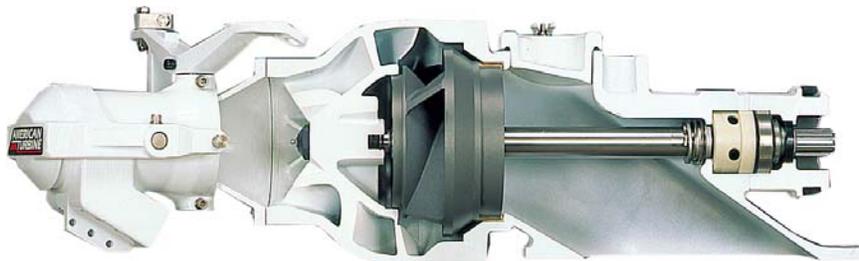


THE POWER IS IN THE PUMP!



SD-309 OVERHAUL MANUAL



AMERICAN TURBINE

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There are three basic sub assemblies that will be done prior to final assembly

1. Bowl Assembly
2. Shaft Assembly
3. Suction Assembly

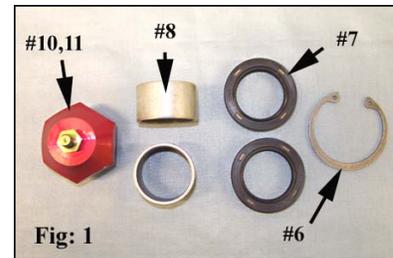
1. Bowl Assembly

Parts:

- Fig: 1&2
- SC 9301 bowl
- B 1502 bowl bearings
- SL 2003 bowl seals
- SC 9201 bowl snap ring
- SC 9001 bowl plug

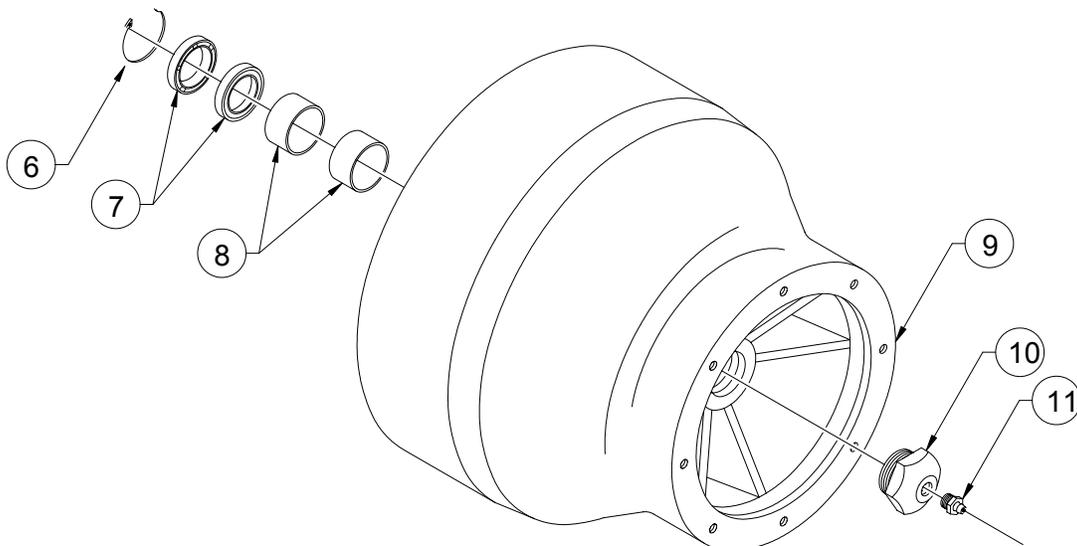
Tools:

- Press
- Bearing mandrel (special tool can be purchased from AT)
- Seal mandrel (special)
- Dead blow hammer
- Snap ring pliers
- WD 40 spray type



Pump bowl assembly

Set #9 bowl (SC 9301)(Fig: 2) large end up, on press. Spray WD 40 into seal/bearing bore. Slide #8 bowl bearings (B 1502) on mandrel. Start into bearing bore much the same as driving a nail. Lightly tap with dead blow hammer. Next use press to seat bearings, press bearings in until flush with casting. Remove mandrel. Next, slide on #7 bowl seal (SL 2003) onto seal mandrel, so that the spring side of seal is facing large end of bowl, tap into seal bore with dead blow till seated, do the same with the second seal. Next take #6 snap ring (SC 9201) run thumb over both sides, the flat side faces the large end of bowl. Using snap ring pliers carefully seat into groove in seal bore. Finally, check by inserting shaft.



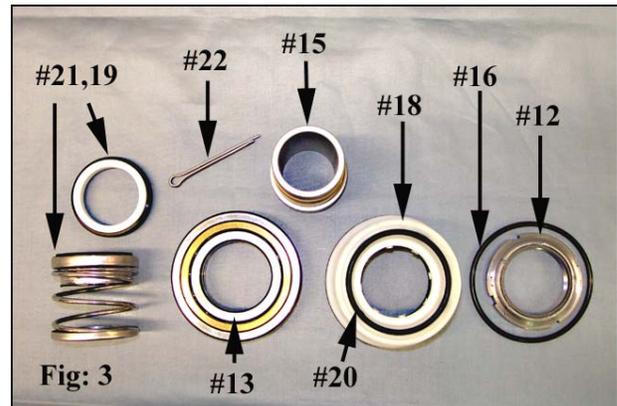
2. SD SHAFT ASSEMBLY

Tools:

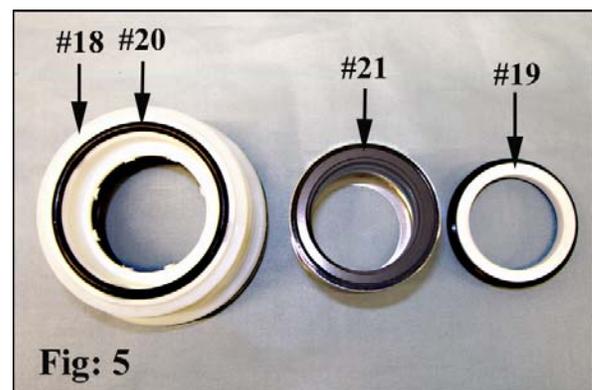
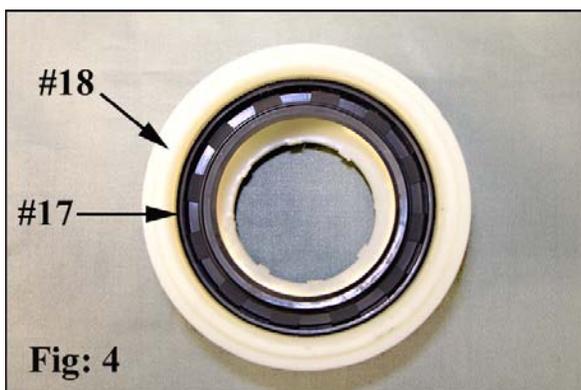
Press
Press plate (special)
Snap ring pliers
Lock collar for bearing sleeve
1/2 " torque wrench
Hugger nut socket or wrench
Seal arbor hand press (special)
Seal arbor hand press (ceramic) (special)
Needle nose pliers

Other:

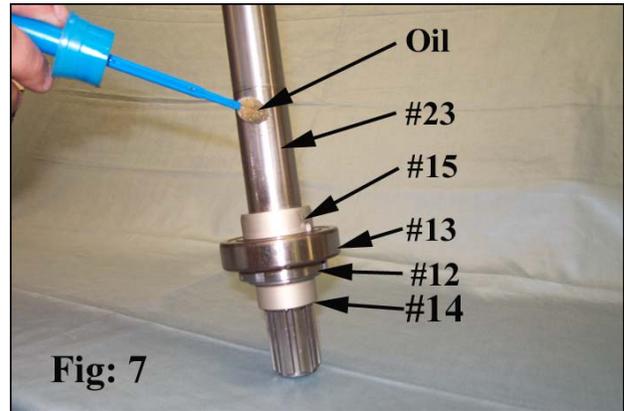
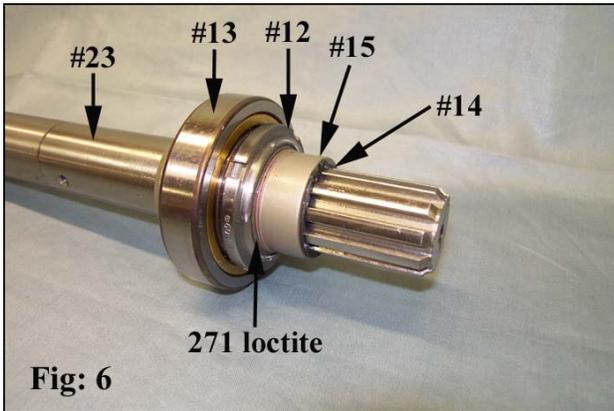
WD 40
Lock tite
Lock tite activator
Oil
454 super glue
Cotton like swabs / Q-tips



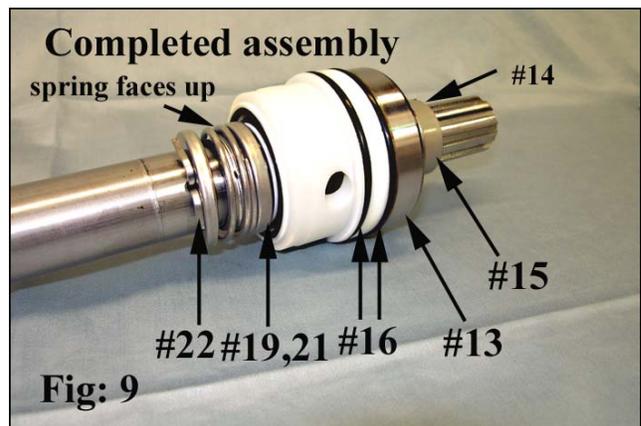
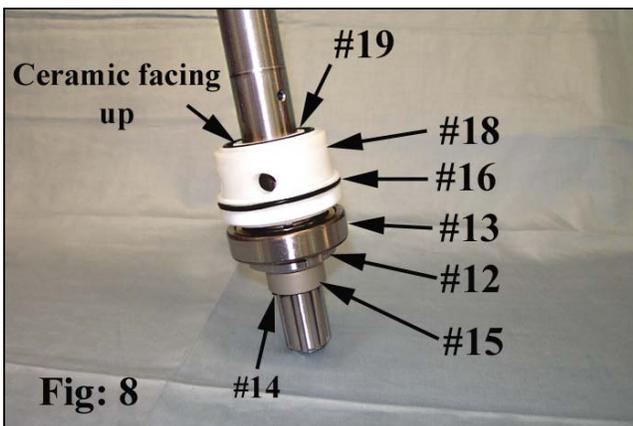
We begin by assembling #18 seal face housing (SH 5201)(Fig: 3). This allows super glue to dry before actual shaft assembly. Place seal face housing, large end up in hand arbor press. Take #17 seal face seal (SL 1201)(Fig: 4) lube outside of seal with swab dipped in WD-40. Press into large end of housing, spring side of seal face up. Turn seal face housing over. Locate groove for #20 seal face O-ring (O 3401)(Fig: 5) place 3 drops of 454 super glue at 12 o'clock, 4 o'clock, & 8 o'clock in groove. Carefully set O-ring into groove, careful not to get glue on top side of O-ring. Next take #19,21 mechanical seal (SL 4008) separate (careful ceramic is like glass) #19 from #21. Place seal face housing on hand arbor press. Again, the large end of the housing is down. Lube outside of #19 ceramic seal with WD-40 (careful do not allow any foreign substance on ceramic face of this seal). Align seal to the seal bore in housing #18 & with mandrel on hand press. Carefully seat ceramic facing up (careful - too much pressure will crack the seal, you can use foam or a rag to protect seal). Examine that the seal is evenly seated in housing.



Take #23 shaft (SH 1207)(Fig: 6) spray splined end with WD-40. Slide on #15 bearing sleeve (SH 5001) large end first. Place this end down in hydraulic press on custom-built press plate (special AT tool see back page). Press on to shaft shoulder. Next place this end up on shaft stand (special AT tool see back page). Spray WD-40 on bearing sleeve threads. Next install #13 bearing (B 1101) on sleeve (Careful - bearing may try to separate - hold together with fingers) visually inspect that bearing is seated flush to bearing sleeve shoulder. Install #14 snap ring (SH 1507) in groove on shaft. Place shaft into bearing sleeve holder (special AT tool). Spray threads with 7471 lock tite primer. Take #12 bearing sleeve nut (SH 5101) place 1 drop of 271 lock tite on thread. Start nut on bearing sleeve, threaded end first, quickly, take (specialty tool see back page) socket & torque to 95 lb. Remove shaft assembly & place spline end down in shaft stand (specialty tool).



To aid in installing the mechanical seal and the seal face housing lube shaft from bearing sleeve up (Fig: 7) approximately 5" on shaft with oil. Now slide (large end down) with the ceramic facing up #18 seal face housing assembly down shaft from threaded end, until contacts bearing (Fig: 8) Be careful not to chip on shaft shoulder or contaminate ceramic seal surface. Next slide with the spring side up #21 mechanical seal (SL 4008) down the shaft until it squarely contacts the other half of seal #19. Now using your hand, compress the spring & spring seat. Slide #22 cotter pin (F12CP) (Fig: 9) through shaft hole. Take pliers and bend legs of cotter pin around shaft. Flip shaft over test seal by grasping holes in #18 and pulling down ward. The seal housing should return to its original position upon being released. Finally take #16 bearing housing oring (O 3301) and install in groove formed between large end of #18 seal face housing and #13 thrust bearing. Careful be sure O ring does not become wedged between these parts but seats in the groove only! Watch for this condition upon installation into suction housing. Notice there are two #16 (O 3301) in Fig: 9. SD-309 models manufactured before May 2001 will not use the second O ring on #18. Shaft assembly is complete and should be kept free of contaminants until installation into the suction housing.

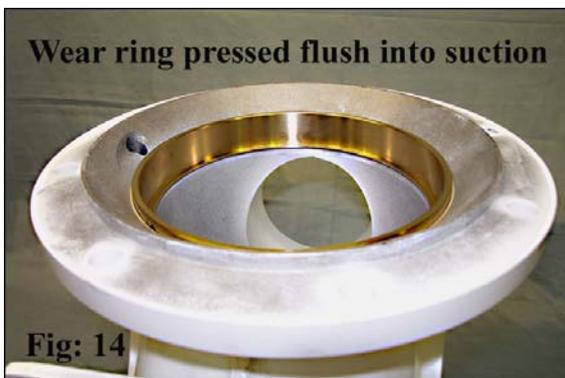
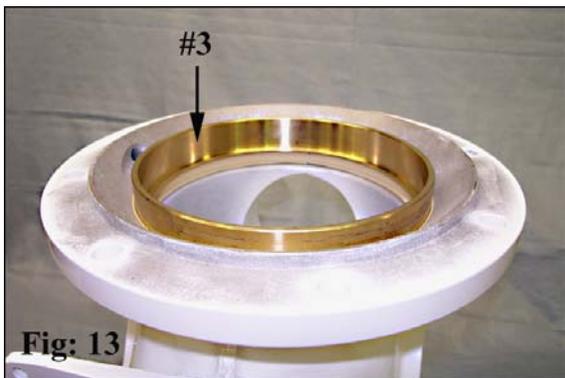
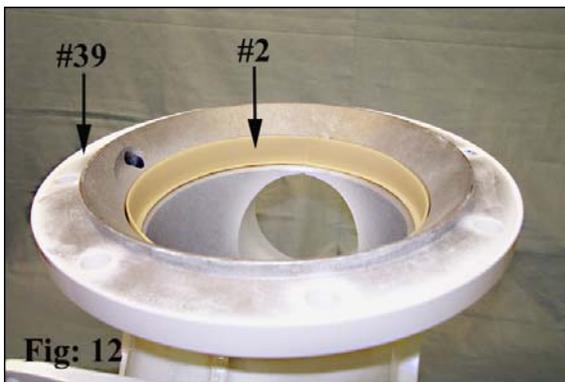


3. SUCTION ASSEMBLY

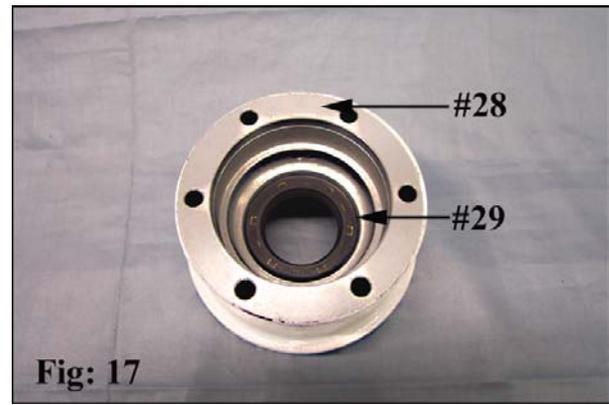
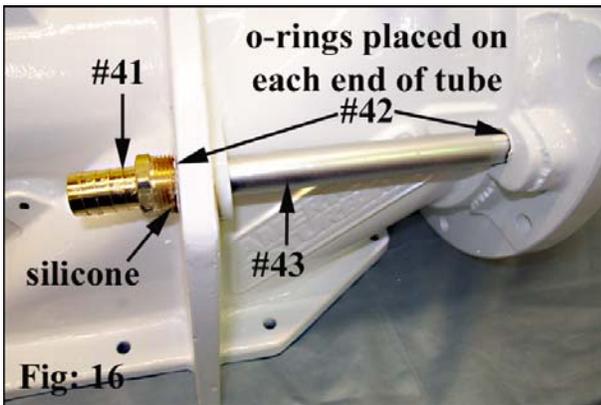
Tools:

- Hydraulic press
- Suction fixture (special)
- Wear ring install plate (special)
- Hand press (bearing cap seal arbor)
- Suction stand (special)

Place #39 suction (SC 1301)(Fig: 12) on fixture in hydraulic press. Coil #2 wear ring insulator (WR 6004) to tight coil, then release. Place into suction wear ring bore, lip down (Fig: 12). Spray liberally with WD-40. Next place #3 wear ring (WR 5000) chamfered end down, into insulator, (Fig: 13) carefully start squarely by hand. (Note: toss W.R. in freezer over night and it installs easier.) Next set wear ring install plate (Fig 15) in wear ring. You can substitute the press plate for an old impeller. Presses in square to surface of bowl register $\pm .004$. Check for trueness with dial indicator or calipers (Fig: 15).



Next place large end down on suction stand, place #42 O-ring (O 3201) on each end of #43 water tube (SC 4401)(Fig: 16). Lube O rings with WD-40. Next take #41 barbed connector and lay a bead of silicon (RTV) around circumference of threads. Insert coolant tube into large end of barbed connector. Then thread into suction port side, being sure bottom of coolant tube does not bind as it enters coolant port of suction/bowl flange.



Next take #28 bearing housing (SC 2101) (Fig: 17) place it, machined end up on hand arbor press. Take #29 bearing housing seal (SL 1101) and lube outside circumference with WD-40. Align with seal bore in bearing housing install, spring side down (i.e. towards front of pump) visually inspect that seal is completely seated against seal bore shoulder.

FINAL ASSEMBLY OF COMPLETE UNIT

1. Shaft to suction
2. Install impeller
3. Install bowl and plug
4. Lube
5. Hand hole cover

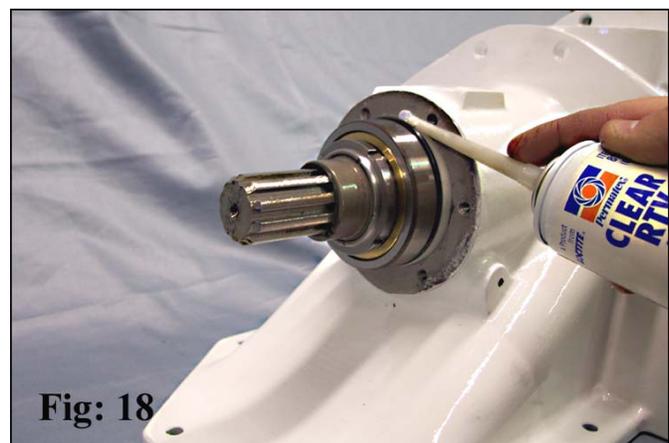
1. Shaft to Suction

Tools:

- Suction stand (special)
- Soft face mallet
- 5/16 socket and 25 ft. torque wrench
- 5/16 speed wrench
- Hand vacuum pump with gauge

Other:

- Silicone
- WD-40



Place suction assembly, large end down on stand. Carefully insert shaft assembly, threaded end first, into suction until O-ring/seal face housing seat squarely into suction. Occasional soft face mallet may be used to help seat fully CAUTION: be careful not to wedge O-ring between seal face housing and thrust bearing. Next, take bearing housing and lube seal with WD-40. Lay a bead of silicone around seal face housing/suction (Fig: 18)(NOTE: JETS WITH SERIAL NUMBERS GREATER THAN 26292, 4/11/01 USE ORING SEAL RATHER THAN SILICONE).

Now squarely slide bearing housing on shaft, over seal face housing unit it mates to suction (may need to gently tap with soft face mallet). Insert (6) bolts and lock washers (F28CS and F20LW) hand tighten in a criss cross pattern. Next use 25 lb torque wrench again using a criss cross pattern. At this point you can use a vacuum gauge to test the Mechanical seal (Optional). Pump up the gauge, a properly installed seal will hold a vacuum and slowly bleed off.

2. Installing Impeller

Tools:

- Pump Stand (special)
- 1/2" torque wrench
- 1 13/16" socket (special)
- .030" feeler gauge
- Spline lock wrench (special)

Other:

- Key
- Shims
- Impeller
- Lock nut

**SEE PAGES 10 & 11 FOR
DETAILED INFORMATION**

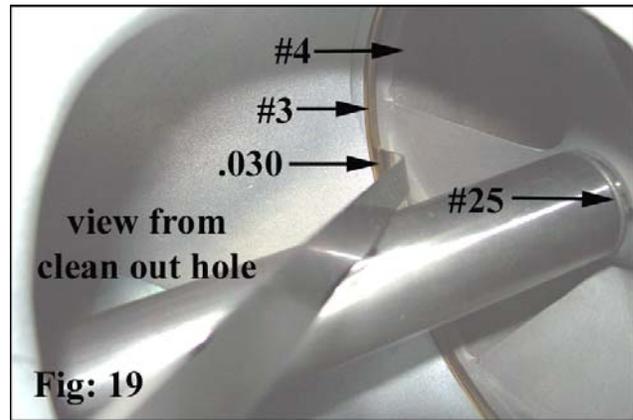
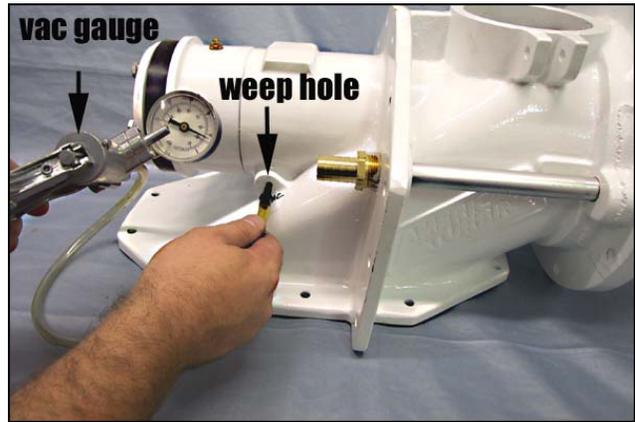


Fig: 19

Place suction assembly on bench and fasten down. Slide .080 on shaft, then try #4 impeller (IM ****)(Fig: 19). Lifting slightly on end of shaft so the impeller will enter wear ring. Push impeller snug against front of shaft. Insert feeler gauge .030 between impeller and #3 wear ring (WR 5000). Adjust shims as necessary to obtain proper gap (CAUTION: too little gap will cause possible damage to pump-to much gap will cause a loss of performance). Next, remove impeller, leaving shims on shaft. Rotate shaft so key way faces up. Install #24 key (SH 3007) apply anti seize to key and threads on shaft. Slide impeller on shaft unit it seats firmly against #25 shims (K 4007) and shaft shoulder. Use spline lock wrench (see special tools on back page) to hold shaft or pipe wrench through clean out hole (do not use pipe wrench on splines) (Fig: 21-W). Start impeller #5 lock nut (SH 3507)(Fig: 21) threads first onto shaft threads. Tighten to approximately 80 FT LB with either socket or offset wrench 1 13/16".(see special tools on back page) Install #1 bowl O-ring (O 3101) give it a little stretch, then install on outer lip of suction bowl register.

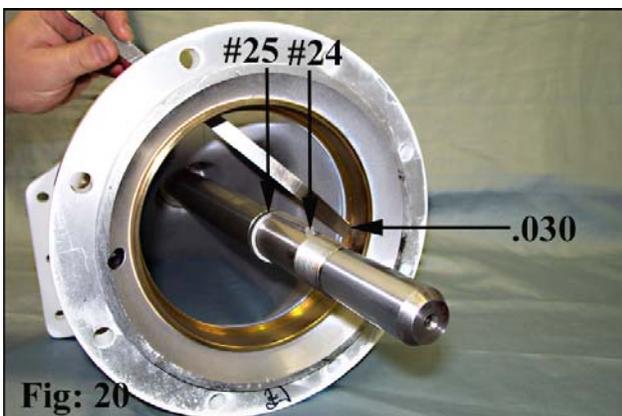


Fig: 20

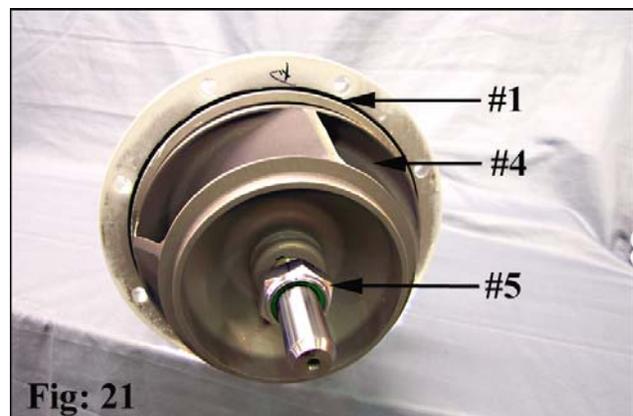


Fig: 21

3. Installing bowl and plug

Tools:

- Pump stand
- 3/4" ratcheting wrench
- 3/4" 1/2" torque wrench
- 1 1/2" socket (bowl plug)
- 1/2" ratchet
- 7/16" wrench (grease zert)
- Hand spinner-spline



Place bowl small end down on bench. Squeeze one pump of grease (SFR) from grease gun on inside of bowl seals. Next anti-seize #40 bowl bolts (8) (F41CS). Slide the bowl onto the shaft, be careful not to fold the seal lip inward. Rotate drain hole towards bottom of pump unit. Hand start the 8 bowl bolts, then finger tighten. Tighten bolts in a criss cross pattern then torque to 55ft. lb. Screw #11 grease zert (SC 8901) into # 10 bowl plug (SC 9001) using 7/16" wrench. Then install bowl plug into bowl. At this point use hand spinner (see special tools on back page) on pump spline end, spin pump while listening through clean out hole for any unusual noises. A hand spinner can be substituted for a yoke or something else to rotate the shaft of the pump.

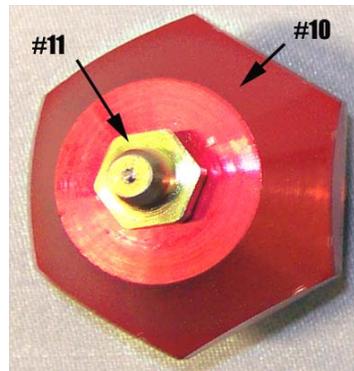
4. Lube jet unit

Tools:

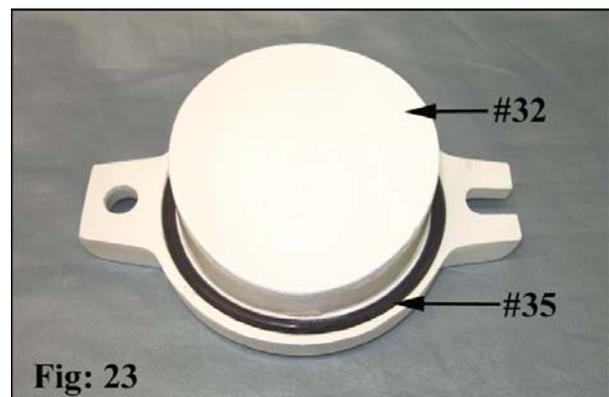
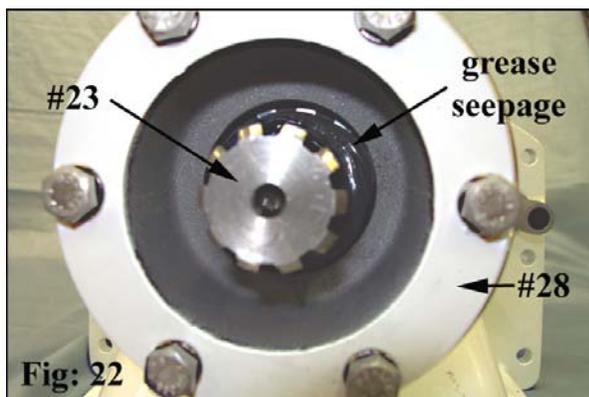
- Grease gun
- Hand spinner tool

Other:

- Grease (SFR) or other AT approved grease



Grease bowl plug zert with approximately 10 pumps. Next move to zert located on top of bearing cap. Slowly rotate shaft while you fill this zert. Look into spline end of pump at the seal. After 45-65 pumps you will see grease beginning to seep past the seal (Fig: 22). Seepage should be even around the shaft. .



5. Installing hand hole cover

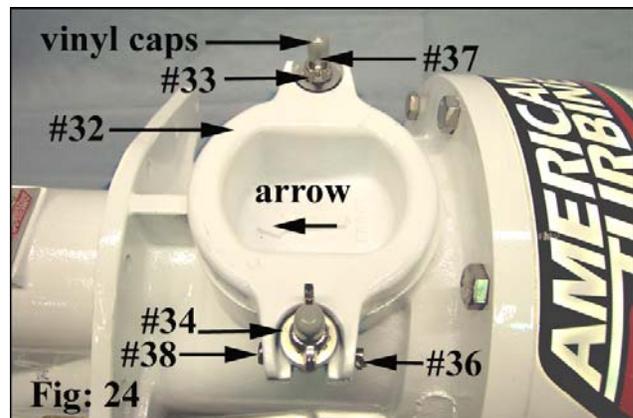
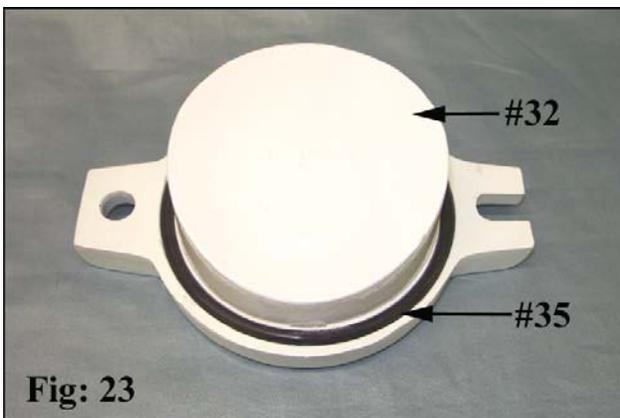
Tools:

needle nose pliers

Other:

super glue

If you are replacing the hand hole cover O ring take the #32 hand hole cover (SC 1701)(Fig: 23) and lay it up side down on bench. Super glue (1 drop) at 3 equally spaced points around the O ring groove. Next take #35 O ring (O 1002) and hand stretch slightly, then seat in groove in hand hole cover. Position hand hole cover on pump watch the arrow on cover and match the contour to that of the pump. Slide threaded end of eye bolts through slot and hole in cover. Next install #34 machined washer (F30MW) lock washer (F30ET) and #33 wing nut (F30WN) tighten evenly, hand tight. Top off with vinyl caps.



JET ASSEMBLY IS NOW COMPLETE

Care for you jet:

You will need to grease your main thrust bearing every 30 hrs with approx 15 pumps of SFR, Mobil 1or Valvoline synthetic grease. Grease the bowl every 60 hrs and pump until you feel pressure. Avoid sand or silty waters. Do not run up or back off of beaches. You will need to replace your wear ring every 200 hrs. On the impeller keep your leading edge blades sharp. If you follow these guidelines your jet shall last you a lifetime.