

# THERMATTACH® Tape

## Thermally Conductive Attachment Tapes



### Description

THERMATTACH® double-sided thermal interface tapes provide exceptional bonding properties between electronic components and heat sinks, eliminating the need for mechanical fasteners.

THERMATTACH® tapes are proven to offer excellent reliability when exposed to thermal, mechanical, and environmental conditioning. They are offered in a variety of configurations, as detailed in the typical properties table.

### Features / Benefits

- Offered in various forms to provide thermal, dielectric, and flame retardant properties
- Offered in custom die-cut configurations to suit a variety of applications

- Eliminate the need for mechanical attachment (i.e. screws, clips, rivets, fasteners)
- Proven reliability under various mechanical, thermal, and environmental stresses
- Embossed version available
- UL recognized V-0 flammability
- Meets RoHS specifications
- No curing required, unlike epoxy or acrylic preforms or liquid systems
- Easily reworkable

### Typical Applications

- Mount heat sinks to components dissipating < ~25 W
- Attach heat sinks to PC (esp. graphics) processors
- Heat sink attachment to motor control processors
- Telecommunication infrastructure components

### Product Attributes

#### T418

- Superior adhesive strength
- Best conformability to components
- UL94 V-0 rated
- Good thermal performance

#### T412

- Good adhesion
- Superior thermal performance
- General use tape with added thermal conductivity of Al foil layer

#### T411

- Designed for adhesion to plastic packages
- Attaches to low surface energy packages

#### T404/T414

- Excellent dielectric strength due to polyimide carrier
- Good thermal performance
- UL94 V-0 rated
- T404 without halogenated flame retardant

#### T405

- General use tape with added thermal conductivity of Al foil layer
- Excellent thermal performance
- UL94 V-0 rated
- T405 without halogenated flame retardant

Thermally Conductive Attachment Tapes										
Typical Properties										
	T418	T412	T404 / T414	T405 / T405-R	T411	Method				
Physical	Recommended for Plastic Component Attachment	No	No	No	No	Yes	--			
	Color	Light Yellow	Gray	Beige	White	Clear / Metallic	--			
	Embossed	Optional	Standard	Standard	Standard	No	--			
	Reinforcement Carrier	Fiberglass	Aluminum Mesh	Filled Polyimide	Aluminum	Aluminum Mesh	Visual			
	Thickness, inch (mm)	0.010 (0.25)	0.009 (0.23)	0.005 (0.127)	0.006 (0.15)	0.010 (0.25)	ASTM D374			
	Thickness Tolerance, inch (mm)	± 0.001 (0.025)	± 0.001 (0.025)	± 0.001 (0.025)	± 0.001 (0.025)	± 0.001 (0.025)	--			
	Adhesive CTE, ppm/°F	300	300	300	300	400	ASTM D3386			
	Glass Transition Temperature Range °F (°C)	-4 (-20)	-22 (-30)	-22 (-30)	-22 (-30)	-58 (-50)	ASTM D1356			
	Operating Temperature Range, °F (°C)	-22 to +257 (-30 to +125)	-22 to +257 (-30 to +125)	-22 to +257 (-30 to +125)	-22 to +257 (-30 to +125)	-58 to +302 (-50 to +150)	--			
	Thermal Impedance °C-in <sup>2</sup> / W (°C-cm <sup>2</sup> /W)	1.2 (7.7)	0.30 (2.0)	0.6 (3.7)	0.5 (3.4)	1.0 (6.5)	ASTM D5470			
Thermal Conductivity W/m-K	0.5	1.4	0.4	0.5	0.5	ASTM D5470				
Electrical										
Voltage Breakdown (kVac)	5	N/A	5	N/A	NA	ASTM D149				
Volume Resistivity, (ohm-cm)	1.0 X 10 <sup>13</sup>	1.0 X 10 <sup>2</sup>	3.0 X 10 <sup>14</sup>	N/A	NA	ASTM D257				
Mechanical / Adhesion	Lap Shear Al-Al @25°C, psi (kPa)	150 (1,034)	70 (480)	100 (689)	100 (689)	40 (270)	ASTM D1002			
	90° Peel Adhesion to 0.002" aluminum foil, lbf /in (N/cm)	4.0 (6.9)	1.0 (1.76)	1.5 (2.6)	1.5 (2.6)	2.0 (3.5)	ASTM D1000			
Mechanical / Adhesion	Die Shear Adhesion after 400 psi attachment, kPa (psi) – 2 hour sample dwell time 77°F (25°C)	150 (1,034)	135 (931)	130 (897)	125 (862)	110 (759)	Chomerics # 54			
	Creep Adhesion, days 77°F (15°C) 302°F (125°C)	>50 >10	>50 >10	>50 >10	>50 >10	>50 >10	PSTC-7			
Regulatory	Flammability Rating [See UL File E140244]	V-0	Not Tested	V-0	V-0	Not Tested	UL94			
	RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Chomerics Certification			
	Shelf-Life, months from shipment	12	12	12	12	12	Chomerics			
	Outgassing, % CVCM (% TML)	Not Tested	0.00 (0.14)	0.02 (0.56)	0.01 (0.25)	Not Tested	ASTM E595			

## Ordering Information

These attachment tapes are available in the following formats.  
Contact Chomerics for custom widths, part sizes, etc.

Sheets form, roll form, or die-cut parts. Offered on continuous rolls.  
A general ordering information table is included below for reference.

Part Number: 6W — XX — YYYY — ZZZZ

W = 0 (Standard Part)	XX = 13 for PSA two sides	YYYY = 4 digit alpha/numeric part number. Contact Chomerics.	ZZZZ = Material Type (T418, T411, etc)
W = 7 (Roll of material)	XX = 10 (100 foot roll) XX = 40 (400 foot roll)	YYYY = 0600 for 6" wide YYYY = 1000 for 10" wide YYYY = 1150 for 11 1/2" wide YYYY = 2400 for 24" wide (other sizes available. Contact Chomerics)	
W = 9 (Custom part)	XX = 13 for PSA two sides	YYYYY = Custom Part Number. Contact Chomerics	

### Handling Information

These products are defined by Chomerics as "articles" according to the following generally recognized regulatory definition for articles:

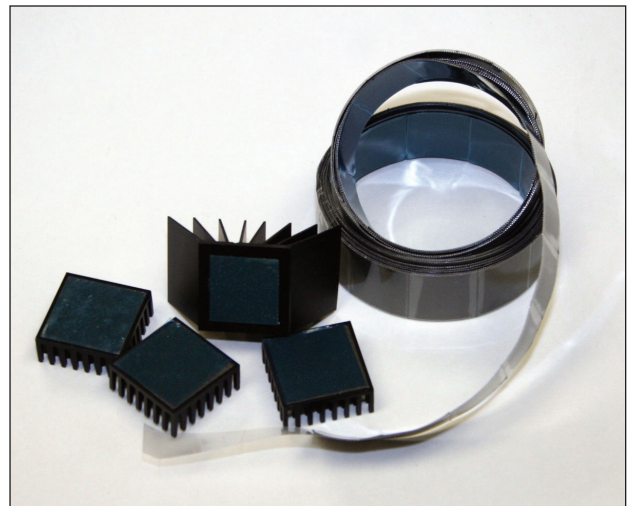
An article is a manufactured item "formed to a specific shape or design during manufacturing," which has "end use functions" dependent upon its size and shape during end use and which has generally "no change of chemical composition during its end use."

In addition:

- There is no known or anticipated exposure to hazardous materials/substances during routine and anticipated use of the product.
- The product's shape, surface, and design is more relevant than its chemical composition.

These materials are not deemed by Chomerics to require an MSDS. For further questions, please contact Chomerics at 781-935-4850.

Excerpt From: *THERM CAT 1001 EN March 2011 Rev H*



**THERMATTACH® Thermally Conductive Attachment Tapes**  
**Tape Application Instructions: T404, T405, T405-R, T411, T412, T413, T414, T418**

**Materials Needed**

- Clean lint-free cloth rag
- Industrial solvent
- Rubber gloves

For optimal performance, Chomerics recommends interface flatness of 0.001 in/in (0.025 mm/25 mm) to 0.002 in/in (0.050 mm/25 mm) maximum.

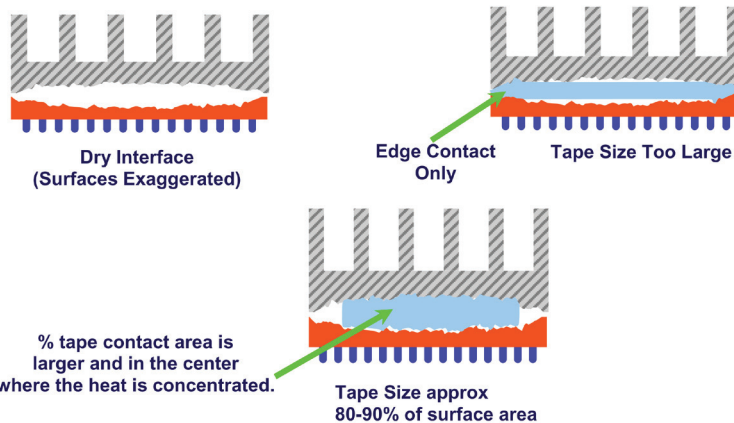
**Step 1:** Ensure that bonding surfaces are free from oil, dust, or any contamination that may affect bonding. Using rubber gloves, wipe surfaces with a cloth dampened with industrial solvents such as MEK, toluene, acetone or isopropyl alcohol.

**Step 2:** Cut tape to size\* and remove a liner or remove pre-cut tape from roll.

**\*Note:** Due to variations in heat sink surfaces, Chomerics' data indicates that it sometimes is beneficial to be cut slightly smaller than the area of the heat sink. See illustration.

**Step 3:** Apply to center of heat sink bonding area and smooth over entire surface using moderate hand pressure / rubbing motion. A roller may be useful to help smooth the part to the surface by rolling from the center out to beyond the edges of the part. This ensures optimal contact between tape and heat sink.

**Step 4:** Center heat sink onto component and apply using any one of the recommended temperature/pressure options:



**Minimum:** 10 psi at room temperature for 15 seconds  
**PREFERRED:** 30 psi at room temperature for 5 seconds

More pressure equals better wetting out of the adhesive to the contact surfaces. A twisting motion during assembly of the substrates will typically improve wetting.

**Note that typically 70% of the ultimate adhesive bond strength is achieved with initial application, and 80-90% is reached within 15 minutes.** Ultimate adhesive strength is achieved within 36 hours; however the next manufacturing step can typically occur immediately following the initial application.

**Removal Instructions**  
 Materials needed: Single-edged razor blade or a small, thin-bladed pocketknife; soft, thin metal spatula. Use safety precautions when handling sharp instruments and organic solvents.

**Step 1:** Carefully insert the blade edge into the bond line at a corner between the heat sink and the component. The penetration need not be very deep.

**Step 2:** Remove the blade and insert the spatula into the wedge. Slowly twist the spatula blade so that it exerts a slight upward pressure.

**Step 3:** As the two surfaces start to separate, move the spatula blade deeper into the bond line and continue the twisting motion and upward force.

**Step 4:** After the two components are separated, the tape can be removed and discarded. If adhesive remains on the component surfaces, it must be removed. Adhesive is best removed by wiping with a clean rag (lint-free) dabbed with isopropyl alcohol, MEK or toluene. Use sufficient solvent to remove all adhesive.

**Step 5:** Solvent cleaned components must be verified 100% free of cleaning solvent and prior to reattachment of adhesive.

**Relative Thermal Performance**

Thermally Conductive Attachment Tapes						
Typical Properties		T418	T412	T404 / T414	T405 / T405-R	T411
Performance*	Ceramic Attachment	5	3	4	4	4
	Metal Attachment	5	3	4	4	4
	Plastic Attachment	N/R	N/R	N/R	N/R	5
	Dielectric Performance	3	N/R	5	N/R	N/R
	Thermal Performance	2	5	3	4	2

\* Performance rated on a scale of 1-5, 5 being the best. N/R = Not Recommended.