Seal part numbering system description

TT 08-005

April 2008

Tech tip

SKF developed and patented its seal part numbering system as a support tool for its customers. The part number identifies the approximate shaft size for the seal it is designed to fit on. Here is how they work:

Small Diameter Oil Seals – the approximate shaft size is indicated by inserting a decimal point to the left of the last four digits in the number. For example, 20425 (2.0425) indicates a 2.040" shaft. Metric shaft sizes are cataloged by their INCH equivalents in the inch size listing section. A complete size listing of metric seals arranged by metric shaft, bore and widths can be found in the Metric-Complete size listing section of the Seal Handbook (457010).

Large Diameter Oil Seals (over 10") – the approximate shaft size is indicated by inserting a decimal point to the left of the last five digits. For example, 1600560 (16.00560) indicates a 16" shaft. Large Diameter and split seals under 10.000" (254 mm), as well as all axial clamp type seals, are listed under the assigned 500,000 series part numbers which do not relate to shaft size.

Speedi-Sleeves – the approximate shaft size is indicated by inserting a decimal point to the left of the last two digits in the number. For example, 99300 (993.00) indicates a 3.00" shaft.

V-Rings – the shaft size is indicated in metric dimensions within the stock number. Locate the fifth digit from the left to determine the approximate shaft size. For example, 400180 (400180) indicates a 18MM shaft and 401800 (4**01800**) indicates a 180MM shaft size.

When a counterperson is looking for a seal by dimension, it is simply a matter of going to the proper shaft size location in the Oil seal specifications manual, or checking the shelf in the proper numerical sequence location.

Using lubricant to trouble-shoot wheel end component failure

TT 08-001

March 2008

Tech tip

Maintaining proper lubrication extends the life of the entire wheel end. SKF seals, bearings and hubcaps all interact with the wheel end lubricant. The lubricant condition can impact any of these components and vise versa. This technical bulletin will help the technician identify when the lubricant is exhibiting characteristics that require addressing.

TMC, Truck Maintenance Council, has several RP (Recommended Practices) that cover lubricants and their effect on the wheel end. TMC RP624, TMC RP631A & TMC RP644 have been used as reference in the development of this technical bulletin.

Acceptable wheel end lubricants

You will find any of the lubricants listed below in heavy duty wheel ends. Be sure to consult the vehicle OEM whenever switching away from the original lubricant. **Never** mix lubricants as this will have a detrimental impact on the seal.

- Fluid lubricant such as engine, transmission or gear oils
- Semi-fluid grease with NGLI grade of 000, 00 or 0

Trouble-shooting wheel ends with lubricants

Inspecting the lubricant condition is a very useful trouble-shooting tool when doing wheel end failure analysis. When inspecting wheel end lubricant, note the condition and if you answer “no” to any of these questions, closer inspection is warranted.

1) Is the color normal?
2) Is the viscosity or consistency typical?
3) Is it free of debris such as dirt, metal or water?
4) Is it free of an odd odor such as a burnt smell?

The lube condition can point you in the right direction in determining root cause of wheel end component failure. The following are some examples of common conditions, potential causes and what subsequent maintenance should be conducted.

Using lubricant to trouble-shoot wheel end component failure – cont.

Condition: Insufficient fill condition
An insufficient fill situation can create a condition of excessive heat and cause the oil to darken, increase in viscosity and/or exhibit a burnt smell. Greases could show evidence of drying or cracking.

Cause: Under filling, seal leakage, plugged breather

Maintenance: Carefully inspect all wheel end components and replace seal and other wheel end components as necessary. Clean hub thoroughly and fill with lubricant to the specifications of the vehicle OEM. Technicians should fill to proper levels and keep out air. Technicians should also check bearing adjustment, breathers and vents regularly. Drivers need to check lube levels on their walk-arounds.

Condition: Solid contamination
Lubricant will contain debris such as dirt or metal fragments which can cause the oil to darken with increased viscosity. The debris is often visible.

Cause: Ingression from seal failure, failure to clean hub properly after a previous failure or metal debris from internal metal component, unclean lubricant containers or dispensers

Maintenance: Carefully inspect all wheel end components and replace seal, lubricant and other wheel end components as necessary. Clean hub thoroughly and fill with lubricant as specified by vehicle OEM. Technicians should employ clean practices such as keeping lubricant containers and dispensers free of debris. Checking of bearing adjustment, seals, breathers and vents should be conducted regularly.

Condition: Water contamination
Lubricant will have a cloudy or milky appearance. Grease will have reduced consistency and oil will be thinned.

Cause: Seal or hubcap failure, or possibly uncovered lubricant containers

Maintenance: Water contamination will cause etching, staining, corrosion and bearing failure. Replace seal and lubricant and carefully inspect other wheel end components particularly bearings. Clean hub thoroughly and fill with lubricant as specified by vehicle OEM. Technicians should employ clean practices such as keeping lubricant containers and dispensers free of debris. Check bearing adjustment, seals, breathers and vents regularly. Technicians should not direct water spray directly at wheel end during vehicle cleaning.

Proper handling, storage and maintenance of lubrications help maximize wheel end component life which reduces the cost of operation – the ultimate goal in the shop.

What are polyacrylate and nitrile seals?

Tech tip

Polyacrylate seals

Polyacrylates are elastomers that are compatible with higher operating temperatures, as well as extreme pressure (EP) lubricants. They are available in most general purpose designs.

Advantages of polyacrylate seals:

- Good compatibility with most oils, including EP lubricants
- High resistance to oxidation and ozone
- Better compatibility with higher operating temperatures than nitrile
- Operating range from -40 degrees F to 300 degrees F

Disadvantages of polyacrylate seals:

- Low compatibility with water and some industrial fluids
- Poor compression set characteristics

Polyacrylates are generally black with the same appearance as nitrile. Nitrile, silicone or fluoroelastomers can be used as substitute materials.

What are polyacrylate and nitrile seals?-cont.

Nitrile seals

Nitrile is the most popular material for the major applications of today's automotive seals. It is actually a mixture of two basic synthetic rubbers, Buna and Acrylonitrile polymers. Synthetic lip materials are bonded to the metal shell (case) to prevent leakage between the sealing lip and the shell; this provides a longer lasting, more effective seal. Different properties are obtained by changing the percentage of each polymer used in the mixture.

Nitrile seals have advantages and disadvantages – these should be reviewed and understood for your specific application choice.

Advantages of nitrile seals:

- Good oil/grease compatibility
- Abrasion resistance
- Good low temperature and swell characteristics
- Good manufacturing qualities
- Relatively low in cost

Disadvantages of nitrile seals:

- Lacks compatibility with synthetic oils
- Not recommended with EP lubes at elevated temperatures

Seal selection very important when replacing seals

TT 08-030

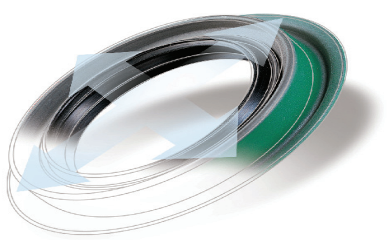
August 2008

Tech tip

Faulty installation is a common cause for seal failure in today's vehicles. But the most common reason a seal fails is because it is the incorrect seal for the particular application. It is very important to check the old seal and replace it with a correct seal for the application.

When replacing an old seal in an application, you first should use the number on the old seal to identify the replacement seal. If there is no seal listed in exactly the same width, a narrower width is usually the best choice. A wider width is perfectly acceptable if space permits, however it is often limited.

If you are installing a seal in a new application, it is important to gather all measurements associated with the seal – seal bore diameter, seal outside diameter, seal width and shaft diameter. When measuring a seal's outside diameter, always remember to take measurements in at least three places equally spaced around the seal (see below). Taking the average of these readings represents the seal's diameter.



Speed, temperature and pressure also play a role in selecting the correct seal.

To find additional information on proper seal selection, please see chapter three of the Automotive Seal Self Study Guide (457492).