Factors Affecting Conductive Stability of EMI Shielding Gaskets.

1) Heat Ageing

The oxidation of the conductive filler particles that are used within elastomers is the main ageing process that affects electrical conductivity with an EMI shielding gasket.

If the filler particles used are non-noble then the oxide forms quite easily, and additionally it is non conductive. These types of fillers (Copper, Nickel and Aluminium) therefore suffer badly in terms of electrical conductive stability.

With Noble metal fillers, such as Silver, the oxide that is formed is relatively soft and reasonably conductive. EMI shielding gaskets that are based on pure silver (Consil R) offer the best performance in terms of heat aged electrical conductive stability.

2) Mechanical Vibration

During high levels of mechanical vibration some EMI gaskets offer high electrical conductive stability whilst others do not. The determining factor of a successful EMI shielding gasket in this type of harsh environment is the shape and surface texture of the conductive particle.

EMI gaskets that offer excellent performance during high levels of mechanical vibration are those that utilise rough textured and irregular shaped particles. During vibration these types of particles tend to remain in physical contact with each and therefore maintain electrical conductivity and hence shielding effectiveness. The Tecknit products that fall into this category are: Consil R, SC Consil, Consil N, Ag/Cu TeckFip, Consil A and Consil C.

EMI gaskets that perform badly in high vibration conditions are those that are based on smooth spherical shaped filler particles. These types of fillers tend to move apart during vibration which dramatically reduces the electrical conductivity of the EMI gasket. The Tecknit products that fall into this category are: Consil E, Consil II, Consil V and Ag/glass TeckFip.

3) Galvanic Compatibility

When choosing an EMI gasket for outdoor use, particularly in salt spray environments, the conductive medium must be carefully selected to ensure galvanic capability with the mating surface. If the EMI gasket is not chosen with galvanic compatibility in mind then it (or the mating part) could erode over a period of time which will dramatically reduce the electrical conductive stability of the joint.

Each metal is given a voltaic value and the gasket conductive material should be chosen so that the minimal amount of potential difference is between the gasket and the mating surface. Typical voltaic values are:

Ag:-0.1, Ni:-0.15, Sn:-0.3, Cu:-0.4, Fe:-0.5, Cd:-0.71, Cr:-0.74, Al:-0.9 Zn:-1, Be:-1.05