The principal characteristic of electronic glasses, used in glass-to-metal sealing, is the property, which prevents the transfer of electricity when placed between two conducting bodies (i.e.: the insulating property)

The measurement of this property is the **Dielectric Constant**, which is defined by "**ε**" in the equation

$$F=\frac{QQ'}{\varepsilon r2}$$

Where "F" is the force of attraction between two charges "Q" and "Q′" separated by a Distance "r" **in a uniform medium**.

The lower the value of the Dielectric Constant "**ε**" the higher the force of attraction "F" that can be supported; the better the insulator.

Two factors, which are always, present in the manufacturing steps of electronic glass powders (Smelting, crushing, milling, calcining and spray drying) work to adversely effect the Dielectric Constant by making it higher thereby reducing the insulating property of these Materials.

These two factors are:

A-The introduction of "trace" quantities of minute metallic particles inherent in the process equipment used in the various steps above, which increase conductivity and reduce the insulating property; and

B-The presence of small numbers of low density agglomerated particles during the smelting and milling steps. These particles look like white spots and result in minute voids during the glass-to-metal sealing process making the part non-uniform and further reducing it's insulating properties.

Although it has been possible to produce electronic glass powders of very high purity and homogeneity in a small-scale laboratory environment, the cost of doing so for wide commercial use is prohibitive.

As a result all commercial grade electronic glass formulations produced worldwide are effected to some extent by the above two factors.

During the last three years, as part of Elan's continuous improvement program, Elan engineers have successfully developed proprietary, processes which have substantially minimized these two undesirable factors and have resulted in very homogeneous, high purity electronic glass ready-press powders.

This in turn has resulted in performs for glass-to-metal seals who's dielectric constant is much closer to the theoretical value than that of similar material formulations against which they have been tested.