

LOCTITE STYCAST ES 4212

September 2012

PRODUCT DESCRIPTION

LOCTITE STYCAST ES 4212 provides the following product characteristics:

Technology	Epoxy
Appearance, Resin (Component A)	Black
Appearance, Hardener (Component B)	Tan
Appearance (cured)	Black
Components	Two component - requires mixing
Mix Ratio, by volume - Part A: Part B	100 : 100
Mixing Ratio, by weight Component A: Component B	100 : 90
Cure	Room temperature cure
Application	Potting and Encapsulating

LOCTITE STYCAST ES 4212 is a two-component, long pot life, casting system with excellent handling properties. This low cost, flexible system is filled with a non-abrasive filler for machine metering/dispensing. This material has good thermal shock resistance and low exotherm, making it suitable for encapsulation of various components and modules.

UL Classification

Classified by Underwriters Laboratories Inc.® UL-94 "Test for Flammability of Plastic Materials" and meets the requirements of 94HB in a 3.3 mm cross section.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Part A Properties

Density, @ 25 °C, g/cm ³	1.6
Filler Content, %	50
Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 7, speed 20 rpm	45,000

Part B Properties

Density, @ 25 °C, g/cm ³	1.45
Filler Content, %	50
Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 6, speed 20 rpm	9,000

Mixed Properties

Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 5, speed 2 rpm	25,000
Density, @ 25 °C, g/cm ³	1.57
Filler Content, %	51
Peak Exotherm Temperature, °C: 200 g mass	36
Pot Life @ 25 °C, minutes: 200 g mass	230
500 g mass	180
1,000 g mass	135

TYPICAL CURING PERFORMANCE

Recommended Curing Conditions

36 to 48 hours @ 25 °C (Recommended cure)
3 hours @ 60 °C (Alternate cure)

The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Glass Transition Temperature, ISO 11357-2, °C	20
Coefficient of Thermal Expansion ASTM D7012, K ⁻¹ : Pre Tg (Alpha 1)	95×10 ⁻⁶
Post Tg (Alpha 2)	235×10 ⁻⁶
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.42
Linear Shrinkage, ASTM D792, %	0.53
Shore Hardness, ISO 868, Durometer D	75
Water Absorption, ISO 62, %: 24 hours in water @ 25 °C	0.76
Izod Impact Strength, N/mm of notch	0.05
Elongation, ISO 527-2, %	14
Tensile Strength, ISO 527-2	N/mm ² 15.5 (psi) (2,250)
Compressive Strength, ISO 604	N/mm ² 72.4 (psi) (10,500)

Electrical Properties

Dielectric Breakdown Strength IEC 60243-1, kV/mm	50
Volume Resistivity, IEC 60093, Ω·cm: @ 25 °C	2×10 ¹³
@ 105 °C	4×10 ⁹
Surface Resistivity, IEC 60093, Ω: @ 25 °C	1×10 ¹⁴
@ 105 °C	2×10 ¹¹
Dielectric Constant / Dissipation Factor, IEC 60250: @ 25 °C:	
100 Hz	5.7 / 0.84
1 kHz	5.2 / 0.062
100 kHz	4.4 / 0.009
@ 105 °C:	
100 Hz	20.0 / 8.862
1 kHz	2.0 / 0.048
100 kHz	8.6 / 0.104

GENERAL INFORMATION

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

Directions for use

1. The standard mix ratio of LOCTITE STYCAST ES 4212 is 100 parts A to 100 parts B by volume. By decreasing the amount of hardener to 90 parts Part B by volume, maximum rigidity and hardness will be obtained. By increasing the amount of hardener to 110 parts Part B by volume, flexibility will be increased. Other property variations may also be observed. No mix ratio beyond these two extremes should be used.
2. LOCTITE STYCAST ES 4212 will settle upon storage, especially at temperatures exceeding 27 °C. Refrigerated storage will minimize filler settling. Each container must be thoroughly mixed before combining Part A and Part B. For ease of mixing, store containers upside down. After warming to room temperature, approximately 10 minutes on a standard paint shaker will normally ensure complete dispersion of the filler.

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Liquid Storage - Liquids should be stored at 25°C or below, in closed containers. If stored below 25°C, the material MUST be allowed to come to room temperature, in the sealed container, to avoid moisture contamination.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

(°C x 1.8) + 32 = °F
 kV/mm x 25.4 = V/mm
 mm / 25.4 = inches
 N x 0.225 = lb
 N/mm x 5.71 = lb/in
 psi x 145 = N/mm²
 MPa = N/mm²
 N·m x 8.851 = lb·in
 N·m x 0.738 = lb·ft
 N·mm x 0.142 = oz·in
 mPa·s = cP

Disclaimer**Note**

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Colombiana S.A.S. the following disclaimer is applicable:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel, is therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Corporation Resin Technology Group, Inc., or Henkel Canada, Inc. the following disclaimer is applicable:

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, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel 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 Henkel 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.

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 1