Ultra-Vanshield® RFI/EMI dual elastomer shielding gaskets

The challenge for the RFI/EMI industry has been to create a highly conductive shielding gasket that maintains its mechanical integrity long-term. Dual Elastomer ULTRA-VANSHIELD® is definitively the unique solution to this problem.

Each style incorporates design features not commonly found in other forms of shielding gaskets. Some of the more important advantages to consider are:

- Continuously extruded high-strength silicone rubber core
- Co-extruded highly conductive metal-filled silicone outer layer
- Extremely high shielding effectiveness
- Environmental sealing
- No compression set
- Low compression force
- Extreme environment and abrasion-resistant options
- Simple installation options

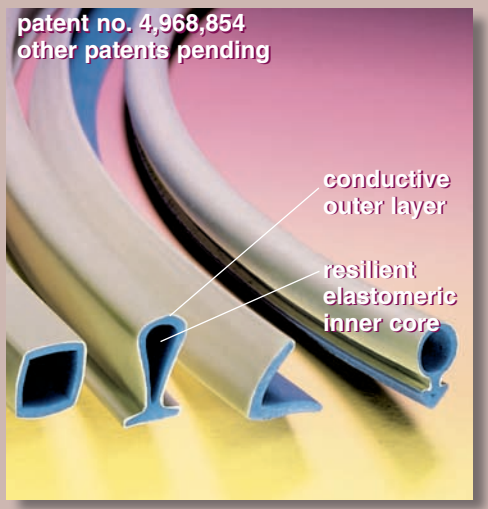

Figure 1. Typical Dual Elastomer gaskets

Silver-filled elastomers have long been used for shielding against electromagnetic interference and radio frequency signals. Silver was chosen since it is an excellent conductor and is one of the few materials that can be put into a rubber matrix while retaining its conductivity.

However, standard silver-filled elastomers have intrinsic problems. Typically, the percentage of silver in the elastomer is extraordinarily high – as much as 70% by weight. At these concentrations, the elastomer matrix loses most of its desirable physical attributes.

The result is neither the desired metallic nor elastomeric properties, but rather a compromise between both. For this reason, conventional silver-filled elastomers have poor physical properties; i.e. low tear resistance and tensile strength along with inordinately high compression forces.

comparison to other designs

ULTRA-VANSHIELD® DUAL ELASTOMERS offer the optimum combination of metallic conductivity and elastomeric performance.

- **Resilient inner core remains free of metal fillers**, resulting in optimum compression and aging properties.
- **Silver conductive material is only present in the outer thin membrane**, resulting in excellent conductive properties.
- **Thin silver layer permits reduction of costly silver** content required.
- **Attenuation performance is not degraded** under full compression as with solid-filled elastomers.
- **Very low compression force** and resistance to deformation.
- **Manufacturing flexibility** and quick turnaround of custom designs. Viable short run alternative.
- **Easy termination.** No requirements for end treatment.
- **Available with a variety of optional conductive metals.** See related information on pages 12, 13 and 15.

Other gasket designs, while having certain acceptable application-specific features, tend to be limited in a general purpose sense. Specifically, some of the common types lack many of the intrinsic features necessary for effective long-term shielding.

GASKET TYPE	ATTENUATION UP TO 1GHz	COMPRESSION FORCE (lbs./in. deflection)	COMPRESSION SET (% free height)	COMPRESSION RANGE (% free height)	COST
ULTRA-VANSHIELD	110dB	Low	None	80-90%	Moderate
Mesh	60-100dB	High	12-20%	40-60%	Moderate
Filled Elastomers	90-100dB	High	7-15%	40-60%	High
Beryllium Copper	100dB	Medium	1-2%	85-90%	High
Clad Foam	60-80dB	Low	15-20%	70-80%	Moderate

Table 1. Comparison of common RFI/EMI gasket types

Meshes have very high compression forces and poor compression set properties along with a limited range of deflection. Environmental sealing of the tandem designs increases the compression forces and is often an unsatisfactory compromise. High frequency performance varies widely. Terminated ends can allow escape of loose slivers.

Standard filled elastomers have poor mechanical properties due to the presence of metal fillers throughout. Common limitations include very high compression forces, undesirable compression set, brittleness, poor aging characteristics and high cost. Some designs lose attenuation properties beyond 50% compression of relaxed height.

Beryllium copper gaskets are expensive and require even more added expense for platings to protect from corrosion. In addition, they lack good environmental sealing options.

Clad foams have low attenuation, a limited range of compression, poor compression set properties, and designs are limited due to the manufacturing process and the conductive materials available for the cladding.