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Laboratory Data Sheet Hysol® Product 3173/3182

formerly Encap® 3173/3182

Industrial Version, August 2001

PRODUCT DESCRIPTION

LOCTITE® Hysol® 3173 Polyurethane Resin is a resin that is designed to be mixed with Hysol 3182 Polyurethane Hardener. This mixture forms a low shrinkage, low exotherm potting compound.

PROPERTIES OF UNCURED MATERIAL (Resin)

	Typical Value
Chemical Type	Polyurethane resin
Appearance	Dark brown
Viscosity, Spindle #1 @ 20 RPM, cP (25°C)	75
Specific Gravity	1.23

PROPERTIES OF UNCURED MATERIAL (Hardener)

	Typical Value
Chemical Type	Polyurethane hardener
Appearance (mixed)	Black (black)
Viscosity, Spindle #6 @ 20 RPM, cP (25°C)	30,000
Specific Gravity	1.59

PROPERTIES OF CURED MATERIAL

	Typical Value
Vol. Mix Ratio, Resin:Hardener	1 to 5.2
Weight Mix Ratio, Resin:Hardener	13 to 87
Mixed Specific Gravity	1.56
Mixed Viscosity, Spindle 5 @ 20 RPM (25°C) cP	5,500
Work Time, 300g (25°C)	< 7 min
Gel Time, 300g (25°C)	14 min
Regular Cure Schedule (25°C)	90 min
Alternate Cure Schedule (85°C)	30 min
Tg, °C, ASTM E1545-95a	-10
CTE, above Tg, (mm/mm°C), ASTM E831	128 E-06
Hardness, Shore A, ASTM D2240	75

Electrical Properties

Dielectric Constant, ASTM D150	0.1 kHz	4.68
	1.0 kHz	4.02
	10.0 kHz	3.76
	100 kHz	3.63
Dissipation Factor, ASTM D150	0.1 kHz	0.13
	1.0 kHz	0.07
	10.0 kHz	0.04
	100 kHz	0.02
Insulation Resistance, ohms, ASTM D257	2.5 E13	
Volume Resistivity, Ω.cm, ASTM D257	1.5 E15	
Dielectric Strength, Volts/mil, ASTM D149	370	

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

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 28°C (46°F to 82°F) unless otherwise labeled. Optimal storage is at 0°C (32°F) or less. To prevent contamination of unused product, do not return any material to its original container. For further 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.

NOT FOR PRODUCT SPECIFICATIONS.

THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.

PLEASE CONTACT LOCTITE CORPORATION QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.

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Properties of Uncured Material

	Specific Gravity	Viscosity (25°C)	Color	Mixed Color
HYSOL 3173 Polyurethane Resin	1.24	75	Dark brown	
HYSOL Polyurethane Hardener 3182	1.59	30,000	Black	Black
HYSOL Polyurethane Hardener 3183	0.96	800	Opaque Black	Opaque Black
HYSOL Polyurethane Hardener 3184	1.46	14,000	Opaque White	Opaque tan

Curing Properties of the Systems (All Properties in Conjunction with HYSOL 3173 Polyurethane Resin)

Hardener	Vol. Mix Ratio Resin:Hardener	Weight Mix Ratio Resin:Hardener	Mixed Specific Gravity	Mixed Viscosity, cP (25°C)	Work Time (25°C, 77°F) sample size noted	Gel Time (25°C, 77°F) sample size noted	Regular Cure Schedule (25°C, 77°F)	Alternate Cure Schedule (66°C, 150°F)
HYSOL Polyurethane Hardener 3182	1 to 5.2	13 to 87	1.56	5,500	< 7 min/300g	14 min/ 300 gm	90 min	30 min 185 F
HYSOL Polyurethane Hardener 3183	1 to 3.01	30 to 70	1.06	450	20 to 40min/105g	40-70 min/ 105 gm	24 hr	1 – 3 hours 185°F
HYSOL Polyurethane Hardener 3184	1 to 4.81	15 to 85	1.40	2,250	45 min/300g	150 min/ 300 gm	24 hr	1 – 3 hours 185°F

Cured Properties of the System (All Properties in Conjunction with HYSOL 3173 Polyurethane Resin)

Hardener	Tg, °C	CTE above Tg (mm/mm °C)	Hardness Shore A
HYSOL Polyurethane Hardener 3182	-10	128 E-06	75
HYSOL Polyurethane Hardener 3183	-16	190 E-06	70
HYSOL Polyurethane Hardener 3184	-15	151 E-06	80

Electrical Properties of the System

Dielectric Constant				
Hardener	Frequency			
	0.1 KHz	1.0 KHz	10 KHz	100 KHz
HYSOL 3182	4.68	4.02	3.76	3.63
HYSOL 3183	5.92	4.36	3.65	3.31
HYSOL 3184	4.51	4.29	3.94	3.56

Dissipation Factor				
Hardener	Frequency			
	0.1 KHz	1.0 KHz	10 KHz	100 KHz
HYSOL 3182	0.13	0.07	0.04	0.02
HYSOL 3183	0.22	0.17	0.10	0.05
HYSOL 3184	0.02	0.04	0.06	0.07

Hardener	Insulation Resistance, ohms	Volume Resistivity, Ω.cm	Dielectric Strength, Volts/mil
HYSOL 3182	2.5 E13	1.5 E15	370
HYSOL 3183	1.1 E11	6.83 E12	375
HYSOL 3184	1.1 E12	6.61 E12	370