Non-Silicone Heat Transfer Compound

TECHNICAL DATA SHEET

Product Code: HTC

PRODUCT DESCRIPTION

Electrolube Heat Transfer Compound is recommended where the efficient and reliable thermal coupling of electrical and electronic components is required or between any surface where thermal conductivity or heat dissipation is important. They should be applied to the base and mounting studs of diodes, transistors, thyristors, heat sinks, silicone rectifiers and semi-conductors, thermostats, power resistors and radiators.

HTC contains no silicones and thus cannot migrate onto electrical contacts with consequent high contact resistance, arcing or mechanical wear. Similarly soldering problems caused by silicones will not be encountered.

A non silicone product is essential for applications where the use of silicone in any product is prohibited or where the specification set by the company states this.

A full range of heat transfer products are available from Electrolube. This range includes silicone based pastes for very high temperature applications (HTS), a RTV rubber (TCR), an adhesive epoxy (TBS) and an epoxy based potting resin (ER2074).

A even higher thermally conductive paste is also available, order code HTSP, for special applications where thermal management is critical.

FEATURES

* Excellent non-creep characteristics.
* Wide operating temperature range.
* Excellent thermal conductivity even at high temperatures.
* Easy to handle.
* Economic in use.
* Low in toxicity.
* White colour enables treated parts to be easily identified.
* Low evaporation weight loss.

ELECTROLUBE, A division of H K Wentworth, Kingsbury Park, Midland Road, Swadlincote, Derbyshire, DE11 0AN
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ISO 9002 Registered Firm. Certificate No. FM 32082

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TECHNICAL DATA SHEET

TYPICAL PROPERTIES

Colour:	White
Base:	Blend of synthetic fluids
Thermo-conductive Component:	Powdered metal oxides
Thermal Conductivity:	0.9 W/m.K
Density @ 20°C:	2.04 g/cm^3
Temperature Range:	-50°C to +170°C
Weight Loss after 168 hours @ 170°C:	0.98%
Permitivity @ 10^{6}Hz:	4.2
Specific Resistance:	1 x 10^{14} Ohms/cm
Dielectric Strength:	42 kV/mm
Penetration:	210-250

PACKAGING	ORDER CODE
2 ml Syringe	HTC02S
10 ml Syringe	HTC10S
20 ml Syringe	HTC20S
35 ml Luer Lock Syringe	HTC35SL
700 gram cartridge	HTC700G
1 Kg Bulk	HTC01K
25 Kg Bulk	HTC25K

NATO Stock No (10ml):	6850-99-775-5881
NATO Stock No (20ml):	5835-99-775-5881

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S/ACC/5TH2xxx/B/01/04/2010

THERMAL Pads

For SC, SV and SO relays
Low thermal resistance
Easy to use

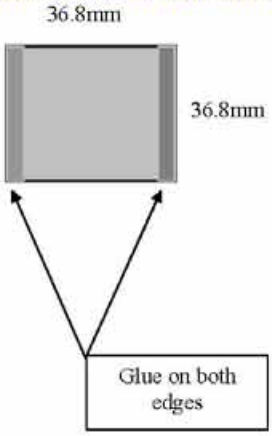
5TH21000 / 5TH23000
1LWP2300

For an efficient cooling of power components, it is usual to apply a thermally conducting media, such as thermal grease, between the power element and the heatsink.
Thermal grease is considered problematic due to difficulties in applying it to the heat-dissipating surface and also performances in the life of the product.
An alternative, **celduc** tested a range of products and compared their thermal resistance characteristics (Rth c/h : Thermal Resistance between case to heatsink)
celduc recommends Aluminium materials thermal pads with very good thermal performances and no modification in the long term. (See comparison tests on last page):
These thermal PAD with very good thermal conduction have also an electrical conduction.
So all the mechanical parts stay connected to the earth. With some silicone thermal PAD the earth conduction is not achieved

Thermal pad

5TH21000

And now in the same technology, celduc introduce an adhesive thermal PAD.



5TH23000

celduc thermal pads performances :

5THxxxx thermal PAD is a thermally conductive phase change material coated on both sides of aluminium foil. At temperatures greater than 52°C, 5THxxxx changes into a molten state and, under low closure force, wets the heat sink and component surfaces to create a very thin, low thermal resistance interface. 5THxxxx has great heat spreading characteristics and won't flow from the interface. 5THxxxx has superior thermal performance comparable to the highest performing grease and phase change products available.

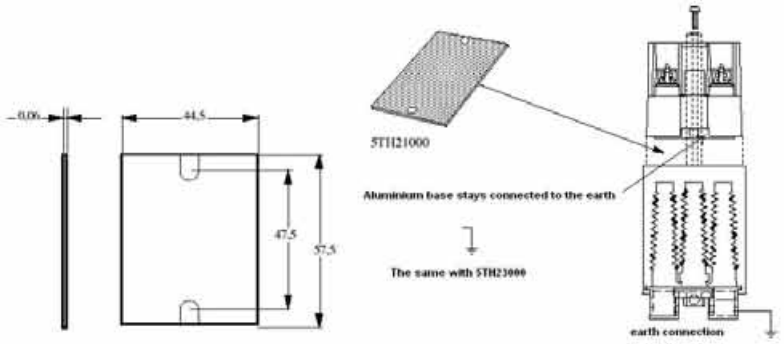
Typical Properties

Colour	Gray
Thickness	0.003" (0.076mm)
Standard Coating Thickness per side	0.0005" (0.013mm)
Density	2.1 g/cc
Shelf Life	Indefinite
UL Flammability Rating	94 V0
Maximum Use Temperature	200°C
Phase Change Softening Temperature	52°C
Thermal Impedance **@ 5 psi** **@ 34.5 Kpa**	 0.03 °C-in²/W 0.193 °C-cm²/W

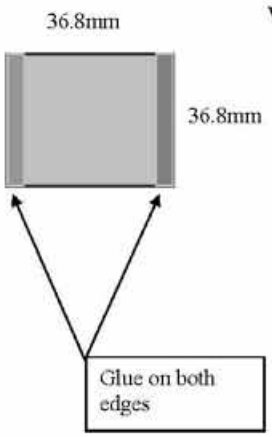
With the 5TH23000 adhesive thermal PAD, as glue is only on the edges, there is no incidence in terms of thermal performances.

On the last page you can see comparison tests between different technologies

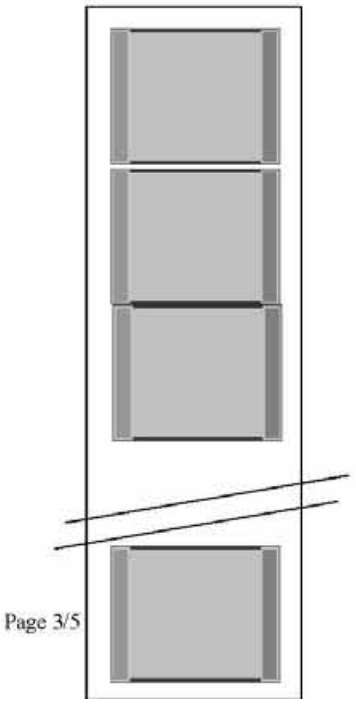
How to use 5TH21000 ?



How to use 5TH23000 (adhesive model).



We can deliver in Roll of 1000 pieces



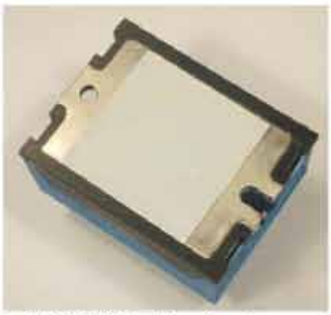
We can deliver the SSR with the 5TH23000 thermal PAD already mounted.

For all SC, SV or SO range we can ask for the option "with thermal PAD 5TH23000 mounted on the SSR": 1LWP23000

When you order your SSR, add the option 1LWP23000
The SSR will be delivered with the thermal PAD.

New okpac® range

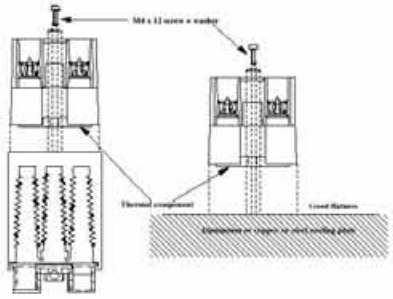
Without thermal PAD



With 5TH23000 adhesive thermal PAD
On aluminium base of the SSR

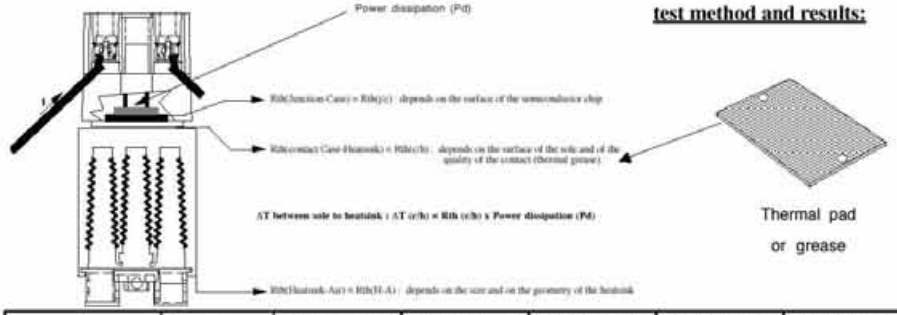
Fixing of solid state device on its heatsink or on a cooling plate

For an efficient cooling of power components , it is usual to apply a thermally conducting media , such as thermal grease , between the power element and the heatsink .
There are two main techniques :
- a small film of thermal grease applied over an area .
- a point of thermal grease at the centre of the power element



Thermal grease is considered problematic due to difficulties in applying it to the heat dissipating surface . As a replacement , a new range of components , thermal pads , are now readily available on the market .
To qualify the different technologies , **celduc** tested a range of products and compared their thermal resistance characteristics (Rth c/h) . The thermal pads have been divided into three categories :
1- thermal pads with insulation . 2- thermal pads with carbon materials . 3- thermal pads with aluminium materials .

test method and results:



	Without Grease or pad	with grease and a small film	with grease and a point of grease	with "thermalpads " with insulation .	with "thermalpads " with carbon materials .	with "thermalpads " with aluminium materials .
Rth c/h for a hockey puck SSR	0,2K/W	0.05K/W	0.045K/W	0,3K/W	0,15K/W	0. 04K/W

The difference in temperature between the SSR case and the heatsink is dependant upon the thermal resistance of the heat conducting media (Rth c/h) and the power dissipation of the SSR (Pd) and is defined by the following equation :
ΔT case / heatsink = Rthc/h x Pd
In conclusion :
For low power (under 10 watts) , the temperature difference ΔT is < 3°C for all solutions .
For higher power dissipations , it is important to use an efficient heat conducting material .
celduc recommend thermal grease or thermal pads with aluminium materials .

Problems in the long term

Usual products

celduc solution : high initial and in long term performances