

THERMAL COMPOUNDS, ADHESIVES AND INTERFACE MATERIALS

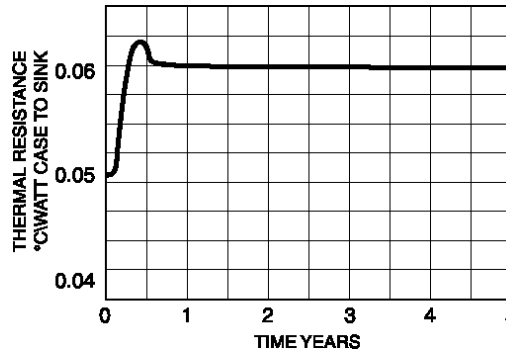
120 SERIES



The **120 Series** Silicone Oil-Based Thermal Joint Compound fills the minute air gap between mating surfaces with a grease-like material containing zinc oxide in a silicone oil carrier. It possesses an excellent thermal resistance of only 0.05°C/W for a 0.001 in. film with an area of one square inch. There is no measurable increase in case temperature of a mounted semiconductor on a heat sink after the 6-month stabilization period (Time versus Thermal Resistivity graph below).

TYPICAL VALUES FOR THERMAL RESISTANCE, CASE TO SINK (θ _{CS}) WHEN THERMAL JOINT COMPOUNDS ARE USED		
Case Style Characteristics	Mounting Torque in inch • pounds (N•M)	Typical Thermal Resistance (°C/W)
TO-3	8 (0.9)	0.09
TO-66	9 (0.9)	0.14
TO-220	8 (0.9)	0.50
0.19 (4.8) stud x 0.44 (11.2) hex	15 (1.7)	0.16
0.25 (6.4) stud x 0.69 (17.5) hex	30 (3.39)	0.10
0.38 (9.7) stud x 1.06 (26.9) hex	75 (8.47)	0.07
0.50 (12.7) stud x 1.06 (26.9) hex	125 (14.12)	0.07
0.75 (19.1) stud x 1.25 (31.8) hex	600 (67.79)	0.052

120 SERIES - THERMAL JOINT COMPOUND	
Characteristic	Description
Volume Resistivity	5 X 10 ¹⁴ ohm/cm
Dielectric Strength	225 volts/mil
Specific Gravity	2.1 min.
Thermal Conductivity @ WC	0.735 W/(m)(K)
	5.1 (Btu) (in.)/(hr)(ft ²)(°F)
Thermal Resistivity (P)	56 (°C)(in.)/watt
Bleed, % after 24 hrs @ 200°C	0.5
Evaporation, % after 24 hrs @ 200°C	0.5
Color	opaque white
Shelf life	5 years
Operating Temperature Range (°C)	-40/+200



120 SERIES - ORDER GUIDE	
Series - P/N	Container Size
120-SA ▲	4 gram plastic pak
120-2 ▲	2 oz (0.06 kg) jar
120-5 ▲	5 oz (0.14 kg) tube
120-8 ▲	8 oz (0.23 kg) jar
120-80 ▲	5 lb (2.27 kg) can
120-320	20 lb (9.08 kg) can

126 SERIES



The **126 Series** is a nontoxic, synthetic, ester-based (nonsilicone) Thermal Joint Compound with metal oxide fillers designed to enhance thermal performance characteristics of plastic and metal package devices exceeding that of silicone-based compounds. Solved are problems associated with contamination of wave solder baths and migration of silicone-based products.

Shelf life: 5 years.

126 SERIES THERMAL JOINT COMPOUND	
Characteristics	Description
Appearance	Smooth, white homogeneous paste
Solids Content, wt %	65% min
Thermal Conductivity at 36°C = 4.8 (Btu)(in.)/(hr) (ft ²) (°F)	19.0 X 10 ⁴ cal/sec cm °C, min
Interface Thermal Resistance	0.043°C/W TO-3 at 0.0008 thick film
Bleed, 24 hrs at 200°C, wt%	0.09% max
Evaporation, 24 hrs at 200°C, wt%	0.6 max
Volume Resistivity	2.3 x 10 ¹² ohms/cm
Dielectric Strength	200 volts/mil
Specific Gravity @ 60°F	2.93 (gm/cc)
Penetration	280 to 320
Operating Range	-40°C to 200°C

126 SERIES - ORDER GUIDE	
Series - P/N	Container Size
126-2 ▲	2 oz (0.6 kg) jar
126-4	4 oz (0.11 kg) tube
126-4S	4 oz (0.11 kg) syringe
126-5LB	5 lb (2.27 kg) can

THERMAL COMPOUNDS, ADHESIVES AND INTERFACE MATERIALS

DeltaBond™ 152



DeltaBond™ 152 adhesive is ideal for general cementing; thermally bonding semiconductors and components to chassis or heat sinks, while electrically isolating one from the other; fabricating heat sinks or thermal links; and for all permanent bonding of assemblies which require high thermally conductive interfaces. It produces a rigid, high strength bond to most materials when cured. DeltaBond™ 152 is available in bi-packs, kits, and quarts. Order one bottle of hardener A-4 or B-4 per one quart of DeltaBond™ 152 separately. Shelf life: 152KA 1 year, all others 2 years.

DELTABOND™152		
Characteristics	Hardener Type	
Typical Properties Fully Cured	A4	B-4
Thermal conductivity - W/(m) (°K)	0.836	0.908
(Btu) (in.)/(hr) (ft²) (°F)	5.8	6.3
Thermal resistivity - (°C) (in.)/watt	47	42
Bond shear strength 77°F	2,900	2,300
1 in. overlap - psi 125°F	2,200	2,000
etched aluminum to etched aluminum 212°F	400	800
Heat distortion point - °F	130	225
Minimum dielectric strength, v/mil, 0.125 in. sample	400	400
Max operation temp - °C	Continuous Intermittent	65 150
		100 190

DELTABOND™152		
Characteristics	Mixing Proportions and Working Properties	
	A-4	B4
Parts of hardener per 100 parts of resin by weight	7.5	3.5
*Working Time - at 77°F	45 min	30 min
†Initial cure time 77°F	8 hrs	6 hrs
150°F	45 min	30 min
250°F	20 min	15 min
‡Post-cure time at a temp in °F	4 hrs @200°F	4 hrs @ 200°F
‡Alternate room temp. aging time at 77°F	4 days	4 days
Working consistency (77°F)	viscous liquid	paste
Working viscosity (77°F) cps	25,000	—

Model Number	DELTABOND™152		
	Ordering Guide - Resin and Hardener		
	Resin		Hardener
	Part No.	Container	Part Number
DeltaBond™ 152	152-1A 152-1B 152-KA 152-Q	Bi-Pack (1 oz) Bi-Pack (1 oz) Kit (7 oz Resin, 0.5 oz Hardener) 1 quart (4 lbs)	Included in PIN 152-1 A ("A-4") Type Included in P/N 152-1 B ("B-4") Type Included in P/N 152-KA A-4 (0.316 lb), B-4 (0.14 lb), (order 1 only)

All hardener part numbers A-4, B-4

NOTES:

* Since the hardener/resin reaction is exothermic, it is important that batch size be matched to hardener speed. Working times given are for approximate batch sizes: A—200 gms, B—200 gms. Larger batch sizes will greatly reduce working time.

** For optimum electrical properties, dry parts for 15 minutes at 150°F (65°C) or 30 minutes at 75°F (24°C) to slowly evaporate the thinner and then final cure for 4 hours at 275°F (135°C).

† After initial cure, material may be handled, removed from fixture, etc., but has not yet achieved full properties and should be room temperature aged or post-cured as shown to achieve full physical and electrical properties.

‡ After initial cure, material may be brought to full physical and electrical properties during post-cure or may be room temperature aged for charted length of time to achieve same full properties.

The information contained herein is based on data believed to be reliable but we do not assume responsibility for accuracy. All such information is used at the customer's own risk, conditions of use being beyond our control.

THERMAL INTERFACE MATERIAL DATA FOR T-SERIES AND S-SERIES

T-Series Thermal Tapes come double-sided, and can be attached at the factory. Clips or mechanical fasteners are not required when thermal tapes are used. Not to be used for electrical isolation.

Material	Thermal Resistivity Degc in. Watt	Thickness	Description	Manufacturer Reference
T-1	79	0.006	Thermal Tape	Chomerics T-405
T-2	55	0.0045	Thermal Tape	Adhesives Research Arclad 8223
T-3	28	0.009	Thermal Tape	Chomerics T-412
T-4	157	0.007	Thermal Tape	Chomerics T-410

S-Series Thermal Interface Material come double-sided, and are applied at the factory only. They fill gaps due to surface roughness and flatness either under pressure or at temperature. These products also require mechanical fasteners. Not to be used for electrical isolation.

Material	Thermal Resistivity Degc in. Watt	Thickness	Description	Manufacturer Reference
S-3	25	0.005	Thermal Interface	Bergquist Q-pad 3
S-4	11	0.005	Thermal Interface	Bergquist softface
S-5	15	0.0055	Thermal Interface	Chomerics T-710
S-6	19	0.0052	Phase-Change Pad	Chomerics T-443
S-7	6	0.003	Tape a/Alum. Sub.	Power Devices AI-S (Thermstrate)
S-8	25	0.0065	Phase-Change Pad	Bergquist 2004

THERMAL COMPOUNDS, ADHESIVES AND INTERFACE MATERIALS
DeltaCast™ 153


DeltaCast™ 153 is a pourable casting resin having thermal expansion characteristics similar to aluminum and copper allowing assemblies to operate over a very wide temperature range. Ideal for encapsulating components and assemblies, this series' major advantages and uses include potted systems (virtually indestructible), protecting components and systems from moisture and contaminants, securing proprietary circuitry, mechanical support of devices, removal of heat from hot components and the assembly equalizing temperatures, and high voltage isolation. DeltaCast™ 153 is available in quarts and gallons. Order one bottle of hardener A4 or B-4 per one quart of DeltaCast™ 153 separately. Shelf life: 2 years.

DELTACAST™153		
Characteristics	Hardener Type	
	A4	B-4
Typical Properties Fully Cured		
Thermal conductivity - W/(m) (°K)	0.836	0.908
(Btu) (in.)/(hr) (ft²) (°F)	5.8	6.3
Thermal resistivity - (°C) (in.)watt	47	42
Bond shear strength 77°F	2,500	1,900
1 in. overlap - psi 125°F	—	—
etched aluminum to etched aluminum 212°F	—	—
Heat distortion point - °F	130	225
Minimum dielectric strength, v/mil, 0.125 in. sample	400	400
Max operation temp - °C	65	150
Continuous Intermittent	100	190

DELTACAST™153		
Mixing Proportions and Working Properties		
Characteristics	A-4	B4
Parts of hardener per 100 parts of resin by weight	7.5	3.5
*Working Time - at 77°F	45 min	30 min
† Initial cure time 77°F	8 hrs	6 hrs
150°F	45 min	30 min
250°F	20 min	15 min
‡Post-cure time at a temp in °F	4 hrs @200°F	4 hrs @ 200°F
‡Alternate room temp. aging time at 77°F	4 days	4 days
Working consistency (77°F)	heavy liquid	viscous liquid
Working viscosity (77°F) cps	10,000	30,000

Model Number	DELTACAST™153		
	Ordering Guide - Resin and Hardener		
	Resin		Hardener
	Part No.	Container	Part Number
DeltaCast™ 153	153-Q	1 quart (4 lbs)	A-4 (0.316 lb), B-4 (0.14 lb), (order 1 only)

All hardener part numbers A-4, B-4

DeltaBond™ 154


DeltaBond™ 154 is a medium viscosity, aluminum-filled resin with the best thermal conductivity of this series. It is, however, neither a good electrical insulator nor conductor. Its principal application is that of a good thermal mechanical adhesive for applications such as bonding fins to base plates or structural mounting blocks or brackets to heat sinks. Shelf life: 2 years.

DELTABOND™154		
Characteristics	Hardener Type	
	A4	B-4
Typical Properties Fully Cured		
Thermal conductivity - W/(m) (°K)	1.053	1.154
(Btu) (in.)/(hr) (ft²) (°F)	7.3	8.0
Thermal resistivity - (°C) (in.)watt	37	34
Bond shear strength 77°F	3,000	2,400
1 in. overlap - psi 125°F	2,300	2,100
etched aluminum to etched aluminum 212°F	500	800
Heat distortion point - °F	130	225
Minimum dielectric strength, v/mil, 0.125 in. sample	NA*	NA*
Max operation temp - °C	65	150
Continuous Intermittent	100	190

DELTABOND™154		
Mixing Proportions and Working Properties		
Characteristics	A-4	B4
Parts of hardener per 100 parts of resin by weight	11.0	4.5
*Working Time - at 77°F	45 min	30 min
† Initial cure time 77°F	8 hrs	6 hrs
150°F	45 min	30 min
250°F	20 min	15 min
‡Post-cure time at a temp in °F	4 hrs @200°F	4 hrs @ 200°F
‡Alternate room temp. aging time at 77°F	4 days	4 days
Working consistency (77°F)	viscous liquid	paste
Working viscosity (77°F) cps	25,000	—

Model Number	DELTABOND™154		
	Ordering Guide - Resin and Hardener		
	Resin		Hardener
	Part No.	Container	Part Number
DeltaBond™ 154	154-Q	1 quart (2.5 lbs)	A-4 (0.316 lb), B-4 (0.14 lb), (order 1 only)

All hardener part numbers A-4, B-4

