

# LOCTITE STYCAST ES 4412

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## PRODUCT DESCRIPTION

LOCTITE STYCAST ES 4412 provides the following product characteristics:

<b>Technology</b>	Epoxy
Appearance - Part A	Black
Appearance - Part B	Tan
Appearance (cured)	Black
Components	Two component - requires mixing
Mix Ratio by weight: Part A: Part B	100 : 87
Mix Ratio by volume: Part A: Part B	100 : 100
Product Benefits	<ul style="list-style-type: none"> <li>• Excellent handling properties</li> <li>• Low cost</li> <li>• Flexible</li> <li>• Low exotherm</li> <li>• Good thermal shock resistance</li> <li>• Low viscosity</li> </ul>
<b>Cure</b>	Room temperature cure
<b>Application</b>	Potting and Encapsulating

LOCTITE STYCAST ES 4412 two-component casting system formulated for impregnating applications with small tolerances encapsulation of various components and modules. This low cost, flexible system is filled with a non-abrasive filler for machine metering/dispensing.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

### Part A Properties

Density, @ 25 °C, g/cm <sup>3</sup>	1.82
Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 6, speed 2 rpm	14,000
Filler Content, %	50

### Part B Properties

Density, @ 25 °C, g/cm <sup>3</sup>	1.64
Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 3, speed 10 rpm	3,500
Filler Content, %	55

### Mixed Properties

Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP): Spindle 4, speed 10 rpm	10,000
Filler Content, %	52
Peak Exotherm Temperature, °C: 200 g mass	42
Pot Life @ 25 °C, minutes: 200 g mass	60
500 g mass	58
1,000 g mass	47

## TYPICAL CURING PERFORMANCE

### Recommended Curing Conditions

24 hours @ 25 °C

### Alternate Cure Schedule

3 hours @ 60 °C

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

Coefficient of Linear Thermal Expansion, ppm/°C:	
Below Tg	74
Above Tg	180
Glass Transition Temperature, °C	36
Tensile Strength	N/mm <sup>2</sup> 9.6 (psi) (1,400)
Compressive Strength	N/mm <sup>2</sup> 96.5 (psi) (14,000)
Linear Shrinkage, %	0.007
Hardness, Shore D	75
Elongation, %	45
Specific Gravity	1.79
Thermal Conductivity, W/(m·K)	0.293
Izod Impact Strength, ft-lb/in. of notch	0.3
Moisture Absorption, 24 hrs immersion, %	1.1

### Electrical Properties

Dielectric Strength, volts/mil	1,100
Dielectric Constant / Dissipation Factor:	
@ 25 °C:	
@ 100Hz	5.7/0.12
@ 1KHz	4.9/0.007
@ 10KHz	4.4/0.063
@ 105 °C:	
@ 100Hz	20/4.36
@ 1KHz	11.8/0.974
@ 10KHz	8.6/0.104
Volume Resistivity, ohm-cm:	
@ 25 °C	2×10 <sup>13</sup>
@ 105 °C	4×10 <sup>9</sup>
Surface Resistivity, ohms :	
@ 25 °C	1×10 <sup>14</sup>
@ 105 °C	2×10 <sup>11</sup>

## 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 4412 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 4412 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.

**Optimal Storage: 8°C to 28°C. Storage below 8°C or greater than 28°C can adversely affect product properties.**

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**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{psi} \times 145 = \text{N/mm}^2$   
 $\text{MPa} = \text{N/mm}^2$   
 $\text{N} \cdot \text{m} \times 8.851 = \text{lb} \cdot \text{in}$   
 $\text{N} \cdot \text{m} \times 0.738 = \text{lb} \cdot \text{ft}$   
 $\text{N} \cdot \text{mm} \times 0.142 = \text{oz} \cdot \text{in}$   
 $\text{mPa} \cdot \text{s} = \text{cP}$

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