

T-form™ 400 Series
Low Thermal Resistance
Gap Fillers With Exceptional
Strength & Compressibility

THERMAGON, INC.



T-form™ 400...Strength & Elasticity Combined with High Thermal Conductivity

Looking for the perfect marriage of high strength and thermal conductivity in a gap filler? Look no further than T-form™ 400 Series Interface Material.

T-form 400 Series is a new, thermally-conductive, interface material that combines a thermal conductivity of 5 W/m°C with elasticity and conformability, as well as unprecedented strength.

The result is a user-friendly material with low thermal resistance (see graph on next page).

Displaces Air Gaps On Rough Surfaces

The material's conformability allows it to displace air gaps on rough surfaces and to help compensate for height variations between different components interfaced to the same heat spreader. For example, at 40 mils thick, conformability is 20% at 30 psi.

Soft But Strong

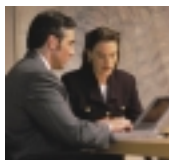
Ultra soft material means thermal resistance can be minimized, while imparting little or no stress to the mating parts. But soft doesn't mean weak; T-form 400 is capable of elongations of up to 120% of its original shape. This strength makes the material better able to tolerate production line variability during application, including variations in applied pressure. It even allows for easy rework, with one side of the interface material naturally tacky.



Application Note #1: How Strong Is Strong?

A manufacturer of semiconductor equipment had to prove to its customers (chip manufacturers) that T-form 400 could withstand the anticipated application, as well as the possibility of several rounds of rework.

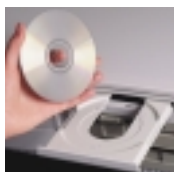
So the equipment manufacturer performed 10,000 pressure cycles on a 10 mil sample of T-form 400. The T-form pad withstood the punishment.



Application Note #2: Rework & Low Resistance?

A manufacturer of notebook computers needed a thermally-conductive interface pad that would permit rework and still provide the lowest possible thermal resistance at low pressure.

The manufacturer did numerous trials with T-form 400, testing both resistance and rework capacities. The results lead to T-form 400 being "spec'ed into" the notebook design for full production runs.



Application Note #3: Compressibility

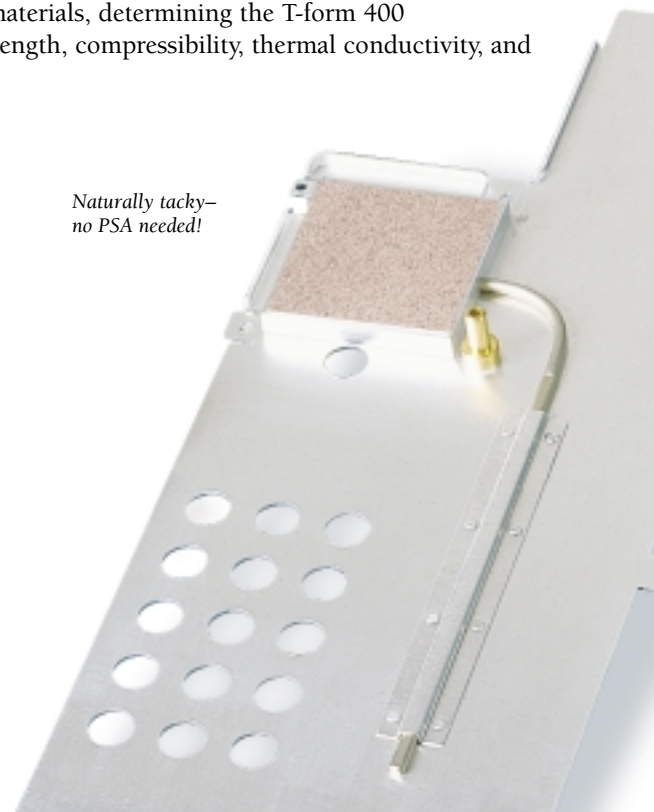
A disc drive manufacturer required strength and compressibility in a high performance, thermally-conductive interface pad.

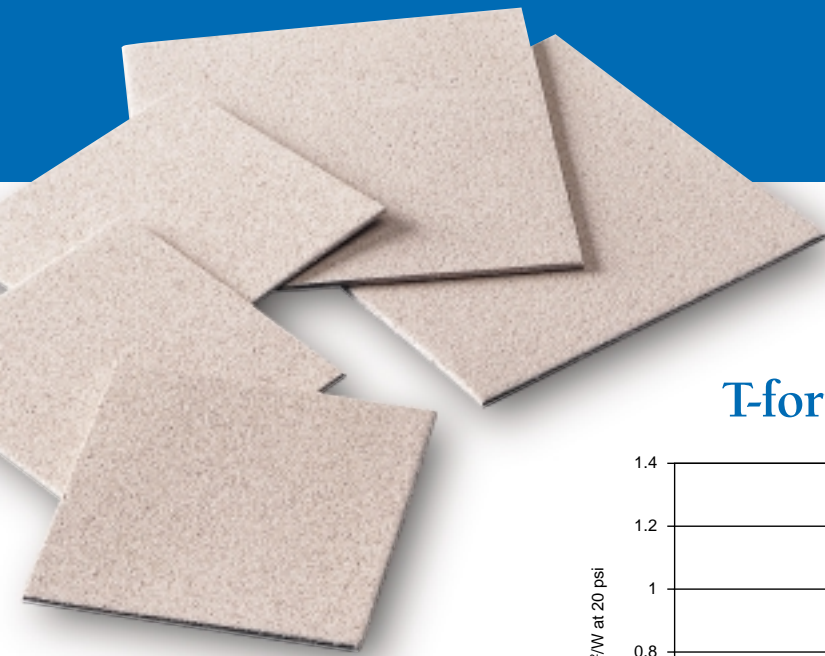
The manufacturer tested a full range of the industry's leading thermally-conductive materials, determining the T-form 400 out-performed all others for strength, compressibility, thermal conductivity, and outgassing.

*Naturally tacky—
no PSA needed!*

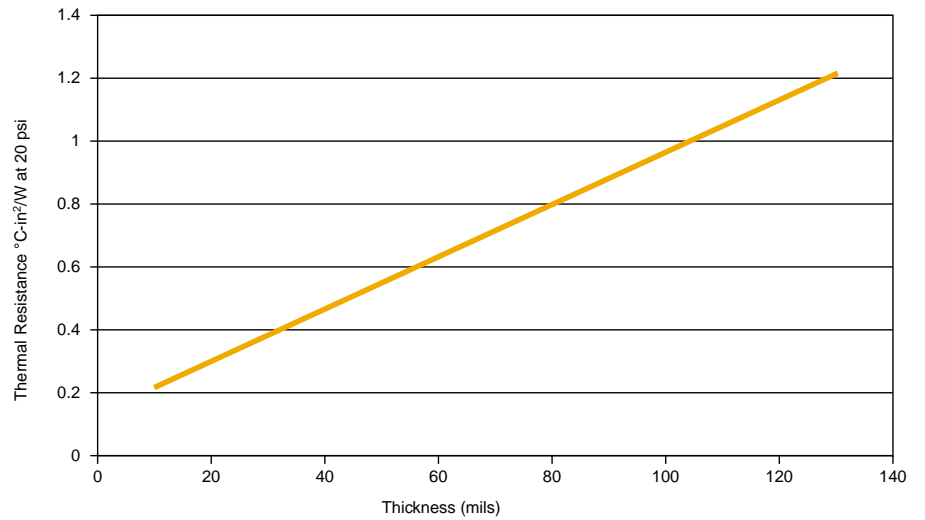


*Available in sheets,
die-cut pads or rolls.*

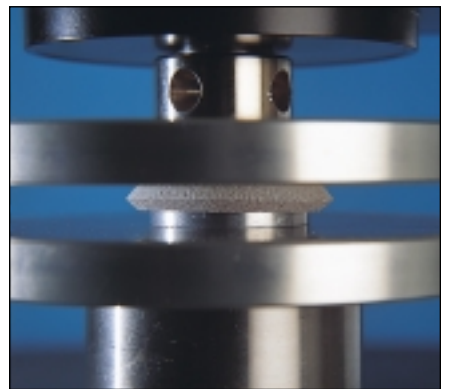




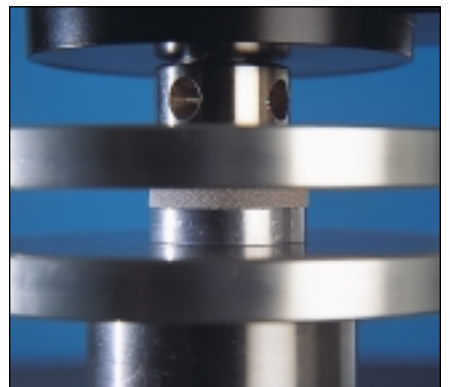
T-form 400 Thermal Resistance



Stretch test demonstrating the superior strength and elasticity of T-form 400 gap filler. Elongations of up to 120% are achieved.



T-form 400 material under pressure of 40 psi.



Virtually instant recovery to original shape upon removal of pressure, assuring that all gaps remain filled.



T-form™ 400 Series Interface Pads & Gap Fillers

| Typical Properties | T-form 410 | T-form 420 | T-form 430 | T-form 440 | T-form 460 | T-form 4100 | T-form 4130 | Test Method |
|---|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| Thickness, mils*/mm | 10/0.25 | 20/0.50 | 30/0.75 | 40/1.0 | 60/1.5 | 100/2.5 | 130/3.25 | – |
| Tolerance, mils/mm | ±1.5/.04 | ±2/.05 | ±3/.075 | ±3/.075 | ±4/.10 | ±5/.125 | ±10/.25 | – |
| Hardness, Shore A | 50 | 45 | 35 | 25 | 20 | 20 | 20 | D 2240 |
| Density, g/cc | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | – |
| Thermal Conductivity, Watts/m-°C | 5 | 5 | 5 | 5 | 5 | 5 | 5 | D 5470 |
| Thermal Resistance @ 20 psi, °C-in ² /Watt | 0.22 | 0.38 | 0.40 | 0.50 | 0.65 | 1.00 | 1.22 | Modified |
| @ 1.4 kg/cm ² , °C-cm ² /Watt | 1.74 | 1.94 | 2.26 | 2.77 | 3.23 | 5.68 | 7.35 | D 5470 |
| Minimum Dielectric Strength, volts | 1500 | 2000 | 4500 | >6000 | >6000 | >6000 | >6000 | D 149 |
| Fiberglass Reinforcement | yes | yes | yes | no | no | no | no | – |
| Color | chocolate | chocolate | chocolate | chocolate | chocolate | chocolate | chocolate | – |
| Tensile Strength, psi | N/A | N/A | N/A | 20 | 20 | 20 | 20 | D 412 |
| Elongation, % of original length | N/A | N/A | N/A | 120 | 120 | 120 | 120 | D 412 |

* Available in any thickness between 10-130 mils

N/A: not applicable due to fiberglass reinforcement.

Part Number Nomenclature

T-form™ 4xxx

Thermally Conductive Elastomer _____

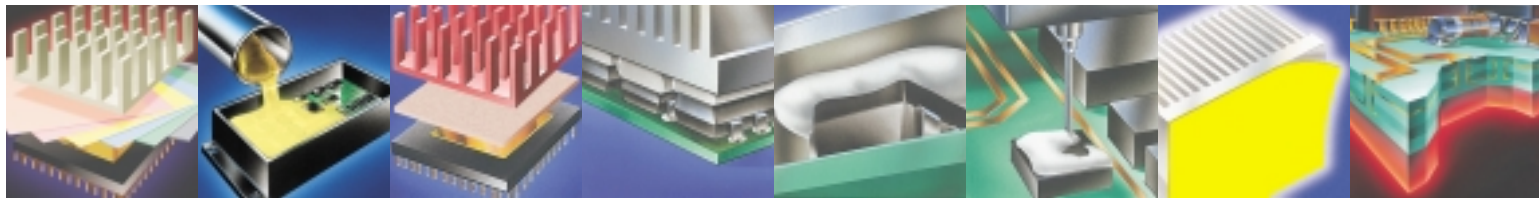
Silicone Sheet Material _____

Thickness _____

Any thickness between 10-130 mils

Availability

- Standard sheets: 8x8 inches (20x20 cm); larger sizes available.
- 10 mils to 130 mils thicknesses available.



Other Thermagon Material Solutions

- For the best thermal performance available anywhere, use T-pli™
- For increased compressibility with the lowest possible thermal resistance, use T-form™
- For the ultimate in electrical resistance and strength, use T-gon™ 200
- For both thermal and electrical conductivity, use T-gon™ 800
- For maximum compressibility with elasticity, use T-flex™
- For softness and compressibility, use T-putty™ or T-flex™
- For the lowest thermal resistance in thin layers, use T-grease™
- For grease-like performance in roll form or pre-attached to heat sink, use T-pcm™ “phase change material”
- For the cost-sensitive applications, use T-dux™, T-pcm™ or T-gon™ 800
- For thermally-conductive printed circuit board laminates, use T-lam™ systems

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