

HEATPACK H2020 Project**WP2****Deliverable D2.6****Thermally Conductive Adhesive film datasheet**

<i>Written by</i>	<i>Responsibility</i>
Nicolas Blasakis	ADAMANT COMPOSITES Ltd., Materials & Processes Engineer
<i>Verified by</i>	
Athanasios Baltopoulos	ADAMANT COMPOSITES Ltd., Commercial Director
<i>Approved by</i>	



CHANGE RECORDS

ISSUE	DATE	§ CHANGE RECORDS	AUTHOR
1.0	25/02/2022	1 st draft	N. Blasakis
1.1	17/06/2023	1 st issued version Update of the TDS (Pages 5 and 6)	N. Blasakis



TABLE OF CONTENTS

1. EDITING OF TIM2 TECHNICAL DATASHEET.....	4
2. TECHNICAL DATASHEET	5

LIST OF ABBREVIATIONS

CVCM	Collected Volatile Condensable Material
HEATPACK	New generation of high thermal efficiency components packages for space
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RML	Recovered Mass Loss
TDS	Technical Datasheet
TIM2	Thermal Interface Material 2
TML	Total Mass Loss
WVR	Water Vapour Regained



1. EDITING OF THE TIM2 TECHNICAL DATASHEET

The development of TIM2 is thoroughly detailed in the deliverable D2.5 [1]. During the repetition phase, several films were produced and characterized in order to ensure the manufacturing robustness and to obtain precise values for the selected properties. This campaign is summed up in Table 15 of D2.5 and these values were used to populate a technical datasheet.

Additionally, a survey of TDS for commercial film adhesives was conducted, in order to identify commonly reported properties and the industry practices. It includes for instance Loctite Ablestik 5025e (Henkel) [2], Epo-Tek B9021-15 [3], Resin Design T2222F [4], AI technology TC8750 [5], DuPont Pyralux LF [6].

The result is the TIM2 Technical Datasheet that is reported in Section2 of this document. It includes:

- The commercial name as well as its description in a sentence.
- A picture.
- Key words.
- A longer product description.
- Typical characteristics including its color, thickness, work life and shelf life.
- Physical properties, including its density and its Tg.
- Thermal properties, including its thermal conductivity.
- Electrical properties, including its electrical conductivity at room temperature and 125°C.
- Mechanical properties, including its shear strength.
- Outgassing properties, including the TML, the CVCM, RML, WPR.
- Extractable ionic content, including the water extract pH, the water extract conductivity, and the extractable content of chlorine anion, other anions, potassium cation & sodium cation.
- The coefficient of thermal expansion for different temperature ranges.
- A Processing section giving guidelines for storage, handling, health & safety, and curing.



2. TECHNICAL DATASHEET



>> FXbond™ Film Adhesive

Adamant Composites introduces a an epoxy B-stage film adhesive for advanced applications requiring strength, thermal and electrical conductivity!



Key features

- B-stage adhesive
- Flexible and versatile
- Improved thermal and electrical properties
- Developed for aerospace electronics

Product description

FXbond™ Film is a flexible nano-enabled B-stage film adhesive. Easy to handle, the FXbond™ Film brings a adhesion while ensuring a good thermal and electrical conductivity. This versatile film is ready to be used and can be included straightforwardly in industrial processes. FXbond™ Film has been also extensively qualified for space applications and was in particular develop for aerospace electronics.

Typical characteristics

Color	Grey
Thickness	98µm
Shelf life at 24°C	> 6 weeks

Typical properties of cured product

Physical properties	
Density	3.6 g/cm ³
T _g	79°C
C _v	0.109 J/(g·°C)
Mass loss onset	349°C

Thermal properties	
Thermal conductivity	0.7-6 W/(m.K) (TBC)

Electrical properties	
Electrical conductivity at 24 °C	5.5 x 10 ⁻⁸ S/m
Electrical resistivity at 125°C	6.2 x 10 ⁻⁸ S/m

Mechanical properties	
Shear Strength	20.3 MPa

Outgassing properties	
TML	0.796%
CVCM	0.004%
RML	0.306%
WPR	0.493%



This product and technology have been partly developed under funding and support from the European Union's Horizon 2020 research and innovation program under grant agreement No 821963.

Adamant Composites Ltd.

Agias Lavras 6 Stadiou Str., Platani-Patras, 26504, Achaia, GREECE

Phone: +302610931730 | E-mail: info@adamant-composites.com | Web: www.adamant-composites.com



CERTIFIED S.S.
ISO 9001:2008
1869/Δ



05/2023





>> FXbond™ Film Adhesive

Extractable ionic content	
Water extract pH	9.48
Water extract conductivity	0.087 mS/cm
Cl-	179 ppm
Other anions	<2.1 ppm
K+	5.2 ppm
Na+	<4.2 ppm

Coefficient of thermal expansion	
[-90°C ; 25°C]	25.3
[25°C ; 85°C]	29.5
[85°C ; 132°C]	34.3

Processing

Storage

FXbond™ Film should be safely stored at -18°C.

Handling

FXbond™ Film is a ready-to-use B-stage film adhesive. However, care should be taken through its manipulation. In particular, prior any usage, the film should be let at room temperature to temper. It can then easily be cut in any desired shape.

Health & Safety

The dedicated Safety Data Sheet must be read and understood prior any use. Appropriate personal protective equipment must be implemented. In a normal usage, FXbond™ Film is harmless to handle, provided usual precautions when handling chemical products.

Recommended Curing Route

Temperature	Duration
120°C	2 hours

Disclaimer: The data and information provided in this document have been obtained from carefully controlled samples and are considered to be representative of the product described. Adamant Composites does not express or imply any guarantee or warranty of any kind including, but not limited to, the accuracy, the completeness or the relevance of the data and information set out herein. Because the properties of this product can be significantly affected by the fabrication and testing techniques employed, and since Adamant Composites does not control the conditions under which its products are tested and used, Adamant Composites cannot guarantee the properties provided will be obtained with other processes and equipment. Adamant composites declines any liability with respect to the use made by any third party of the data and information contained herein. All trademarks are the property of their respective owners. All rights reserved.



This product and technology have been partly developed under funding and support from the European Union's Horizon 2020 research and innovation program under grant agreement No 821963.

Adamant Composites Ltd.

Agias Lavras & Stadiou Str., Platani-Patras, 26504, Achaia, GREECE

Phone: +302610931730 | E-mail: info@adamant-composites.com | Web: www.adamant-composites.com



CERTIFIED M.S.
ISO 9001:2008
1869/Δ



3. REFERENCES

- [1] HEATPACK – D2.5 – Additional note – Development of the thermal film adhesives for use in demonstrator packages
- [2] https://www.henkel-adhesives.com/gr/en/product/film-adhesives/loctite_ablestik5025e.html
- [3] <https://www.epotek.com/docs/en/Datasheet/B9021-15.pdf>
- [4] <https://info.resindesigns.com/hubfs/T2222F.pdf>
- [5] <https://www.bondingsource.com/techdata/tc8750.pdf>
- [6] <https://www.dupont.com/content/dam/dupont/amer/us/en/products/ei-transformation/documents/EI-10119-Pyralux-LF-SA-Data-Sheet.pdf>

END OF DOCUMENT

