

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	
	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	2,900	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	150
	Intermittent	100

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
	250°F	20 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

THERMAL COMPOUNDS, ADHESIVES AND INTERFACE MATERIALS



173/174 SERIES
175 SERIES

DeltaPads™ Thermally Conductive Insulators
Greaseless Thermally Conductive Kapton® Reinforced Insulators

TO-3, TO-66, TO-220, DO-4, DO-5 SHEET

The 173, 174, and 175 Series are highly efficient thermally conductive insulators designed for semi-conductor interface to heat sinks. Their properties eliminate messy concerns associated with thermal greases.

Characteristics	DeltaPads™ 173-7 Series	DeltaPads™ 173-9 Series	DeltaPads™ 174-9 Series	Kapton® 175-6 Series	Test Method
Material Thickness	0.007 in.	0.009 in.	0.009 in.	0.006 in.	Micrometer
Color	Gray	Gray	Tan	Gray	Visual
Tear Strength, lb/in. Typical	100	100	100	100	ASTM 0624
Volume Resistivity, megohm-cm, Minimum Normal	1.0 x 10e 9	1.0 x 10e 9	1.0 x 10e 13	1 x 10e 13	ASTM D257
Breakdown Voltage, Minimum	4,000	5,000	5,000	6,000	ASTM 0149
Dielectric Constant at 60 Hz and 100 V Maximum	2.70	2.40	2.50	5.5 @ 1,000 Hz	ASTM D 150
Continuous Use Temperature, °C	-60/+200	-60/+200	-60/+200	-60/+200	-
Thermal Conductivity, cal/cm sec. °C, Minimum	3 x 10e -3	3 x 10e -3	1 x 10e -2	1.2 x 10e -3	-
Thermal Resistance (TO-3), 1 in.² °C/W	0.33	0.50	0.25	0.40	-
Recommended Mounting Pressure, lb/in.²	350/550	350/550	350/550	350/550	Formula*

$$*P \text{ (pressure in psi)} = \frac{T \text{ (torque [in.-lb]} \times N \text{ (number of fasteners)}}{0.2 \times D \text{ (Thread Dia)} \times A \text{ (contact surface area square inches)}}$$

173-7 Series		173-9 Series	174-9 Series	175-6 Series	Mechanical Dimensions in. (mm)				
No Adhesive	Adhesive Backing	No Adhesive	No Adhesive	Greaseless	A	B	C	D	Case Style
173-7-210P	-	173-9-210P	174-9-210P	175-6-210P	0.687 (17.4)	0.562 (14.3)	0.218 (5.5)	0.125 (3.2)	TO-220
173-7-220P▲	-	173-9-220P▲	174-9-220P	175-6-220P	0.710 (18-0)	0.500 (12.7)	0.160 (4.1)	0.141 (3.6)	TO-220
173-7-230P	-	173-9-230P	174-9-230P	175-6-230P	0.750 (19.1)	0.500 (12.7)	0.187 (4.8)	0.125 (3.2)	TO-220
173-7-240P	173-7-240A	173-9-240P	174-9-240P	175-6-240P▲	0.750 (19.1)	0.500 (12.7)	0.187 (4.8)	0.147 (3.7)	TO-220
173-7-250P	-	173-9-250P	174-9-250P	175-6-250P	0.865 (22.0)	0.650 (16.5)	0.205 (5.2)	0.140 (3.6)	TO-220
-	-	-	-	175-6-260P	1.000 (25.4)	0.750 (19.1)	0.320 (8.1)	0.141 (3.6)	TO-220
-	-	173-9-280P	-	175-6-280P	0.860 (21.8)	0.740 (18.8)	0.200 (5.1)	0.160 (4.1)	TO-220
173-7-290P	-	173-9-290P	-	-	0.855 (21.7)	0.630 (16.0)	0.230 (5.8)	0.093 (2.4)	TO-220
173-7-310P	-	173-9-310P	174-9-310P	175-6-310P▲	1.593 (40.5)	1.100 (27.9)	0.156 (4.0)	0.062 (1.6)	TO-3
173-7-320P	173-7-320A	173-9-320P	174-9-320P	175-6-320P	1.650 (41.9)	1.140 (29.0)	0.122 (3.1)	0.062 (1.6)	TO-3
173-7-330P	-	173-9-330P	174-9-330P	175-6-330P	1.650 (41.9)	1.140 (29.0)	0.140 (3.6)	0.093 (3.4)	TO-3
173-7-340P	-	173-9-340P	-	175-6-340P	1.780 (45.2)	1.250 (31.8)	0.140 (3.6)	0.093 (3.4)	TO-3
173-7-350P	-	173-9-350P	-	-	1.563 (39.7)	1.050 (26.7)	0.140 (3.6)	0.080 (2.0)	TO-3
173-7-410P	-	173-9-410P	174-9-410P	175-6-410P	0.625 (15.9)OD	0.200 (5.1)ID	N/A	N/A	DO-4, DO-5
173-7-510P	-	173-9-510P	174-9-510P	175-6-510P	0.800 (20.3)OD	0.260 (6.6)ID	N/A	N/A	DO-4, DO-5
173-7-520P	-	173-9-520P	174-9-520P	175-6-520P	1.000 (25.4)OD	0.260 (6.6)ID	N/A	N/A	DO-4, DO-5
173-7-610P	-	173-9-610P	174-9-610P	175-6-610P	1.312 (33.3)	0.762 (19.4)	0.140 (3.6)	0.062(1.6)	TO-66
173-7-710P	-	173-9-710P	-	175-6-710P	0.360 (9.14)OD	0.200 (5.1)ID	0.040 (1.0)	-	TO-5
-	-	173-9-810P	-	175-6-810P	2.000 (50.8)	0.750 (19.1)	0.187 (4.3)	0.125 (3.8)DIA	TO-220
-	-	173-9-820P	-	175-6-820P	4.000 (101.6)	0.750 (19.1)	0.187 (4.3)	0.125 (3.8)DIA	TO-220
-	-	173-9-910P	-	-	1.000 (25.4)	0.500 (12.7)	0.200 (5.1)	0.141 (3.6)	TO-66
173-7-66P	173-7-66A	173-9-66P	174-9-66P	175-6-66P	6.000 (152.4)	6.000 (152.4)	N/A	N/A	SHEET
173-7-1212P	173-7-1212A	173-9-1212P	174-9-1212P	-	12.000 (304.8)	12.000 (304.8)	N/A	N/A	SHEET
-	-	-	-	175-6-1311P	13.000 (330.2)	11.000 (279.4)	N/A	N/A	SHEET

