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Product used in EV Battery Thermal Application

	Product Name	TC (W/m.k)	Hardness	Thickness Range (mm)	Comment
Thermal Pad	ELAN-Flex® TC Thermal Conductive Pad R-Series	1.0-3.0	Shore A 10-60	0.3-12	High strength mechanical properties
Thermal Pad	ELAN-Flex® TC Thermal Conductive Pad Series	1.0-2.0	Shore OO 10-35	0.5-10	Ultra soft, one side tacky
Thermal Pad	ELAN-Flex® TC Thermal Conductive Pad S-Series	1.5	Shore OO 20	1.0-10	Ultra soft, one side tacky
Thermal Gel	ELAN-Bond® TF Series	1.2-3.5	Shore OO 40-50	-	Two-Part dispensable

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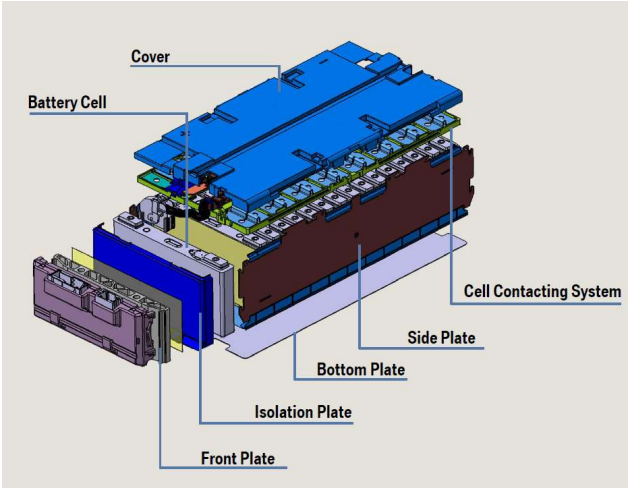
ELAN-Flex® TC Thermal Conductive Pad R-Series

Product Model	Color	Thickness (mm)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating	Thermal Resistance (°C-in²/W)
TCP120R -T10/H10	Light Yellow	1,0	Shore A 10-15	1.2	-40 to 200	UL 94 V0	1.47
TCP200R -T10/H50	Gray	1.0	Shore A 45-55	2.0	-40 to 200	UL 94 V0	0.4
TCP300R -T10/H55	Light Blue	1.0	Shore A 50-60	3.0	-40 to 150	UL 94 V0	2.82

- Silicon Resin & Ceramics Filler

Distinctive Properties

- High strength
- High elasticity
- Low compression application
- Double side in natural inherent tack
- Excellent electrical isolation
- Superior temperature endurance



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ELAN-Flex® TC Thermal Conductive Pad

Product Model	Color	Thickness (mm)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating	Thermal Resistance (°C-in²/W)
TCP100-T10/H10	Brown Red + White	1.0	Shore OO 10	1.0	-40 to 150	UL 94 V0	1.9

- Silicon Resin & Fiberglass

Distinctive Properties

- Ultra soft with exception compressibility to 50%
- Single side in natural tack
- Fiberglass reinforced without deforming in die-cut
- Excellent electrical isolation
- Cut-through resistance

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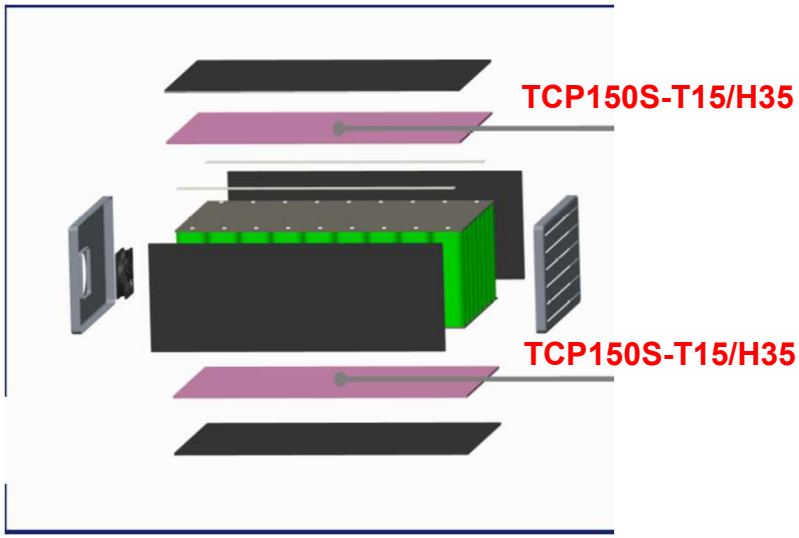
ELAN-Flex® TC Thermal Conductive Pad S- Series

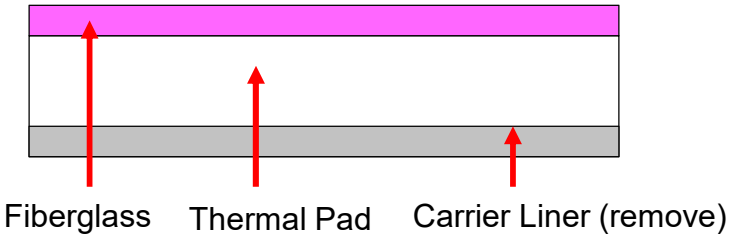
Product Model	Color	Thickness (mm)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating
TCP150S-T15/H35	Light Pink	1.5	Shore OO 35	1.5	-40 to 150	UL 94 V0

- Silical Gel, Ceramic Filler & Fiberglass



Distinctive Properties

- Ultra soft with excellent compressibility
- Single side in natural tack
- Fiberglass reinforced without deforming in die-cut
- Close contact with electronic components
- Effectively reducing the thermal resistance of the interface
- High electrical insulation
- Self adhesive and easy to assemble



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The Different Among 3 Types of Thermal Pad

1. TCP (Normal type)
- Material: silicon resin + fiberglass
- Ultra-soft
- Single side tack
- Good electrical insulation
- Hardness – soft
- Used in between **battery pack and battery casing**

2. TCP R-series
- Material: silicon resin + ceramics
- Double side tack
- Better Electrical insulation – higher than TCP and S-series
- Hardness – slightly hard than TCP and S-series
- Used in between **soft cell battery and soft cell battery** or between **soft cell battery and heatsink**

3. TCP S-series
- Material: silicon resin + ceramics + fiberglass
- Ultra-soft
- Single side tack
- Electrical insulation Same like TCP
- Hardness – same as TCP
- Same as TCP used in between **battery pack and battery casing**

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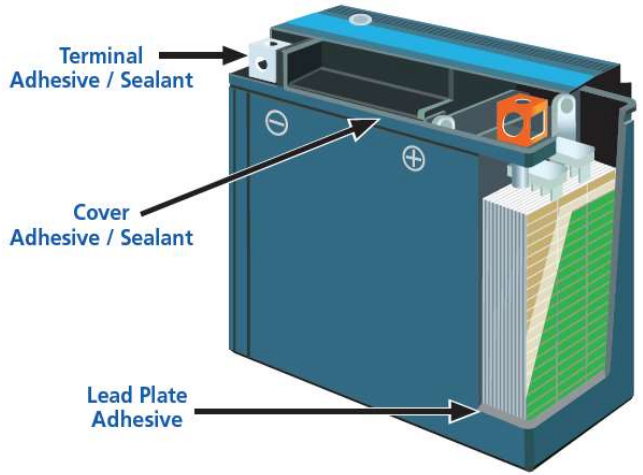
ELAN-Bond® TF Series

Product Model		Color	Viscosity (cps)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating
TF150	Part A	White	30000	Shore OO 50	1.5	-40 to 200	UL 94 V0
	Part B	Khaki	30000				
TF200	Part A	White	350000	Shore OO 50	2.0	-40 to 200	UL 94 V0
	Part B	Gray	400000				

- Liquid Gap Filling Material
- 2 component with mix ratio 1: 1
- Ceramic Filled Silicone Elastomer
- Cured at room temperature or elevated temperature
- Replace grease or potting compounds



Distinctive Properties

- Easy dispensing
- Thixotropic nature makes it easy to dispense
- Ultra-conforming, designed for fragile and low stress applications
- Excellent low and high temperature mechanical and chemical stability

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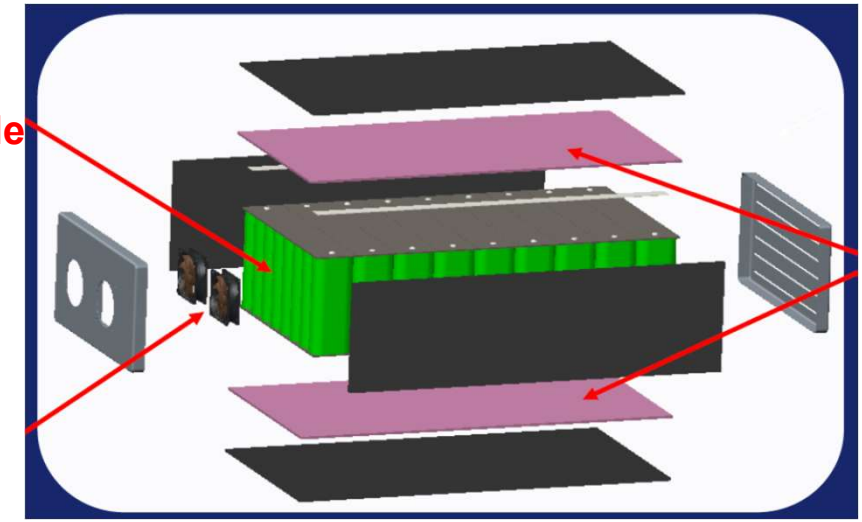
ELANTAS TM Materials for Air Cooled Battery

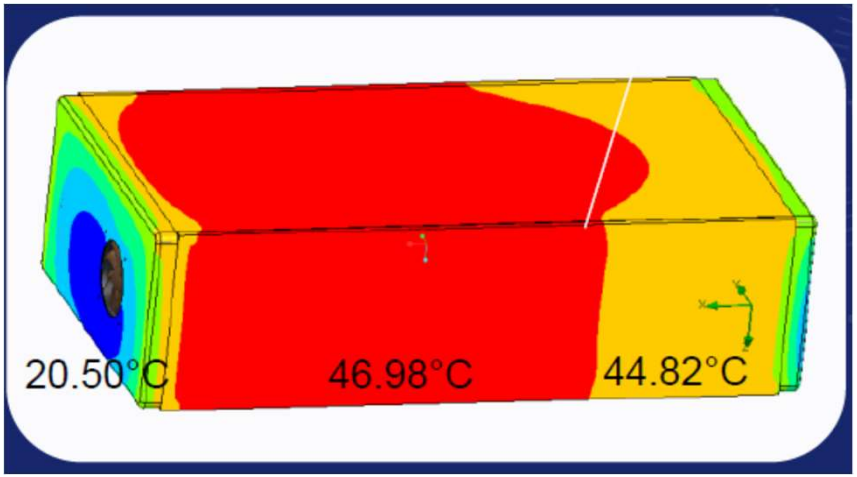
Battery Module

Cooling Fans



TCP100 / TCP150S

Thermal conductive pads conduct heat from the battery pack to the aluminum housing allowing the heat to get to ambient air, wile also proving electrical isolation from battery pack to housing



Air cooling in conjunction with Thermal Interface Materials can effectively dissipate heat of the battery pack

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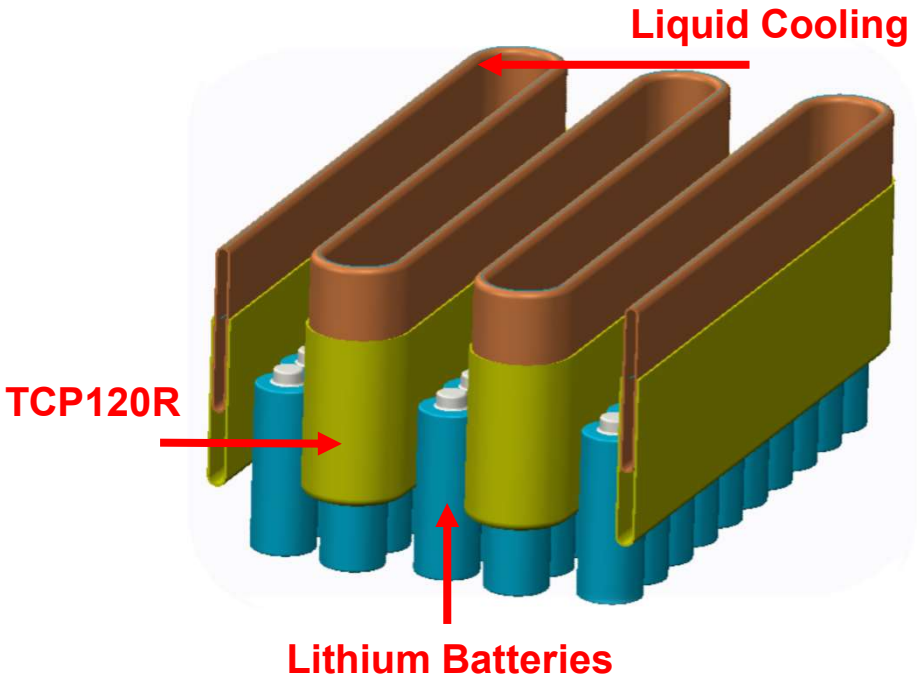
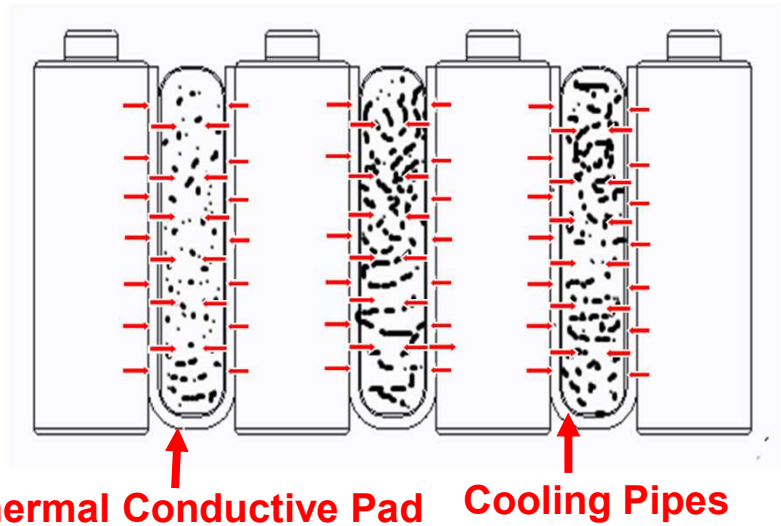
ELANTAS TM Materials for Liquid Cooled Battery





Heat is conducted from the battery cells to liquid cooling pipe through the thermal conductive pad, them to ambient via a heat exchanger.

The thermal conductive pad fills the voids creating a continuous thermal path between the cell and cooling pipe. Besides creating a heat path, thermal conductive pads electrically isolates the cells, plus absorbs shock and vibe during operation in the vehicle.

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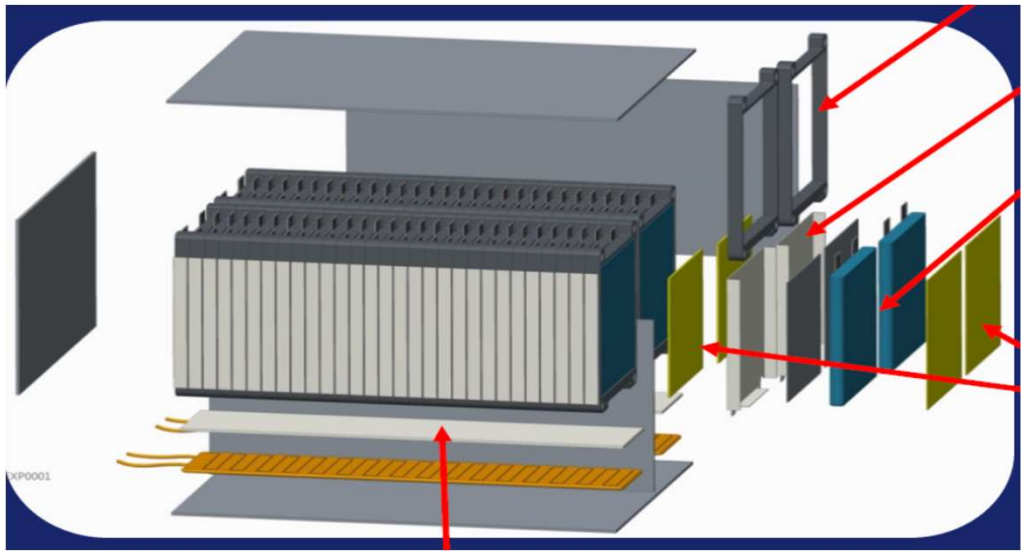
ELANTAS TM Materials for Soft Cell Battery



The thermal interface materials creates a path, for the heat generated by the cell pouch, to the heat transfer plate. TCP R-Series or Dispensable TF Series not only provide good thermal performance but they also provide excellent dampening to absorb shock and vibe.

TCP Series is an option where electrical isolation is a concern or a rugged construction is preferred

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1 Soi Phutthabucha 2, Phutthabucha Rd., Bangmod Sub district Jomthong District, Bangkok 10150, Thailand

www.covermat.co.th got@covermat.co.th +66(0)892164949