |

## Seal Repair Kit 277362 Piston Seal Kit 17K914 PTFE Seal Conversion Kit 277363

**For 1500cc Lowers:** Part Nos. 24F432, 24F433, 24F434, 24F435, 24F436, 24F437, 24F439, 17K658, 17K662, 17K666, and 17K670.

| Ref. No. | Description                                | Qty. |
|----------|--|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE          | 6    |
| 4*       | GASKET, cylinder                           | 2    |
| 7*       | GASKET, seat, valve                        | 4    |
| 11*      | SEAL, piston; 3.5 in.; UHMWPE (Kit 277362) | 1    |
| 11*      | SEAL, piston, 3.5 in.; ZXP (Kit 17K914)    | 1    |
| 11*      | SEAL, piston; 3.5 in.; PTFE (Kit 277363)★  | 1    |

## Seal Repair Kit 277358 Piston Seal Kit 17K915 PTFE Seal Conversion Kit 277359

**For 2000cc Lowers:** Part Nos. 24F440, 24F441, 24F442, 24F443, 24F444, 24F445, 24F447, 17K659, 17K663, 17K667, and 17K671.

| Ref. No. | Description                              | Qty. |
|----------|--|------|
| 2*       | O-RING; 1.25 in. (31 mm) OD; PTFE        | 6    |
| 4*       | GASKET, cylinder                         | 2    |
| 7*       | GASKET, seat, valve                      | 4    |
| 11*      | SEAL, piston; 4 in.; UHMWPE (Kit 277358) | 1    |
| 11*      | SEAL, piston; 4 in.; ZXP (Kit 17K915)    | 1    |
| 11*      | SEAL, piston; 4 in.; PTFE (Kit 277359)★  | 1    |

## Piston Seal Kit 25U311

**For HP 750cc Lowers:** Part Nos. 26B217 and 26B218.

| Ref. No. | Description           | Qty. |
|----------|-----------------------|------|
| 2*       | O-RING, #024, FX75    | 6    |
| 4*       | O-RING, 70 MM x 2 MM  | 2    |
| 7*       | GASKET, seat, valve   | 4    |
| 11*      | SEAL, piston; (750cc) | 1    |

# Throat Packing Kits for Enclosed Wet Cup and Open Wet Cup Lowers

**NOTE:** The lowers listed in this manual **must** use the throat packing kits listed below. **Do not** use kits for older-style lowers (see manual 311690) with these lowers. The throat packing gland height has changed.

See FIG. 1 on page 3 for pumps with Enclosed Wet Cup Lowers. For best results, install the TSL Pump Repair Kit 24F617 each time the throat packings are changed. See FIG. 3 on page 7 for Open Wet Cup Lowers.

**For 750cc Lowers:** Part Nos. 24F413, 24F414, 24F415, 24F416, 24F417, 24F418, 24F420, 24F421, 24F422, 24F423, 17K656, 17K660, 17K664, and 17K668.

**For 1000cc Lowers:** Part Nos. 24F424, 24F425, 24F426, 24F427, 24F428, 24F429, 24F431, 17K657, 17K661, 17K665, and 17K669.

**For 1500cc Lowers:** Part Nos. 24F432, 24F433, 24F434, 24F435, 24F436, 24F437, 24F439, 17K658, 17K662, 17K666, and 17K670.

**For 2000cc Lowers:** Part Nos. 24F440, 24F441, 24F442, 24F443, 24F444, 24F445, 24F447, 17K659, 17K663, 17K667, and 17K671.

## Kit 24F245

With leather and UHMWPE throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING; UHMWPE                 | 5    |
| 25†      | V-PACKING, leather                | 3    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE, 1.63 in. (41 mm) OD | 1    |

## Kit 24F244

With leather throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING, leather                | 8    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE, 1.63 in. (41 mm) OD | 1    |

## Kit 24F243

With PTFE throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING; PTFE★                  | 8    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE, 1.63 in. (41 mm) OD | 1    |

## Kit 17K916

## Kit 24F246

With UHMWPE and PTFE throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING; UHMWPE                 | 5    |
| 25†      | V-PACKING; PTFE★                  | 3    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE, 1.63 in. (41 mm) OD | 1    |

## Kit 17K754

With leather and ZX throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING; ZX                     | 5    |
| 25†      | V-PACKING, leather                | 3    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE, 1.63 in. (41 mm) OD | 1    |

With ZX and PTFE throat packings.

| Ref. No. | Description                       | Qty. |
|----------|-----------------------------------|------|
| 19†      | GLAND, male                       | 2    |
| 20†      | V-PACKING; ZX                     | 5    |
| 25†      | V-PACKING, PTFE★                  | 3    |
| 26†      | GLAND, female                     | 1    |
| 35†      | O-RING; PTFE; 1.5 in. (38 mm) OD  | 1    |
| 42†      | O-RING; PTFE; 1.63 in. (41 mm) OD | 1    |

★ Use PTFE seals only when required for chemical compatibility. PTFE seals may result in a reduced cycle life.

## Lip Seal Kit For Sealed 4-Ball Lowers

NOTE: See FIG. 2 on page 5.

### Lip Seal Kit 17K753

| Ref. No. | Description | Qty. |
|----------|-------------|------|
|          | O-RING      | 2    |
|          | SEAL, lip   | 1    |

## Additional Kit For Enclosed Wet Cup Lowers

NOTE: See FIG. 1 on page 3.

### TSL Pump Repair Kit 24F617

| Ref. No. | Description                                  | Qty. |
|----------|--|------|
| 45◆      | SPRING, compression                          | 1    |
| 46◆      | SEAL, piston, TSL pump                       | 1    |
| 47◆      | O-RING; fluoroelastomer; 1.88 in. (48 mm) OD | 2    |

## Additional Kit For Open Wet Cup Lowers

NOTE: See FIG. 3, page 7.

### Belleville Springs Kit 17K755

| Ref. No. | Description        | Qty. |
|----------|--------------------|------|
| 42       | SPRING, belleville | 8    |

## Additional Kit For Sealed 4-Ball Lowers

NOTE: See FIG. 2 on page 5.

### Bellows Repair Kit 17K766

| Ref. No. | Description     | Qty. |
|----------|-----------------|------|
| 25       | BEARING         | 1    |
| 51       | SEAL, backup    | 1    |
| 53       | BELLOWS         | 1    |
| 55       | O-RING, bellows | 1    |
| 57       | O-RING          | 1    |
| 61       | O-RING          | 1    |

# Complete Pump Repair Kits for 3000cc and 4000cc Lowers

**NOTE:** The lowers listed in this manual **must** use the pump repair kits listed below. **Do not** use kits for older-style lowers (see manual 311832) with these lowers. The throat packing gland height has changed.

## Pump Repair Kit 24F664

**For 3000cc Lowers:** Part Nos. 24F448, 24F449, and 24F450.

| Ref. No. | Description  | Qty. |
|----------|--|------|
| 3*       | SEAL, gasket, cylinder   | 2    |
| 5*       | SEAL; UHMWPE   | 4    |
| 15*      | GASKET, seat, valve  | 4    |
| 17*      | SEAL; UHMWPE   | 4    |
| 22*      | O-RING; PTFE encapsulated fluoroelastomer; 1.07 in. (27 mm) OD | 1    |
| 23*      | O-RING; PTFE; 2.32 in. (59 mm) OD                              | 1    |
| 25*      | PACKING, piston; 5.0 in.; UHMWPE                               | 1    |
| 30†      | V-PACKING; UHMWPE  | 6    |
| 31†      | V-PACKING; leather   | 4    |
| 32†      | GLAND, female  | 1    |
| 33†      | GLAND, male  | 2    |
| 35◆      | SPRING, compression  | 1    |
| 36◆      | SEAL, piston, TSL pump   | 1    |
| 51◆      | O-RING; fluoroelastomer; 2.25 in. (57 mm) OD                   | 2    |
| 52†      | O-RING; PTFE; 1.75 in. (44 mm) OD                              | 2    |

\* These parts are included in Seal Repair Kit 243728.

† These parts are included in Throat Packing Repair Kit 24F247.

◆ These parts are included in TSL Pump Repair Kit 24F618.

## Pump Repair Kit 24F665

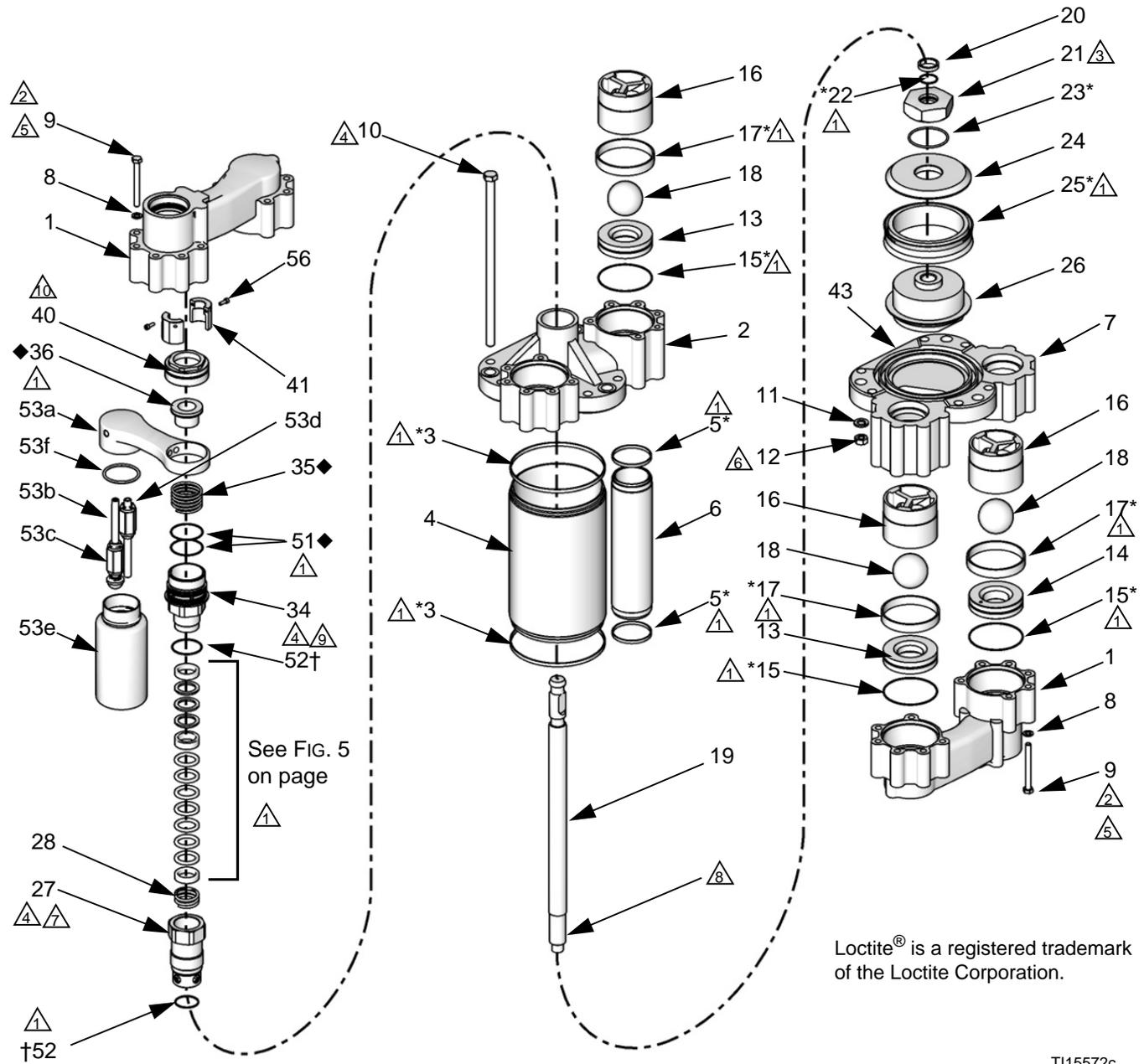
**For 4000cc Lowers:** Part Nos. 24F451, 24F452, and 24F453.

| Ref. No. | Description  | Qty. |
|----------|--|------|
| 3*       | SEAL, gasket, cylinder   | 2    |
| 5*       | SEAL; UHMWPE   | 4    |
| 15*      | GASKET, seat, valve  | 4    |
| 17*      | SEAL; UHMWPE   | 4    |
| 22*      | O-RING; PTFE encapsulated fluoroelastomer; 1.07 in. (27 mm) OD | 1    |
| 23*      | O-RING; PTFE; 2.32 in. (59 mm) OD                              | 1    |
| 25*      | PACKING, piston; 5.75 in.; UHMWPE                              | 1    |
| 30†      | V-PACKING; UHMWPE  | 6    |
| 31†      | V-PACKING; leather   | 4    |
| 32†      | GLAND, female  | 1    |
| 33†      | GLAND, male  | 2    |
| 35◆      | SPRING, compression  | 1    |
| 36◆      | SEAL, piston, TSL pump   | 1    |
| 51◆      | O-RING; fluoroelastomer; 2.25 in. (57 mm) OD                   | 2    |
| 52†      | O-RING; PTFE; 1.75 in. (44 mm) OD                              | 2    |

\* These parts are included in Seal Repair Kit 243729.

† These parts are included in Throat Packing Repair Kit 24F247.

◆ These parts are included in TSL Pump Repair Kit 24F618.



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TI15572c

- △1 Apply lubricant to all packings and seals.
- △2 Apply removable (blue) Loctite® 243 to entire length of threads.
- △3 Torque to 200-210 ft-lb (270-285 N•m).
- △4 Apply thread lubricant.

- △5 Torque to 18-20 ft-lb (24-27 N•m).
- △6 Tighten uniformly until cylinder is seated then torque to 60-65 ft-lb (81-88 N•m).
- △7 Torque to 95-100 ft-lb (129-135 N•m).

- △8 Apply high strength (red) Loctite® 263 or 2760 to entire length of threads. Sealant must be allowed to cure for a minimum of 12 hours before use.
- △9 Torque to 70-75 ft-lb (95-102 N•m).
- △10 Torque to 25-30 ft-lb (34-40 N•m).

Fig. 4. 3000cc and 4000cc Enclosed Wet Cup Lower

# Seal Kits for All 3000cc and 4000cc Lowers

## Piston Seal Kits

**NOTE:** See FIG. 4 on page 12.

### Seal Repair Kit 243728 PTFE Seal Conversion Kit 235855

**For 3000cc Lowers:** Part Nos. 24F448, 24F449, and 24F450.

| Ref. No. | Description  | Qty. |
|----------|--|------|
| 3*       | SEAL, gasket, cylinder   | 2    |
| 5*       | SEAL; UHMWPE   | 4    |
| 15*      | GASKET, seat, valve  | 4    |
| 17*      | SEAL; UHMWPE   | 4    |
| 22*      | O-RING; PTFE encapsulated fluoroelastomer; 1.07 in. (27 mm) OD | 1    |
| 23*      | O-RING; PTFE; 2.32 in. (59 mm) OD                              | 1    |
| 25*      | PACKING, piston; 5.0 in.; UHMWPE (Kit 243728)                  | 1    |
| 25*      | PACKING, piston; 5.0 in.; PTFE (Kit 235855)★                   | 1    |

### Seal Repair Kit 243729 PTFE Seal Conversion Kit 235854

**For 4000cc Lowers:** Part Nos. 24F451, 24F452, and 24F453.

| Ref. No. | Description  | Qty. |
|----------|--|------|
| 3*       | SEAL, gasket, cylinder   | 2    |
| 5*       | SEAL; UHMWPE   | 4    |
| 15*      | GASKET, seat, valve  | 4    |
| 17*      | SEAL; UHMWPE   | 4    |
| 22*      | O-RING; PTFE encapsulated fluoroelastomer; 1.07 in. (27 mm) OD | 1    |
| 23*      | O-RING; PTFE; 2.32 in. (59 mm) OD                              | 1    |
| 25*      | PACKING, piston; 5.75 in.; UHMWPE (Kit 243729)                 | 1    |
| 25*      | PACKING, piston; 5.75 in.; PTFE (Kit 235854)★                  | 1    |

★ Use PTFE seals only when required for chemical compatibility. PTFE seals may result in a reduced cycle life.



## TSL Pump Repair Kit 24F618

**NOTE:** See FIG. 4 on page 12.

| Ref. |  |      |
|------|--|------|
| No.  | Description                                  | Qty. |
| 35◆  | SPRING, compression                          | 1    |
| 36◆  | SEAL, piston, TSL pump                       | 1    |
| 51◆  | O-RING; fluoroelastomer; 2.25 in. (57 mm) OD | 2    |

## California Proposition 65

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