



Hysol[®] ES4412

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PRODUCT DESCRIPTION

Hysol[®] ES4412 is a two-component casting system with excellent handling properties. This system combines low cost and flexibility with ease in handling. ES4412 is a 1 to 1 mix ratio by volume and is filled with non-abrasive fillers for machine metering and dispensing. This material has good thermal shock resistance and low exotherm, making it suitable for encapsulation of various components and modules. ES4412 is a low viscosity material, making it suitable for impregnating applications with small tolerances.

APPLICATION CHARACTERISTICS

Color	Part A	Black
	Part B	Tan
Filler Content, %	Part A	50
	Part B	55
Density @ 25°C, gm/cc	Part A	1.82
	Part B	1.64
Viscosity @ 25°C, Brookfield RVF		
Spindle 6, Speed 2, cps	Part A	14,000
Spindle 3, Speed 20, cps	Part B	3,500
Shelf Life, from date of manufacture, months		12

TYPICAL CURED PROPERTIES

Color	Black
Coefficient of Linear Thermal Expansion	
In/in/°C below Tg Alpha 1, x 10 ⁻⁶	74
In/in/°C above Tg Alpha 2, x 10 ⁻⁶	180
Glass Transition (Tg), °C	36
Compressive Strength, psi	14,000
Linear Shrinkage, %	0.007
Filler Content, %	52
Hardness, Shore D	70-80
Tensile Strength, psi	1,400
Elongation, %	45
Specific Gravity	1.79
Thermal Conductivity	
W/mK	0.293
Izod Impact Strength,	
Ft-lb/in of notch	0.30
Moisture Absorption (24 hr immersion), %	1.1

TYPICAL ELECTRICAL PROPERTIES

Dielectric Strength, volts/mil		1,100
Dielectric Constant @ 25°C	100 Hz	5.7
	1 kHz	4.9
	10 kHz	4.4
Dielectric Constant @ 105°C	100 Hz	20.0
	1 kHz	11.8
	10 kHz	8.6
Dissipation Factor @ 25°C	100 Hz	0.120
	1 kHz	0.007
	10 kHz	0.063
Dissipation Factor @ 105°C	100 Hz	4.36
	1 kHz	0.974
	10 kHz	0.104

Volume Resistivity @ 25°C	2 x 10 ¹³
Volume Resistivity @ 105°C	4 x 10 ⁹
Surface Resistivity @ 25°C	1 x 10 ¹⁴
Surface Resistivity @ 105°C	2 x 10 ¹¹

HANDLING

Mix Ratio, parts by weight*	100/87	
Mix Ratio, parts by volume*	100/100	
Pot Life @ 25°C, minutes	200 gm mass	60
	500 gm mass	58
	1000 gm mass	47
Viscosity @ 25°C, Spindle 4, Speed 10, cps		10,000
Peak Exotherm temperature		
200 gm mass, °C		42

*The standard mix ratio of ES4412 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 changes may also be observed at alternate mix ratios. No mix ratio beyond these two extremes should be used.

Note: ES4412 will settle upon storage, especially at temperatures exceeding 80°F. 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.

CURE SCHEDULE

Recommended cure	24 hrs @ 25°C
Alternate cure	3 hrs @ 60°C

GENERAL INFORMATION

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

STORAGE

Liquid Storage – Liquids should be stored at 23°C or below, in closed containers. If stored below 23°C, the material MUST be allowed to come to room temperature, in the sealed container, to avoid moisture contamination.

DATA RANGES

The data contained herein may be reported as a typical value and/or range values 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

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