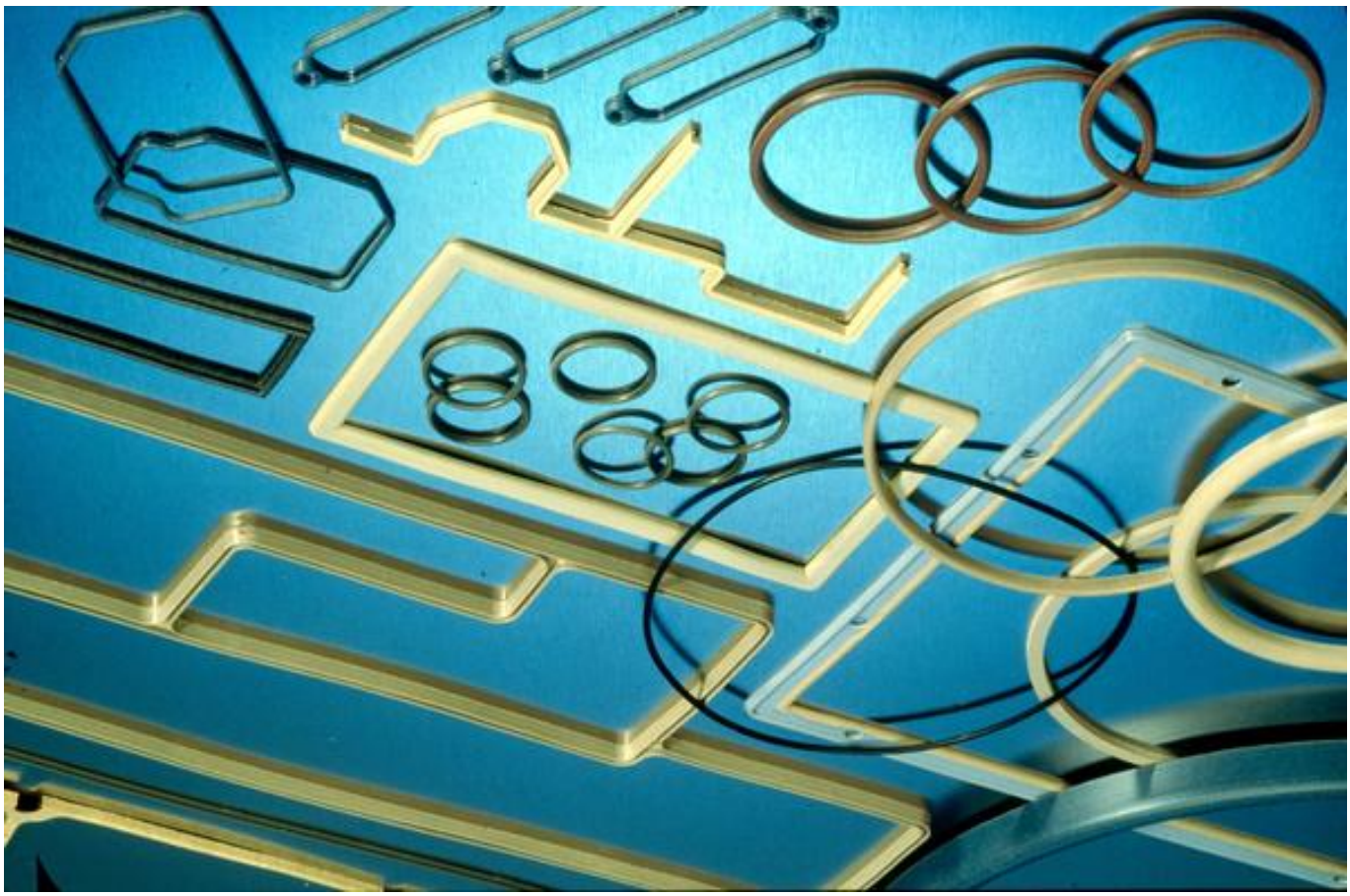
Choosing an EMI Gasket for Your Design

By Janine E. Mooney, Editor

EMI gaskets are a must in order to properly block all interference from reaching your device.

A key concern when shielding your design is choosing a gasket. Gaskets are used to seal seams and other gaps that can cause problems in shielding, thus implementing the best fit is imperative. But how do you know if an EMI gasket is even necessary?

Where Gaskets Began
Let’s take a big step back in time to properly answer this question. EMI gaskets were generally used in military systems and radio communications equipment, as the designs demanded a high level of shielding needs, and gaskets perform quite well in rugged, harsh environments. Due to todays rising EMI threats and increasing processor speeds, gaskets are now widespread in electronic equipment. Though still effective at lower levels, gaskets are recommended whenever shielding needs exceed 60dB. It would not be wise to leave the EMI gasket choices only to the mechanical engineers, as that may result in leaks. Working with the mechanical engineers will most likely result in a leak-free, more efficient design.

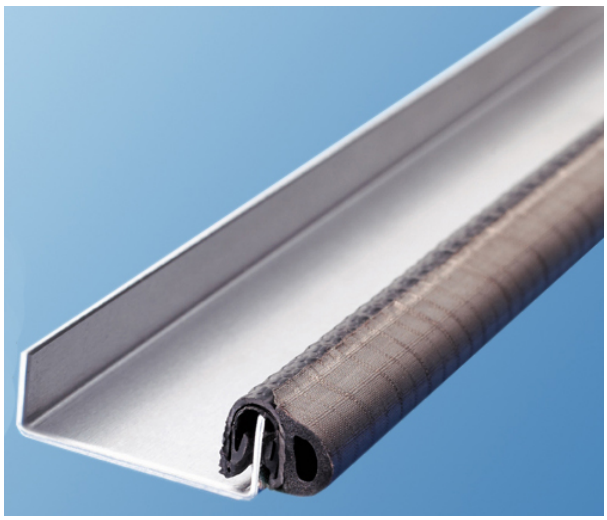


How It's Made

Conductive EMI gaskets must fit perfectly on the enclosure. They provide current continuity in shielding systems by reducing the resistance across the seams. Generally gaskets are made of metal, metal combined with metalized fabric over foam cores, or elastomer materials. All-metal gaskets include knitted wire mesh made of various metals. By knitting wire mesh around elastomer cores, metal gaskets can better meet mechanical design needs such as improved compressibility. Another sort of metal gasket, typically used in door seams, features rows of beryllium copper spring fingers laid out in linear format, or spirals. Foam-core gaskets covered by yarn, conductive fabric or metal foil provide a deflection range that is quite large with a modest closure force. For low closure applications, you can also use a silicone tube that is hollow with a conductive surface coating.

All Things Considered

When optimizing a shielding solution, consider the housing design as well as performance. Key considerations in the housing design include flatness, surface roughness, material type, rigidity, contact area, tolerance take-up, conductivity, fastener type, and fastener locations. Key factors in an EMI gasket include softness, tolerance take-up, conductivity (DC resistance), and shielding effectiveness both before and after Accelerated Life Testing (ALT).



From a cost perspective, the method of installing an EMI gasket will be the biggest factor. Gaskets can be installed using fasteners, epoxies or pressure-sensitive adhesives. They can also be installed by press-fitting into grooves. Some gaskets are molded in place on a plastic spacer frame or on the enclosure flange. The installed cost for an EMI gasket includes the cost of the gasket, together with labor and other manufacturing costs. A gasket applied without fasteners or adhesives, for instance, may offer lower installed cost than an EMI gasket purchased at a lower price. It also might fall apart.

As you can see, EMI gaskets are an important shielding consideration when creating your design. The key is to design smart before you begin testing, so you do not have to redesign multiple times. If shielding needs exceed 60dB, EMI gaskets are a must in order to properly block all interference from reaching your device. If shielding needs are fall below 60dB, you make the call.

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