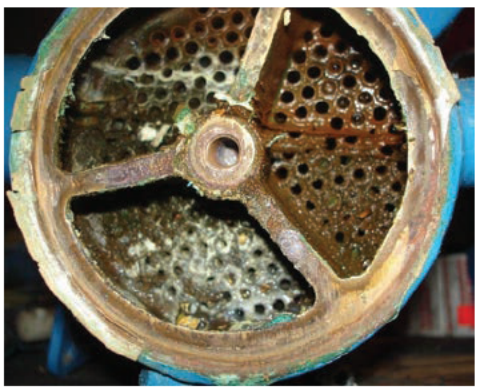
Dressing Up Your Gaskets

BY **STEVE SCOTT**

Putting additional gasket sealant or gasket maker on a quality gasket is similar to putting ketchup on filet mignon. Each may be good on their own, but where gaskets are involved, they may not be the best combination. There is a variety of gasket makers and flange sealants available and putting gasket maker on a conventional gasket is one of the most common errors of all. These compounds are engineered for specific applications and understanding where and when to use them is important. In some instances, they can keep the gasket from sealing properly. Typically, if an added sealant is needed, the manufacturer will bead the gasket. This controls the amount (height and width) and provides a uniform seal.

However, there are applications where the OE recommends adding various sealing compounds, and experienced technicians will know of applications and areas that benefit from adding them. That experience also tells them how much to use. The old saying that "more is better" can be far from the truth. It only stands to reason that if the liquid gasket maker or sealant is squeezing out… it's also squeezing in!

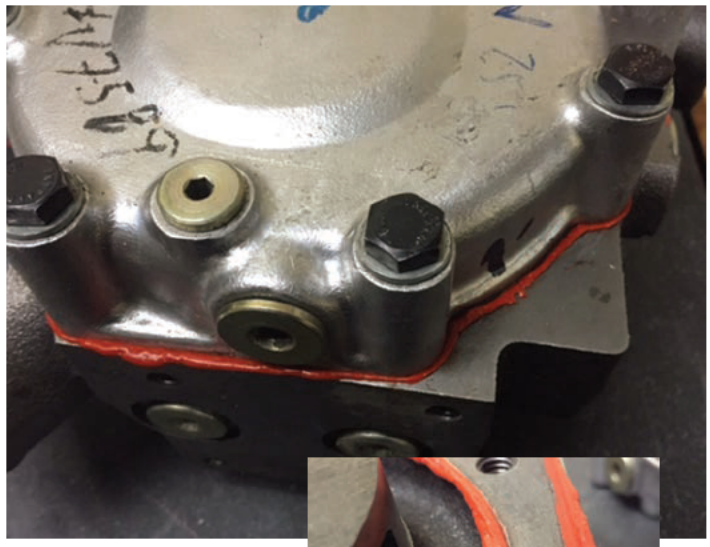
And by squeezing inward, it's most likely going into a coolant, oil, or air passage. If the overage comes loose, it will likely get trapped in the filters or survive without damaging anything. But there is a chance that while floating around, it could plug up oil cooler tubes or other small passages.



Sealant ends up in oil coolers.

Many of today's industrial engines have piston cooling jets (tubes) that spray oil to the bottom of the piston to help cool them. Cooler jets (tubes) may be single or dual tube designs and are made from various metals or even plastics.

Two Types of Piston Oil Coolers



Self-applied sealant goes inside crankcase.

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A small amount of loose sealing compound can stop the flow of oil through these tubes and cause catastrophic damage. The photo (pictured right) shows a connecting rod that has exited the side of the cylinder block. A very unfortunate and expensive failure for this engine owner.

While investigating the cause of the failure, among all the broken pieces, a plugged cooler tube was found.

This small piece of loose sealant was enough to stop the oil flow and cause the piston to seize, and in this instance the operator was unable to get the engine shut down in time to salvage it.

The point of this article is not to say that gasket compounds are bad, but if the gasket is engineered correctly, and surface conditions are acceptable, a quality gasket should seal properly without adding them. There are times when you need to "MacGyver" a makeshift gasket with that odd roll of gasket material you have lying around the shop cabinet, a pair of scissors, and maybe a small ballpeen hammer. That might get you out of a pinch, and maybe that's the appropriate time you want to add a little extra "something". But serious

Connecting rod through the side of the block, metal debris, damaged piston coolers, and RTV sealant blocking oil stream.

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engineering goes into developing a good quality gasket, and they rarely need to be altered.

Much like other internal engine parts, gasket materials have various ratings and specifications. The conditions that the gasket will be subjected to (temperature, oil, coolant, chemicals, etc.) must be considered during the development of the gasket:

• Tensile strength is measured by the pulling force in the plane of the gasket material, rather than a force perpendicular to the gasket. It represents the maximum tensile stress applied during stretching the material to the point it ruptures.

• Creep relaxation indicates how well the gasket material will maintain initial bolt torque after being exposed to specific stress, temperatures, and time. After a gasket has been installed and exposed to its operating conditions for a given amount of time, the gasket will begin to relax or "creep". Lower creep values indicate the material is better at sustaining flange pressure.

• One possible phenomenon occurring in a joint, which results in gasket failure, are referred to as crush or extrusion. As a gasket is compressed, it reduces the pore volume of the material. Crushing occurs when the compressive force applied to the gasket causes the material to compress to the point it exceeds its ultimate density. This typically can be seen near the bolt holes where the compressing force is the greatest.

• Compressibility relates to the material's ability to conform to surface irregularities. However, high degrees of compressibility can sacrifice the material torque retention, relaxation, and its ability to maintain a positive seal.

Some materials are intended to swell once they are put into service. Adding sealing compounds may prevent the gasket from swelling properly. Surface finish is also a consideration and adding a compound can mask those surfaces and allow the gasket to slide.

This is not limited to just paper gaskets. Adding sealants can also affect molded gaskets, seals, and O-rings. If the compound being added is not compatible with the material the seal or O-ring is made of, over time, the seal will deteriorate and fail.

Like most other internal engine parts, gaskets and seals have had to evolve to withstand the demands and conditions of today's industrial engines. Following the manufacturer's installation instructions and the advice of an experienced technician is the best practice. If after reading this article you still feel the need to add sealing compounds on a quality conventional gasket or seal, you might want to consider the old Brylcreem jingle, "A Little Dab'll Do Ya".■

Steve Scott joined the service department at IPD in 1982, working with parts, service and sales for a variety of equipment, diesel, and natural gas engines. Since 2004, he has been the director of product development and technical support for IPD. For more information, email sscott@ipdparts.com.