Science. Applied to Life.™

Technical Data | July 2020

3M™ Thermally Conductive Acrylic Interface Pad 5590H

Product Description

3M™ Thermally Conductive Acrylic Interface Pad 5590H is designed to provide a preferential heat transfer path between heat generating components, such as IC Chip or Electric Vehicle (EV) battery, and heat sink or spreader. It consists of highly conformable, slightly tacky acrylic elastomer sheets filled with thermally conductive ceramic particles. These high-performing thermal pads have the following features:

Key Features

- Easy handling and soft pad
- High conformability even for non-flat IC surfaces and automotive EV batteries
- Incorporates a thin, firm acrylic layer for good handling
- Highly thermally conductive while electrically insulating
- Slight tack allows pre-assembly
- Good wettability for better thermal conductivity
- Non-silicone acrylic elastomer
- Excellent durability
- UL94 V-0 listed (File No. E176845)

Product Construction/Material Description

Thermally conductive conformable layer
Thermally conductive firm layer (less tack) permanent
PET liner (outside of roll)

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ Thermally Conductive Acrylic Interface Pad 5590H	
Property	**Value**
Color	White/Gray
Base resin	Acrylic
Thickness	0.5, 1.0mm, 1.5 mm, 2.0 mm (thicker pads available upon request)
Filler type	Ceramic
Very low tack layer	Good for re-workability and handling, light gray color-permanent layer
Low tack layer	Soft, good thermal conductivity, white color

3M™ Thermally Conductive Acrylic Interface Pad 5590H

Applications

- Heat transfer in consumer electronics and automotive electronic products
- Decrease of compression stress to electronic parts by thermal pad conformability

Examples:

- Heat transfer between PCB and heat sink
- Thermal management in automotive EV batteries
- Power electronics component thermal management
- Chip on film (COF) heat conduction
- Automotive electronics
- LED thermal management
- General gap filling in electronic devices

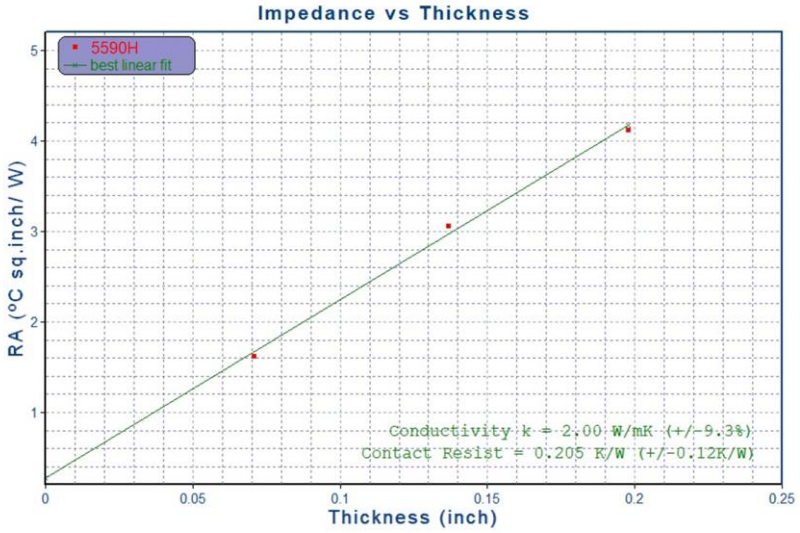
Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the product's Certificate of Analysis (COA) that is shipped with the commercialized product. This value is a measured value, not a guaranteed value.

3M™ Thermally Conductive Acrylic Interface Pad 5590H		
Property	**Method**	**Value**
Thermal conductivity	3M Method	2.8 W/mK
Thermal conductivity	ASTM D5470	2.0 W/mK [*1]
Hardness	Asker C Shore 00	55[*2] 70
Volume Resistivity	ASTM D257	6 X 10 [11] (Ω-cm)
Dielectric strength	ASTM D149	12 (kV/mm)
Density	ASTM D6111	2.1 (g/cm^3)
Flammability	UL94	V-0
Operating Temperature Range	Short Term (Hours-Days) Long Term (Weeks-Months)	-40°C to 130°C -40°C to 110°C

[*1] Methods listed as ASTM are tested in accordance with the ASTM method noted. Sample thickness are 2-8mm. Sample size is 33mm ϕ . Pressure condition is fixed at 200kPa, with thickness control.

[*2] Test results are based on a 6mm thickness sample. Sample tested to soft layer side of sample pad.



3M™ Thermally Conductive Acrylic Interface Pad 5590H

Heat Resistance *

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the product's Certificate of Analysis (COA) that is shipped with the commercialized product. This value is a measured value, not a guaranteed value.

As tested on 3M™ Thermally Conductive Acrylic Interface Pad 5590H			
Duration (hrs)	Initial	1000	2000
Thermal conductivity (W/m-K)	3.0	3.0	3.0
Hardness (Asker C)	30	33	34
Appearance	-	No effect	No effect

*Note1: Aged by dwelling at 110℃ in high temperature chamber.
*Note2: Thermal conductivity for aging tested using the 3M Method.

Storage and Shelf Life

The shelf life of 3M™ Thermally Conductive Acrylic Interface Pad 5590H is 24 months from the date of manufacture when stored in the original packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is manufactured and deemed commercially available from 3M. The COA contains the 3M test methods, specifications limits and test results for the product's performance attributes that the product will be supplied against. Contact your local 3M representative for this product's COA.

3M™ Thermally Conductive Acrylic Interface Pad 5590H

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer: Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. **3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OR TRADE.** If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

3M

Electronics Materials Solutions Division
3M Center, Building 224-3N-11
St. Paul, MN 55144-1000
1-800-251-8634 phone
651-778-4244 fax
www.3M.com/electronics

3M is a trademark of 3M Company.
Please recycle.
©3M 2020. All rights reserved.
60-5005-0122-0