GASKETS AND SEALANTS

Figure 36-1  Gaskets are used in many locations in the engine.

Figure 36-2  Gaskets help prevent leaks between two surfaces.
Figure 36-3 A typical perforated steel core head gasket with a graphite or composite facing material.

Figure 36-4 A solid steel core head gasket with a nonstick coating, which allows some movement between the block and the head, and is especially important on engines that use cast-iron blocks with aluminum cylinder heads.

Figure 36-5 The armor ring can be made from steel or copper.
Figure 36-6 Multilayer steel (MLS) gaskets are used on many newer all-aluminum engines as well as on engines that use cast iron blocks with aluminum cylinder heads. This type of gasket allows the aluminum to expand without losing the sealing ability of the gasket.

Figure 36-7 Left to right: Cork-rubber, paper, composite, and synthetic rubber (elastomer) gaskets.

**TECH TIP: Wow! I Can’t Believe a Cylinder Can Deform That Much!**

An automotive instructor used a dial bore gauge in a 4-cylinder, cast-iron engine block to show students how much a block can deform. Using just one hand, the instructor was able to grasp both sides of the block and then squeeze it. The dial bore gauge showed that the cylinder deflected about 0.0063 in. (3/10,000 of an inch) just by squeezing the block with one hand—and that was with a cast-iron block!

After this demonstration, the students were more careful during engine assembly and always used a torque wrench on each and every fastener that was installed in or on the engine block.
Figure 36-8 Rubber-coated steel gaskets have replaced many oil pan gaskets that once had separate side rail gaskets and end seals.

Figure 36-9 Formed in place gaskets often use silicone rubber and are applied at the factory using a robot. Check gasket manufacturers for the correct gasket replacement.

TECH TIP: Rubber and Contact Cement

One of the reasons why gaskets fail is due to their movement during installation. Some gaskets, such as cork or rubber valve cover gaskets or oil pan gaskets, can be held onto the cover using a rubber or contact cement. To use a rubber or contact cement, use the following steps:

STEP 1 Apply a thin layer to one side of the gasket and to the cover where the gasket will be placed.

STEP 2 Allow the surfaces to air dry until touch free.

STEP 3 Carefully place the gaskets onto the cover being sure to align all of the holes.

CAUTION: Do not attempt to remove the gasket and reposition it. The glue is strong and the gasket will be damaged if removed. If the gasket has been incorrectly installed, remove the entire gasket, clean the gasket surfaces, and repeat the installation using a new gasket.
Figure 36-10 A typical intake manifold gasket showing the metal washer at each fastener location which keeps the gasket from being compressed too much.

Figure 36-11 This intake manifold gasket was damaged due to fretting. Newer designs allow for more movement between the intake manifold and the cylinder head.

TECH TIP: Hints for Gasket Usage

1. Never reuse an old gasket. A used gasket or seal has already been compressed, lost some of its resilience, and has taken a set. If a used gasket does reseal, it will not seal as well as a new gasket or seal.

2. A gasket should be checked to make sure it is the correct gasket. Also check the list on the outside of the gasket set to make sure that the set has all the gaskets that may be needed before the package is opened.

3. Read the instruction sheet. An instruction sheet is included with most gaskets. It includes a review of the things the technician should do to prepare and install the gaskets, to give the best chance of a good seal. The instruction sheet also includes special tips on how to seal spots that are difficult to seal or that require special care to seal on a particular engine.
A rear main seal has to be designed to seal oil from leaking around the crankshaft under all temperature conditions.

**TECH TIP: Always Check the VIN**

There are so many variations in engines that it is important that the correct gasket or seal be used. For example, a similar engine may be used in a front-wheel-drive or a rear-wheel-drive application and this could affect the type or style of gasket or seal used. For best results, the wise technician should know the vehicle identification number (VIN) when ordering any engine part.

Room-temperature vulcanization (RTV) is designed to be a gasket substitute on nonmachined surfaces. Be sure to follow the instructions as printed on the tube for best results.
Figure 36-14 Anaerobic sealer is used to seal machined surfaces. Always follow the instructions on the tube for best results.

ANAEROBIC SEALER

Figure 36-15 The strength of the thread locker depends on whether the fastener is to be removed by hand (blue). High-strength thread locker (red) can only be removed if heated.

HIGH STRENGTH THREADLOCKING

HAND TOOL REMOVABLE THREADLOCKING

Figure 36-16 Applying antiseize compound to the threads of a bolt helps prevent the threads from galling or rusting.
**Chart 36-1** Summary chart showing where sealants are used and their common trade names.

<table>
<thead>
<tr>
<th>GASKETS AND SEALANTS</th>
<th>COMMON TRADE NAMES</th>
<th>Uses</th>
<th>Examples</th>
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<tbody>
<tr>
<td>E8 (low compression)</td>
<td>Silicon</td>
<td>Valve seats, oil seals, oil seals, transmission seals, engine mounts, engine mounts, transmission parts</td>
<td>For oil and fuel applications: 1/3 to 1/4 in. (8 to 10 mm) for engine bearings 6/6 to 1/2 in. (15 to 25 mm)</td>
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