

Agilent Torr Seal Products



Torr Seal low vapor pressure resin sealant

Agilent Torr Seal epoxy resin quickly seals leaks on any type of vacuum system or component. Provided in convenient tubes, Torr Seal is solvent free and can be used at pressures of 10^{-9} Torr (mbar) and below, and at temperatures from -45°C to 120°C (bakeable temperature). Additionally, Torr Seal permits leak checking immediately after curing, and bonds with many materials including metal, ceramic, and glass.

Ordering information

Description	Part Number	Weight lb (kg)
Torr Seal base resin, 82 g, and Torr Seal hardener, 36 g	9530001	1.0 (0.45)



Torr Seal mixing system

The Agilent Torr Seal mixing system includes an applicator gun, a premeasured Torr Seal cartridge, and an epoxy/resin mixer. The system uses the same low vapor pressure resin sealant as standard Torr Seal, while providing a systematic and scientific way of mixing the Torr Seal epoxy and resin. The applicator gun dispenses premeasured epoxy and resin from the cartridge through the mixer so that a uniform Torr Seal bead can be placed on any surface. As with the standard Torr Seal tubes, the mixing system can be used at pressures of 10^{-9} Torr and below, and at temperatures from -45°C to 120°C (bakeable temperature).

Ordering information

Description	Part Number	Weight lb (kg)
Applicator gun with Torr Seal cartridge (2 oz) and three mixers	9530002	2.00 (0.91)
Applicator gun only	9530003	1.50 (0.68)
Torr Seal cartridge (2 oz) and three mixers	9530004	0.75 (0.34)
Mixers only (six to a package)	9530005	0.25 (0.11)

Technical specifications

Absorption	0.30% (water, 24 h immersion)	
Acid Resistance	Withstands SF6 at 25 °C	
Adhesion	Will not adhere to Teflon, Kel-F, nylon, nor polypropylene	
Color	Off white	
Combustion	(Gases emitted at normal temperatures) NOx, CO ₂ , H ₂ O, COe	
Compressive Strength	10,000 psi ± 20% (at 25 °C)	
Corrosive Properties	Corrosive to copper when uncured; noncorrosive when cured	
Cure Time	24 h at 25 °C, 2 h at 60 °C	
Dielectric Strength	350 V/mil	
Dissipation Factor	0.09 (at 25 °C, 1 kHz)	
Expansion, Linear	30.3 x 10 ⁻⁶ in/in/°C (at 30–90 °C)	
Flash Point	175 °C	
Flexural Strength	11,000 psi ± 20% (at 25 °C)	
Fungus Resistance	Very high	
Hardening Time	1–2 h at 25 °C, 30 min at 60 °C	
Hardness	75–80 Shore D	
Outgassing: Typical Sample at Various Temperatures		
Temperature (°C)	Cumulative Pumping Time (h)	Outgassing Rate (T-I/cm ² /s)
25	1	1.0 x 10 ⁻⁵
25	40	7.5 x 10 ⁻⁷
116 (for 3 h)	43	7.0 x 10 ⁻⁶
135 (for 9 h)	52	8.0 x 10 ⁻⁶
130 (for 14 h)	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 min (100 g at 25 °C)	
Radiation		
Similar epoxy resins have been tested to 1011 ergs of gamma radiation without noticeable effect. Torr Seal is a rigid epoxy resin (as opposed to other epoxies that 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 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 h, 1600 psi After 24 h room temperature cure, 800 psi		

Shelf Life	12 months minimum from date of shipment
Shrinkage, Linear	0.00125 in/in (at 25 °C)
Specific Gravity	1.6
Solvent	Contact Agilent technical support
Temperature	–45 to 120 °C cracks at LN ₂ temperatures
Tensile Strength	5000 psi ± 30%
Thermal Conductivity	10.4 x 10 ⁻⁴ cal/s/cm ² /°C/cm
Viscosity	Thick nonflow paste
Directions for Use	
Mixing	
When using the applicator gun, dispense equal lengths of resin and hardener. When mixing by hand, mix part A (resin) and part B (hardener) in a ratio of 100:44 by weight or 2.5:1 by volume. Mix thoroughly until the color and consistency are uniform	
Mixing the adhesive just prior to use is recommended. The temperature of the separate components prior to mixing is not critical, but they should be close to room temperature	
Heat buildup during and after mixing is normal. To reduce the likelihood of exothermic reaction or excessive heat buildup, mix less than 900 g at a time. Mixing smaller amounts will minimize heat buildup	
Applying	
Bonding surfaces should be clean, dry, and free of contamination	
Once the adhesive is applied, the bonded parts should be held in contact until the part has developed handling strength (3–4 h at 25 °C). Note: this can vary with different bond configurations. It is not necessary to clamp the parts unless movement during cure is likely	
Cure	
Curing will take 24 h at 25 °C, 2 h at 60 °C	
Heat cures can be modified to achieve a desired degree of cure from handling strength to full cure	
Clean Up	
It is important to clean up the excess adhesive from the work area and application equipment before it hardens	
Denatured alcohol and many common industrial solvents are suitable for removing uncured sealant	
Additional Notes	
<ul style="list-style-type: none"> • If crystallization is observed on the resin side of the Torr Seal cartridge in the form of thickening (hard to dispense), a "grainy" texture, or inability to push the material out of the cartridge the solution is to reheat the cartridge and melt the resin back into its liquid form • This can be performed in several different ways: <ul style="list-style-type: none"> A) Place the entire cartridge or cartridges in an oven set at approximately 50 °C Allow the cartridges to warm for about an hour to allow the resin to melt back into a liquid to remove any formed crystals. The melting point for the epoxy resin in Torr Seal is approximately 42 °C B) Place the cartridge in hot water (approximately 50 °C) for about 10–15 min to allow the resin to melt back into a liquid to remove any formed crystals 	

Contact information

North and South America

Agilent Technologies
121 Hartwell Avenue
Lexington MA 02421
USA Tel: +1 781 861 7200
Fax: +1 781 860 5437
Toll free: +1 800 882 7426
vpl-customer@agilent.com

Europe and other countries

Agilent Technologies Italia SpA
via F.lli Varian 54
10040 Leini, (Torino), Italy
Tel: +39 011 9979 111
Fax: +39 011 9979 350
Toll free: 00 800 234 234 00
vpt-customer@agilent.com

China

Beijing Office Agilent Technologies (China) Co. Ltd.
No.3, Wang Jing Bei Lu,
Chao Yang District,
Beijing, 100102, China
Toll free: 800 820 6778
Contacts.vacuum@agilent.com

For more information, please contact
your Agilent representative or visit
www.agilent.com/chem/vacuum where
you can chat live with a vacuum expert.



DE58898313

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© Agilent Technologies, Inc. 2022
Published in the USA, July 11, 2022
5994-5102EN