Torr Seal Specifications

Absorption
0.30% (water, 24-hour immersion)

Acid Resistance
Withstands SFs at 25 °C

Adhesion
Will not adhere to Teflon, Kel-F, nylon nor polypropylene

Carcinogenic
Does not contain any of the carcinogens listed in the OSHA Standards of November 29, 1975

Color
Off-white

Combustion
(Gasses emitted at normal temperatures) NOx, CO2, H2O, CO

Compressive Strength
10,000-psi ± 20% (at 25 °C)

Corrosive Properties
Corrosive to copper when uncured; non-corrosive when cured

Cure Time
24 hours at 25 °C, 2 hours at 60 °C

Dielectric Strength
350 volts/mil

Dissipation Factor
0.09 (at 25 °C, 1 kHz)

Expansion, Linear
30.3 x 10^-6 in/in/°C (at 30 °C to 90 °C)

Flash Point
175 °C

Flexural Strength
11,000 psi ± 20% (at 25 °C)

Fungus Resistance
Very high

Harding Time
1 to 2 hours at 25 °C, 30 minutes at 60 °C

Hardness
75 – 80 Shore D

Outgassing
See table below for typical sample at various temperatures

Temperature, °C Cumulative Pumping
Time in hrs Outgassing Rate T-/cm²/sec
25 1 1.0 x 10^-5
25 40 7.5 x 10^-7
116 (for 3 hrs) 43 7.0 x 10^-5
135 (for 9 hrs) 52 8.0 x 10^-6
130 (for 14 hrs) 66 2.0 x 10^-6

Heat of Reaction
Very slightly exothermic

Pressure Range
Suitable for use in pressures of 10^-9 Torr and below

Pot Life
55 minutes (100 grams at 25 °C)

Radiation
Similar epoxy resins have been tested to 10^11 ergs of gamma radiation without noticeable effect. Torr Seal is a rigid epoxy resin (as opposed to other epoxies which have plasticizers added); all rigid epoxies are relatively impervious to damage from radiation (as compared to other organic materials such as silicone rubber, phenolics and polyesters)

Resistivity, Volume
3.52 x 10^14 ohms/cm (at 25 °C)

Shear Strength, Tensile (on an aluminum lap joint)
at 25 °C, following 7 days at -45 °C, 2150 psi
at 25 °C, following 7 days at 25 °C, 2000 psi
at 25 °C, following 7 days at 80 °C, 1900 psi
at 80 °C, 800 psi
100% relative humidity, long-term, 1900 psi immersed in alcohol, 0.5 hour, 1600 psi after 24-hour room temperature cure, 800 psi

Shelf Life
12 months minimum from date of shipment from Varian

Shrinkage, Linear
0.00125 in/in (at 25 °C)

Specific Gravity
1.6

Temperature
-45 °C to 120 °C; cracks at LN2 temperatures

Tensile Strength
5000-psi ± 30%

Thermal Conductivity
10.4 x 10^-4(cal/sec)/(cm² °C/cm)

Toxicity
Known in cured product - none

Viscosity
Thick non-flow paste