

# GASKET TECH

## Fabrication and Installation

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Gaskets and related sealants are seemingly simple products involved in all automotive repair and restoration that seal joints in engines, transmissions, drivelines, and related components between two parts to keep liquids, gases, or foreign matter in or out of a particular area. Gaskets are also used in body parts to prevent water intrusion and for noise elimination. Using the correct gaskets and sealants and properly installing them are essential to a leak-free joint.

Often, the gaskets required are readily available from parts purveyors. However, there are some instances where no gasket is available for purchase or where deadlines are tight that preclude buying a manufactured gasket. Or, maybe a custom assembly is being fabricated. With the right materials and a few simple tools most gaskets can be made by the mechanic. Head gaskets and some specialty gaskets in modern cars are the exception.

## Tools

Figure 1



Figure 1 - Gasket making tools – hole punches and Olfa Compass Cutter (upper right) are essential for efficient, accurate cuts.

Figure 1 shows the tools needed for gasket making. A gasket punch set enables cutting neat bolt holes and smaller round gaskets. Olfa and Exacto knives are handy for free hand cutting. A leather punch is good for making small holes. And, an Olfa Compass Cutter is essential for making large round gaskets.

## Materials

Figure 2



Figure 2 - Most gaskets can be made from various thicknesses of cork/rubber material (top) and composition paper in.

Composition paper and cork/rubber materials are the two most common gasket materials; see Figure 2. The paper-like material is usually used between two rigid castings and is typically available in thicknesses ranging from 1/64" (0.015") to 1/16" (0.062"). Cork/rubber material is typically used when a stamped sheet metal part is mated to a casting. This use requires thicker material ranging from 1/16" (0.062") to 1/4" (0.250"). Typical uses include valve covers, oil pans, etc. The major manufacturers of gasket materials are Fel-Pro and Victor and sheets of

these are available from auto parts suppliers.

In a few instances, rubber may be used when two pieces are mated, generally for water sealing and insulation of body, not engine, parts. Comprehensive hardware suppliers like McMaster-Carr and Fastenal are sources for a variety of sheet rubber goods.

The correct type of material can be determined by examining the old gasket on the part removed or consulting parts books for the project car.

## Making Gaskets

Sometimes the parts requiring the gasket can serve as the cutting pattern. Simply, place the part on the correct gasket material and cut around the part with the Olfa or Exacto knife. In other instances, a pattern must be drawn first. Heavy shipping paper or heavier stock, like that found in file folders, with good dimensional stability should be used. After drawing an accurate pattern using applicable drafting techniques, the pattern must be carefully cut out using the Olfa or Exacto knife and straight edge and curve guides; sometimes free hand cutting is required. The hole punches are used to cut out the bolt holes. Once the pattern is made it must be checked to confirm that it correctly fits. The gasket pattern is placed on the appropriate gasket material and the gasket cut using the same tools. Once the inner and outer edges of the gasket are cut, the bolt or other holes can be marked and then cut using the hole punches (do the cutting on a smooth, hard wood surface). With thicker material, multiple cuts work best instead

of trying to cut completely through the material with one cut.

Circular gaskets are made by determining the appropriate diameters and then using the Olfa Compass Cutter to cut out the circles. Cut the outer circle first and then the inner circle. This ensures that the same compass pivot point is used for both circles. Gaskets with a radius up to 5.5 inches can be cut with this tool. Smaller circular gaskets are cut using a combination of gasket punches, assuming the appropriate-sized punches exist for the gasket needed.

Another method for making paper gaskets for cast parts, such as a water outlet, uses a light ball peen hammer. A piece of gasket material is placed on the part and the hammer is used to tap around the part until the excess material is cut free – See Figure 3. Use light taps at angle to the part edge to avoid damage to the part. Mark the location of bolt holes by pressing around the holes to mark their location and then cut them with hole punches. This method does not work for thick materials.

Figure 3



Figure 3 - A ball peen hammer is used to cut composition paper material for a simple cast metal piece (thermostat outlet).

Figure 4 shows three gaskets. Two were cut with the compass cutter from cork/rubber composition stock and the

third was cut using the hammer method from a paper-like gasket material.

**Figure 4**



Figure 4 - The two round cork/rubber gaskets on the left were cut with the Olfa Compass Cutter and the paper gasket was cut with the hammer method.

## Installation

To ensure good sealing the part faces to be joined must be clean, flat, and true. All traces of old gasket materials must be carefully removed using gasket scrapers (do not gouge the metal) and solvents. Media blasting and Scotchbrite discs on a die grinder or drill can also be used. Again, care is required to avoid damaging the mating surfaces. For cast parts, the mating surface can be trued by machining. For small parts the mating face can be sanded true by moving the part across sandpaper on a perfectly flat plate. For larger pieces, mount the sand paper on a hard, straight block and use this block to sand the mating surfaces.

Leaking at valve covers, oil pans, and similar stamped metal pieces often

occurs because the stamped metal flange is distorted. Typically, this is caused by over tightening the mounting bolts in an attempt to stop a leak. This only makes the leak worse. All flanges must be straightened with a hammer and dolly.

Gasket sealants (not RTV) help hold the gasket in place during assembly. If the parts need to be disassembled later, like valve covers for example, I cement the gasket to the stamped metal piece using Permatex High Tack™ (98H) and then coat the surface contacting the casting with anti-seize. This way, the cover can be easily without destroying the gasket.

Finally, torque the assembled parts with the gasket between according to the manufacturer's specifications. Valve covers and the like typically require no more than 5 to 10 ft-pounds for an effective seal. More than that just squeezes out the gasket and distorts the bolts holes.

## Summary

Making gaskets when they are not available is a simple task. Proper care in preparing the mating surfaces and proper installation will result in a leak-free assembly. Although most of this article has focused on mechanical parts, the same procedures can be used construct flat gaskets for body parts.