

## Helpful hints



- Stay organized—a messy shop is dangerous and inefficient.
- Keep loose components together
- It is important to not mix wheel-end components – bearings are “mates” that wear together. This includes new bearings.



- Do not use chisels, impact wrenches and torches
- Do not use hammers directly on seals or bearings



Do not use compressed air. After cleaning, dry with a clean paper towel or a clean rag. Air jets cause small abrasive particles to become jammed in between the bearing surfaces.



Bearings must be cleaned for inspection and re-use. Use only clean solvents—effectiveness of solvent in removing old lubricant depends on how clean the solvent is.

Good cleaning requires proper equipment such as:

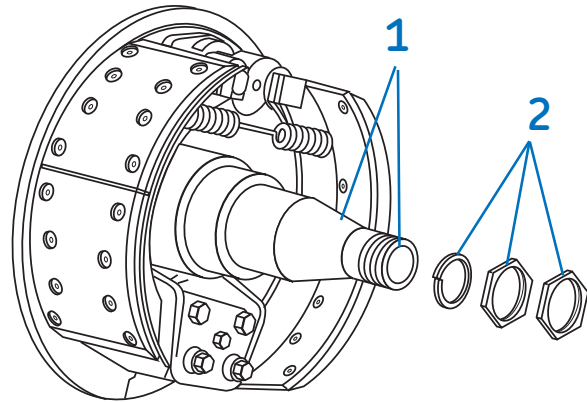
- Solvent bath
- A filter system and regular changes of the solvent and the filters

# Inspection of the spindle and hub

## 1. Inspect the spindle and spindle threads for damage, and remove light fret. Also check for the following:

- Spalling
- Corrosion pits
- Discoloration from overheating
- Punch marks / chisel marks
- Weld beads
- Upset metal

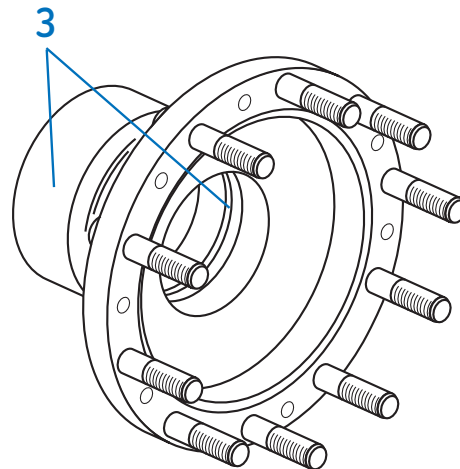
Note: Damaged threads can be repaired using a pitch thread file or die nut.



## 2. Inspect the fastener / Locknut / Bearing adjustment nut / Washer

(The use of these spindle end components varies by truck or trailer manufacturer)

Look for chisel marks or other deformation as a sign of improper installation, or an attempt to make temporary repairs.



## 3. Inspect the inside and the outside of the hub. Look for the following:

- Broken fasteners / bolts
- Cracks in the housing
- Damage to the hub and bore

Note: If the bearing cup is loose in the hub, this indicates a serious condition and the hub must be replaced.

**WARNING:** Never work under a unit supported by only a jack. Always support the vehicle with stands. Block the wheels and make sure the unit will not roll before releasing brakes. Always wear eye protection.

# The SRT-1 seal removal tool

U.S. Patent No. 5,617,621

The SKF SRT-1 Seal Removal Tool is recommended for removal of most tractor, truck, dolly or trailer wheel seals. With the wheel hub assembly removed from the axle, simply insert the hook tip of the tool between the seal and bearing. The unique design of the tool allows you to use leverage to easily and safely remove the seal, without damaging the spindle.



Simple design, rugged construction and ergonomic features increase your productivity and eliminate costly bearing damage.

- Saves time — no more laborious prying against bearings or driving out seals.
- Saves bearings — tool grabs seal only and bearings go undamaged.
- Easy to use — wedges and long handle provide exceptional leverage.
- Rubber grip for security in handling.
- Heavy duty construction for long life and dependability.
- Works with steer, drive, and trailer wheel seals.
- Seal is removed intact allowing for proper seal inspection, and failure analysis if required.

**WARNING:** Do not add a handle extension to the tool. This tool is to be used for seal removal only.

# Bearing and seal installation

## General instructions

Wheel hub designs differ from one manufacturer to another. However, the correct procedures for installing bearings and seals remain basically the same. Care in handling components and proper tooling are always the critical factors in all procedures which lead to Trouble-Free Operation.

## Oil lubricated wheel-ends



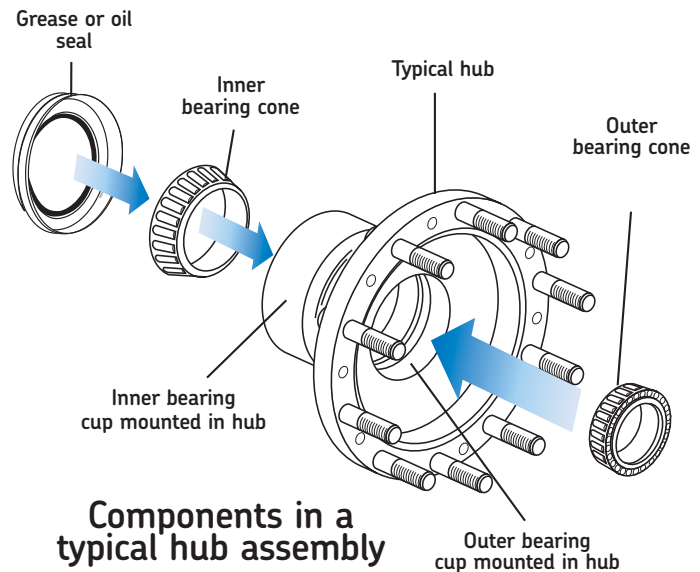
Coat the bearing cones with a light oil film before inserting them into the bearing cups. Always use the specified oil for replacement and do not mix lubricants.

## Installing bearing cup and seal

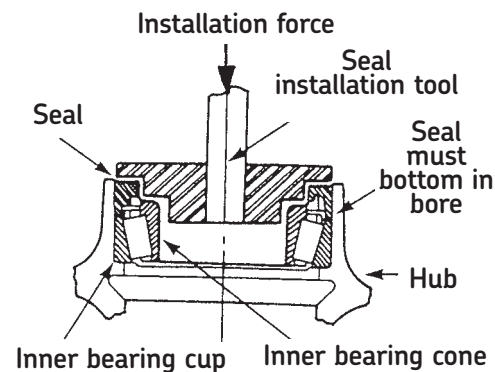
Avoid any direct hammering on the bearing or the seal – this will cause deformation or damage, which will result in premature failure. Use a simple vertical press to push the bearing cup into correct position in the hub.

Use a recommended seal installation tool to set the seal correctly in the hub. When hammering on the tool, be sure to stop when the seal is “bottomed.” Do not add extra blows or it will cause immediate damage to the seal.

Note: if the tire is mounted on the hub, place the entire assembly against a solid surface at a 45° angle before final setting.



Components in a typical hub assembly



## Installation procedures: Scotseal® PlusXL

This seal is hand installable. No special tools are required.

**Caution: Do not install the Scotseal® PlusXL directly onto the spindle.**

Place the hub (wheel) assembly flat or at least a 45° angle for seal installation.

1. Pre-lube the inner bearing cone with the lubricant that is being retained and place it into the hub.
2. Lightly lubricate the seal O.D. and I.D. evenly with the fluid that is being retained. Also apply a thin layer of oil on the hub bore that the seal is being pressed into. NEVER INSTALL DRY.
3. Press the seal by hand evenly into the bore. A rubber mallet or other soft-faced tool may be used to gently tap the seal into place. Be sure that the seal is evenly seated and bottomed in the bore. As in any seal installation, apply an even driving force to avoid cocking the seal or damaging the flange surface.
4. Allow seal to set for about 5 minutes prior to installing hub assembly onto spindle.



Lightly lubricate the OD and ID with the fluid being retained.



A rubber mallet may be used to tap into place.



Press the seal into the bore evenly by hand.

**Caution: Install a new seal if the seal is cocked or damaged during or after installation.**

## Installation procedures:

### Scotseal® Classic / Scotseal® Longlife



**Caution: Do not install the Scotseal® directly onto the spindle.**

Place the hub (wheel) assembly against a solid surface or bench at a 45° angle for seal installation. This aids in centering the bearing and seal in the hub bore. Clean bore of any particles, rust or grease.

1. Pre-lube the inner bearing cone with the lubricant that is being retained and place it into the hub.
2. Place the **Scotseal® Classic** or **Scotseal® Longlife** into the hub bore and insert the tool assembly with centering plug into the seal. Note: Be sure to wear proper eye protection.
3. Hold the tool handle firmly and straight, and drive the seal with firm hammer strokes until the seal is squarely seated. Continue driving the seal into the hub until the sound of impact changes.
4. After the seal is bottomed in the bore, check for freedom of movement by manually moving the packing of the seal up and down. Ensure that the inner bearing rotates freely.

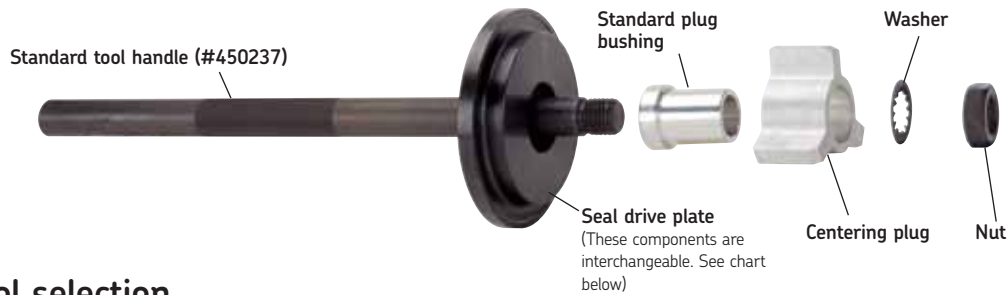
**Caution: Install a new seal if the seal is cocked or damaged during or after installation.**

# The Scotseal® toolboard

- Keeps tools orderly and lessens chances of tools being misplaced or damaged
- Sturdy metal construction — mounts easily on shop wall
- Fitting chart included
- Just order Part No. TB-1



## Installation tooling: Scotseal® Classic / Scotseal® Longlife



### Tool selection

SKF Scotseal® Classic and Scotseal® Longlife are to be installed using only SKF Scotseal® installation tools. (See Chart A below)

### Centering the seal

Precisely matched centering plugs are engineered to fit within the inside diameter of the inner bearing cone and allow accurate centering of the Scotseal in the bore of the hub, as well as preventing cocking of the seal. Chart B below provides correct matchup of bearing cone and centering plug.

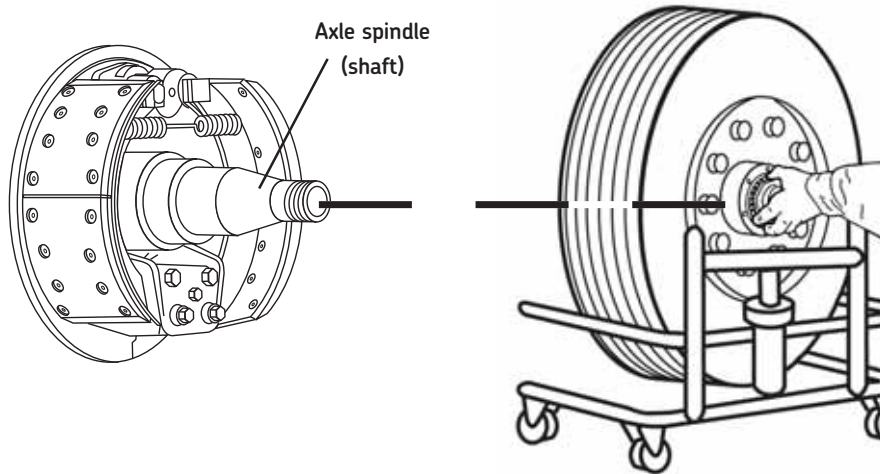
Bearing cone no.	Centering plug no.	Bearing cone no.	Centering plug no.	Bearing cone no.	Centering plug no.
495AX	708	749	719	39585	704
497	711	749A	710	42688	708
539	701	749S	719	45284	700
555S	702	756A	709	45285	700
557A	703	758	711	47678	708
559	704	759	712	47685	710
560	706	760	717	47686	710
567	707	776	715	47687	710
568	731	780	718	52400	718
575	708	3778	730	52401	718
580	710	3982	704	JH217249	719
582	710	3984	706	JM205149 A	722
593	712	4595	701	JM207049 A	723
594	715	5557	721	JM511946	724
594A	715	5760	708	JM716649	719
595	710	6379	705	JM718149	713
596	711	6386	706	JM719149	733
598	714	6386A	706	HM212044	703
598A	714	6389	706	HM212046	704
639	704	6461	708	HM212047	704
641	706	6461A	708	HM212049 X	706
659	708	6559	710	HM212049	706
663	710	6580	712	HM215249	707
663A	710	28995	703	HM218248	713
664	732	33281	716	HM516449	710
665	711	33287	707	HM518445	712
665A	711	33895	701	H715345	716
68LA	714	39578	701		
683	715	39580	702		
687	718	39581	702		

<b>427</b>	<b>441</b>	<b>451</b>	<b>463</b>
34387	40086	46305	27438
36274	40090	46306	28758
36285	<b>445</b>	46308	28820
36358	39380	<b>452</b>	28832
36365	39420	42623	<b>465</b>
<b>428</b>	39425	42624	43752
31175	42550	42630	43764
31244	42672	42631	43765
31264	42800	<b>453</b>	43800
31266	<b>446</b>	50190	<b>472</b>
31281	43860	52660	39380
31307	43865	52664	(w/disc
32470	43875	<b>457</b>	brks.)
<b>435</b>	46390	40040	<b>474</b>
47690	47483	40136	52658
47693	48297	40139	<b>484</b>
47696	48298	40146	44922
47697	48690	40147	44964
47698	48792	<b>461</b>	45010
48000	48794	45152	45099
<b>436</b>	48796	45160	45100
34975	48884	45162	45103
35000	50124	45163	45108
35001	<b>448</b>	<b>462</b>	450737
35060	38709	38747	42625
35066	39988	38750	
35072	39990	38780	
35075	<b>449</b>	38782	
35102	47686	38783	
35103			

## Installing hub assembly

### Do not attempt to install the hub assembly by hand!

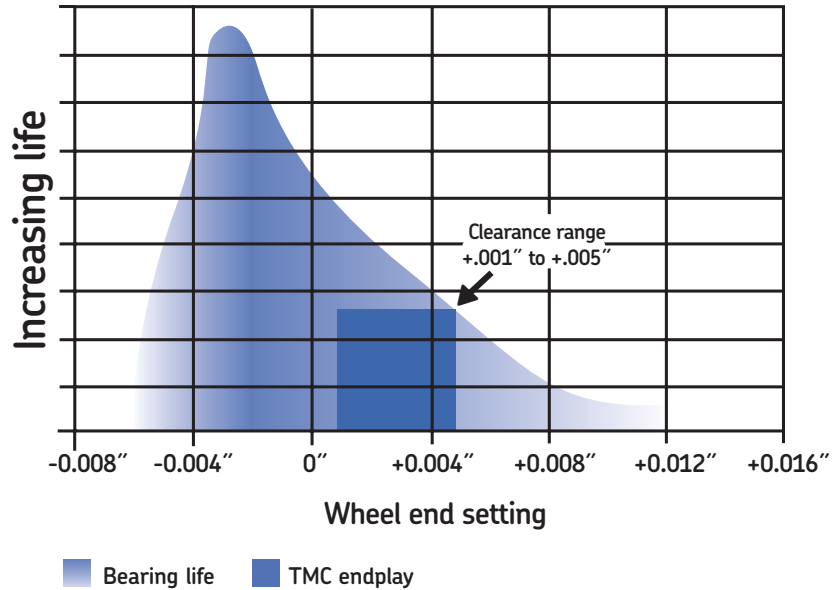
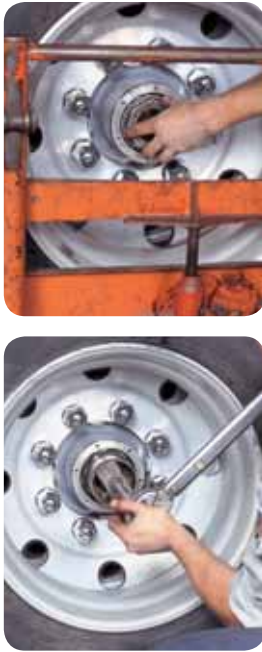
Whether the hub is with or without the tire, do not install it without mechanical support.



1. **When installing the hub assembly** over the axle spindle be sure to align the hub bore to the center of the spindle. Mechanical supports will allow you to do this without scraping or otherwise damaging the spindle, the threads, and in particular the seal.
2. **Install the outer bearing cone and adjusting nut.** Tighten nut only until it is snug against the bearing cone. **DO NOT USE A PNEUMATIC TOOL** during this part of the procedure. Be sure to maintain support of the hub assembly until the adjusting nut is secure. Failure to do so may cause damage to the seal and subsequent leakage of lubricant.
3. **Remove the hub support** so that the hub is resting on the bearings. Check for free rotation of the bearings. **Never allow hub to rest on seal.**
4. **Follow wheel bearing adjustment** as instructed on following page.



# Wheel bearing and end play adjustment procedures



## Wheel bearing adjustment procedure<sup>1</sup>

<b>Step 1:</b> Lubricate the wheel bearing with clean axle lubricant of the same type used in the axle sump or hub assembly. Note: Never use an impact wrench when tightening or loosening lug nuts or bolts during the procedure.								
Initial adjusting nut torque	Initial back off	Final adjusting nut torque	Back off			Jam nut torque		Acceptable end play
			Axle type	Threads per inch	Final back off	Nut size	Torque specifications	
Step 2	Step 3	Step 4		Step 5	Step 6	Step 7		Step 8
200 lb•ft (271 N•m) While rotating wheels	One full turn	50 lb•ft (68 N•m) While rotating wheels	Steer (front) non-drive	12	1/6 Turn *	Install cotter pin to lock axle nut in position		.001"-.005" (.025mm-.127mm)  As measured per procedure with dial indicator
				18	1/4 Turn *			
				14	1/2 Turn	Less than 2 5/8" (66.7mm)	200-300 lb•ft (271-407 N•m)	
				18				
			Drive	12	1/4 Turn	Dowel type washer	300-400 lb•ft (407-542 N•m)	
				16		Tang type washer**	200-275 lb•ft (271-373 N•m)	
Trailer	12	1/4 Turn	2 5/8" (66.7mm) and over	300-400 lb•ft (407-542 N•m)				
	16							

- \* If dowel pin and washer (or washer tang and nut flat) are not aligned, remove the washer, turn it over, and reinstall. If required, loosen the inner (adjusting) nut just enough for alignment.
- \*\* Bendable type washer lock only: Secure nuts by bending one wheel nut washer tang over the inner and outer nut. Bend the tangs over the closest flat perpendicular to the tang.

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<sup>1</sup>For ConMet "PreSet" hubs:

With single nut: 250 lb•ft. Do not back off.

With two-piece nut: Inner nut 300 lb•ft, outer nut 200 lb•ft. Do not back off.

## Wheel bearing end play verification

Wheel bearing end play is the free movement of the wheel assembly along the spindle axis. It is recommended, for verification purposes, that wheel bearing end play be measured with a dial indicator. (Example in photo below.)

- Step 1** Make sure the brake drum to hub fasteners are tightened to the manufacturers' specifications.
- Step 2** Attach a dial indicator with its magnetic base at the bottom of the hub or brake drum.
- Step 3** Adjust the dial indicator so that its plunger or pointer is against the end of the spindle with its line of action approximately parallel to the axis of the spindle.  
**Note:** For aluminum hubs, attach the magnetic base of the indicator to the end of the spindle with the plunger against the hub or brake drum.
- Step 4** Set the dial indicator to zero by rotating the gauge face so the zero mark lines up with the gauge needle. For digital indicators, push the zero-out button.
- Step 5** Grasp the wheel assembly at the 3 o'clock and 9 o'clock positions, while oscillating it to seat the bearings. Read bearing end play as the total indicator movement.  
**Note:** If end play is not within specifications, refer to the readjustment procedure of SKF technical bulletin No. TBF 9301.



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# Hubcap installation procedure

## Procedure

1. Hub mating surface must be free of dirt, burrs and radial score lines.
2. Hub mating surface, hubcap flange and gasket should not be greased or oiled.
3. Always install and re-install a hubcap with a new gasket.
4. When using a Tamper Proof system with synthetic grease, never fill hubcap with grease.

## Bolt on hubcaps

- Lockwashers of the split, conical or internal toothed design may be used in conjunction with the fastening bolts. Do not use flat washers.
- Thread all bolts loosely, then tighten down bolts uniformly in a star pattern per the following recommended torque values:

<b>TF (Zytel) Hubcap with embedded metal ring</b>	<b>12-16 lbs./ft.</b>
<b>Stamped Steel Hubcaps</b>	<b>10-14 lbs./ft.</b>
<b>Plastic Hubcap with external metal ring</b>	<b>6-10 lbs./ft.</b>

## Threaded hubcaps

- Lightly lubricate the threads of the hubcap and the O-ring, with the lubricant that is being retained.
- Install the O-ring onto the hubcap.
- Install the hubcap assembly onto the hub.
- Using an 8-point 4 13/16" opening x 4 1/4" high socket, torque to the following recommended values:
 

<b>Lexan</b>	<b>60-70 lbs./ft.</b>
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## Oil fill

### Through center fill port

- Fill wheel end assembly through centerfill port with the specified grade of oil. Wheel hub configurations vary, allowing different amounts of oil to be added depending on design. Allow for the oil to seep through the outer bearing and fill the hub cavity. Continue to add oil until the oil reaches the oil level fill line as indicated on the hubcap.
- Install center fill hubcap plug.



### Through side fill port

- Fill wheel end assembly through side fill port with the specified grade of oil. Wheel hub configurations vary, allowing different amounts of oil to be added depending on design. Allow for the oil to seep through the outer bearing and fill the hub cavity. During this fill operation, **DO NOT ALLOW THE OIL TO GO ABOVE THE CENTERLINE OR WEEP HOLE.** This may result in a weeping condition that may be perceived as a leaking hubcap. Continue to add oil until the oil reaches the oil level line as indicated on the hubcap.
- Install side fill hubcap plug per the following recommended torque values:

<b>3/8" - 18 NPT</b>	
<b>Pipe Plug</b>	<b>100-140 lbs./in.</b>
<b>3/4" - 16 UNF (Zytel)</b>	
<b>Side Fill Plug</b>	<b>15-25 lbs./in.</b>

Clean up any overspills that would give the appearance of a leaky hubcap.

### Grease fill: See TMC RP631

"Recommendations for Wheel End Lubrication" and the vehicle manufacturer's recommendation for proper fill procedure.