



### SIL-FREE PLUS



#### PRODUCT DESCRIPTION

Sil-Free Plus is a non-silicone thermal grease with the current lowest thermal resistance on the market (for thin bond line applications\*). Sil-Free Plus is also extremely durable and will not pump-out making it ideal for applications requiring extended life and no degradation.

\*For larger gaps/thicker films use a high thermal conductivity material such as Sure-form® gap filler

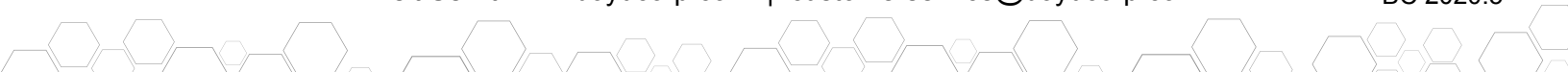
#### ADVANTAGES

Silicone-based compounds have an undesirable tendency to physically migrate and contaminate components nearby. This interferes with circuit operation long after hardware installation to cause unexpected, untimely and often inaccessible problems. The Heat Sink Compound's no creep feature extends circuit life by protecting components longer and by eliminating premature failure of adjacent components caused by migrating silicone base fluid.

PART NUMBER	STRUCTURE TYPE	VOLUME
104100F00000G	454 g (16 oz.)	JAR
104000F00000G	142 g (5 oz.)	TUBE
103900F00000G	340 g (12 oz.)	CARTRIDGE
103800F00000G	57 g (2 oz.)	TUBE
103700F00000G	42.5 g (1.5 oz.)	SYRINGE

#### NOTICE:

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### SIL-FREE PLUS

#### BENEFITS

Sil-Free Plus is non-silicone based, non-reactive, and non-abrasive with a soft, grease-like consistency with thixotropic behavior. It has excellent dielectric properties, lowest thermal resistance and superior durability (will not pump-out).

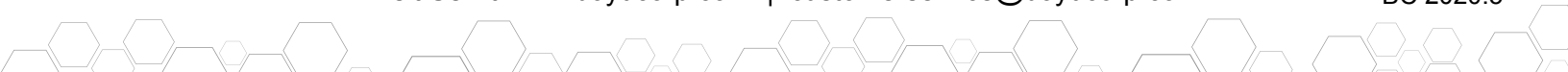
#### APPLICATIONS

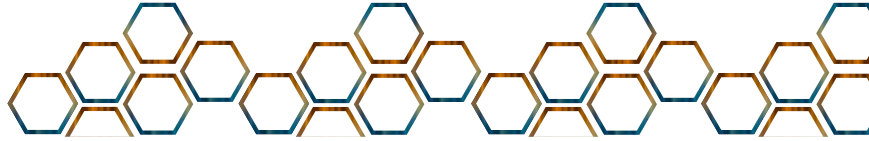
Sil-Free Plus is designed to be applied where thermal coupling is required and where a device may need to be removed from the heat sink at a later time. Major applications include CPU/ GPU, power semiconductors and LED's. It is also the most efficient and cost effective low bond line TIM 2 for use in any thermal management application

PROPERTY	VALUE	TEST METHOD
Specific Gravity, @ 25°C	3	ASTM D-70
Bleed, @ 200 C, 24 Hrs., %/Wt	0.00%	FTM-321 MODIFIED
Viscosity, 1 sec-1 , 25°C/50°C	470,000/410,000 cP	ARES RHEOMETER
Evaporation, @ 200 C, 24 Hrs., %/Wt.	1.00%	FTM-321 MODIFIED
Thermal Conductivity, @ 36°C	1.4 W/m-K	ASTM D5470-06
Thermal Resistance, @ 50C	0.0310 °C/W	Oracle TTV Model 270-7806-01
Anticipated Bond Line Thickness (mils)	< 0.3 mils	
Electrical Properties		
Dielectric Strength, 0.05" gap, V/mil	265	ASTM D-149
Dielectric Constant, 25°C @ 1,000 Hz	5.02	ASTM D-150
Dissipation factor, 25°C @ 1,000 Hz	0.0022	ASTM D-150
Volume Resistivity, ohm-cm	2.0 X10 <sup>15</sup>	ASTM D-257
Operating Temperature Range	-40°C to 180°C	
Flow Rate	7 to 10 g/min	AZ Method
Appearance	Smooth White Paste	
Shelf Life	2 Years	

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### SIL-FREE PLUS

#### PROPERTIES

Sil-Free Plus's exceptional performance can be attributed to its durability and resistance to pump-out. Sil-Free Plus was uniquely engineered and tested under thermal cycling conditions in order to ensure stability. Due to the growing number of various applications in the thermal management industry, an increased demand for longer lasting products has proven essential. Sil-Free Plus's resistance to pump-out provides excellent performance and product longevity.

#### THERMOGRAVIC ANALYSIS (TGA)

Thermogravimetric Analysis is a vital technique used in evaluating the thermal stability of a material over a designated temperature range. A material will begin to lose weight % composition at the onset temperature of degradation. Sil-Free Plus's highly stable thermal properties allow it to reach temperatures as high as 275°C in an inert atmosphere before any initial degradation or mass loss reinforcing its performance and durability.

#### COMPANY A: STANDARD WHITE THERMAL GREASE

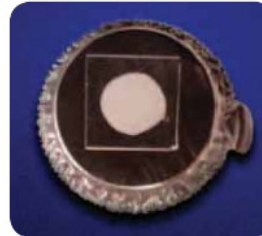


Zero Cycles

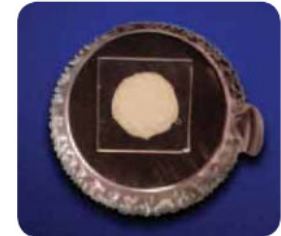


After 300 Cycles: Thermal grease voids and pumps out

#### Sil-Free Plus THERMAL GREASE



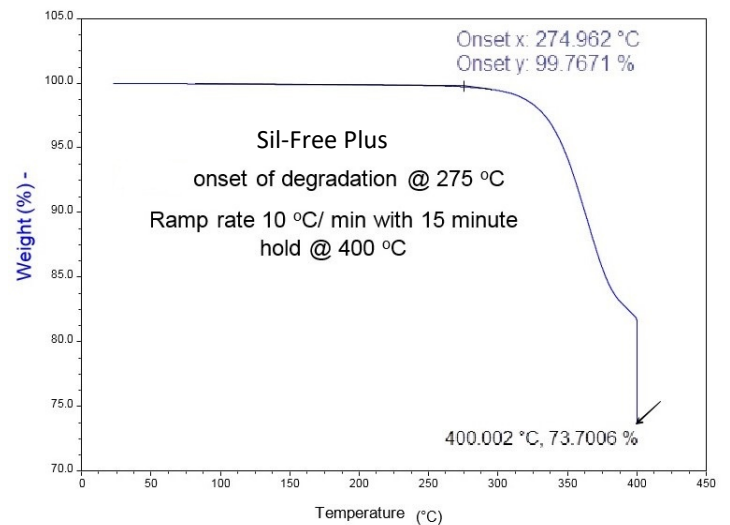
Zero Cycles



After 300 Cycles: Remains tacky with zero pump out

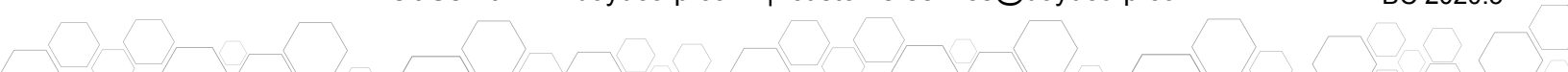
Thermal Shock Stability (0-165°C @ 10 Minute Dwell)

#### Thermogravimetric Analysis of Sil-Free Plus



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