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Product Description Sheet

Product 5100

Industrial Version, May 1999

PRODUCT DESCRIPTION

LOCTITE® Flexseal 5100 is a 100% reactive, low viscosity, anaerobic sealant that cures to form a tough, flexible, thermoset plastic with excellent environmental resistance. A primary use of the product is to seal leak paths between dissimilar materials (e.g., metal leads molded in plastic housings for electronic connectors, etc.). The flexibility insures maintaining integrity of the seal despite differing thermal expansion properties of the dissimilar substrates.

The sealant is designed for use in Loctite Flexseal Processing Equipment. The process involves removal of air trapped in porosity or leak paths in a part, followed by filling the voids with a liquid sealant which subsequently hardens to a durable plastic. Polymerization occurs via an anaerobic cure mechanism. Only when confined and away from air does hardening take place. Sealant exposed to air (e.g., on the surface of the parts), will remain liquid and is readily removed by an aqueous wash.

PROPERTIES OF UNCURED MATERIAL

	Typical Value
Chemical Type	Methacrylate
Appearance	Clear, pale yellow
Odor	Mild
Specific Gravity	1.0
Viscosity @ 25°C	
Cannon-Fenske #200	400
Flash Point, TCC, °F (°C)	>200 (>93)

TYPICAL PROPERTIES OF CURED MATERIAL

	Typical Value
Hardness	
Shore A-2	97
Shore D-2	72
Tensile Modulus, psi,	
ASTM D 638	43,500
Elongation at break, %	
ASTM D 638	42
Tensile Strength at break, psi,	
ASTM D 638	1600
Thermal Conductivity, K,	
BTU-in/hr-ft ² - °F	0.948
Water Vapor Transmission	
ASTM E 96	
grams/hr-m ²	0.182
grams/hr-ft ²	0.262
permeance, U.S. Perms	0.63
Compressive Modulus, psi,	
ASTM D 695	42,000
Compressive Strength, psi,	
ASTM D 695	15,000
Coefficient of Thermal Expansion	
(10°C to 160°C)	1.8 x 10 ⁻⁴ /°C
Outgassing, NASA Test, RT Cured	
% TML	3.67
% CVMC	0.34

Subsequent heat curing shows no significant change in outgassing characteristics.

ELECTRICAL PROPERTIES

Dielectric Strength, volts/mil, ASTM D 149 (10 ml thick specimen)	1170
Dielectric Constant, ASTM D 150	
@ 100 Hz	3.84
@ 1 kHz	3.61
@ 1 MHz	3.23
Dissipation Factor, ASTM D 150	
@ 100 Hz	0.0546
@ 1 kHz	0.0349
@ 1 MHz	0.0276
Volume Resistivity, ohms-cm, ASTM D 257	7.3 x 10 ¹³
Surface Resistivity, ohms/sq., ASTM D 257	>5.7 x 10 ¹⁶

DURABILITY

A. Chemical Resistance

Flexseal XT exhibits excellent long term durability in both polar (water, glycol) and non-polar (motor-oil, transmission fluid) media. In addition, exposure to ordinary processing chemicals (solder flux, isopropanol, etc.) has no adverse effect on the cured sealant.

In typical applications, exposure of the cured polymer at the surface of the porosity is so minute that any resultant degradation of the cured polymer normally does not affect product performance.

Loctite recommends testing in actual assemblies prior to final approval.

Long term durability is illustrated by the following data, which was generated by immersing 1" x 3/8" cylinders of cured sealant in the test fluids at elevated temperature for the times indicated:

Test Fluid	% Weight Change, 188°F	
	2 weeks	4 weeks
Water	+ 1.0	+ 1.0
Glycol/water (antifreeze)	+ 0.3	+ 0.3
Motor Oil	+ 0.5	+ 0.7
Automatic transmission fluid	- 0.2	- 0.3

Resistance to typical processing chemicals is illustrated by similar testing at room temperature for the time intervals indicated:

Test Fluid	% Weight Change, RT	
	2 hours	4 hours
Water	+ 0.1	+ 0.1
5% detergent in water	+ 0.1	+ 0.1
Solder flux	+ 0.3	+ 0.5
Freon TMS	+ 3.3*	+ 4.5*
Freon TF	+ 1.0	Not Determined
Trichloroethane	+ 4.5*	+ 6.4*
Isopropanol	+ 0.4	+ 0.6

* Solvent absorption, not polymer degradation

B. Thermal Resistance**1. Use Temperature**

Thermogravimetric analysis (TGA) indicates that Flexseal XT is thermally resistant to 300°F (149°C) for continuous use and to 350°F (177°C) intermittently.

<u>Temperature</u>		<u>% Weight Loss</u>
<u>°F</u>	<u>°C</u>	
122	50	0
212	100	0.1
302	150	0.5
392	200	2.0
482	250	8.9
572	300	22.7
662	350	48.0
752	400	76.0

2. Resistance to Solder Temperatures

Tests have shown that exposure to standard solder temperature for a typical length of time has no adverse effect on Flexseal XT. Cured test cylinders of Flexseal XT immersed in SN60 solder at -240°C (-465°F) for ten seconds exhibited no weight change or visual modification. Also, it has been shown that tinning of metal leads on a typical plastic/metal pin connector (by immersion of the leads in solder for ten seconds) had no adverse effect on the integrity of the seal between the metal and plastic.

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).

Storage

Products shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8° to 28°C (46° to 82°F) unless otherwise labeled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused product, do not return any material to its original container. For specific shelf-life information, contact your local Technical Service Center.

Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.