



FIRE PROTECTION JUST GOT  
SMARTER

# ArmaGel HTF

Flexible aerogel blanket for passive fire  
protection

- // Achieves 120 minutes of fire protection according to UL1709
- // Achieves 90 minutes of fire protection according to jet fire (ISO 22899-1)
- // Fire tested configurations are representative of the intended applications
- // ASTM C1728 compliant
- // Up to five times better thermal performance than competing insulation materials
- // Mitigates the risk of corrosion under insulation (CUI)

[www.armacell.com/armagel](http://www.armacell.com/armagel)



 **armacell**<sup>®</sup>  
ArmaGel<sup>®</sup>

**A sustainable one-step solution for  
fire protection and thermal insulation.**

# ArmaGel<sup>®</sup> HTF

ArmaGel HTF is a new generation of aerogel fire protection blanket. A reliable solution for superior thermal insulation for high-temperature applications up to 650 °C (1200 °F). ArmaGel HTF provides additional fire protection to reduce the risk of shut-downs. Officially tested up to 120 minutes, compliant with UL 1709. ArmaGel HTF is easy to install, flexible and environmentally safe. The perfect solution for applications where both, thermal insulation and fire protection, is required.

Passive Fire Protection



Thermal



Hydrophobic



[Learn more.](#)

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## AEROGEL

Used by NASA to bring home a piece of a comet because it's strong enough to stop a bullet in its track, aerogel offers an uncanny array of physical properties - thermal, acoustical - and so holds incredible potential for insulation uses. As the name suggests, aerogel is a solid derived from gel in which the liquid component of the gel has been replaced with air making it dry and porous. In fact, over 90 percent of the volume is empty space making aerogel the world's lightest solid material. It's also 1,000 times less dense than glass, making it the world's lowest density solid material.

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## YOUR BENEFITS

### // One-step solution

Advanced insulation material which additionally provides fire protection - reduce the risk of shut-downs in case of fire and protect assets.

### // Fire Protection

Passive Fire Protection with aerogel technology. UL1709 compliant.

### // Superior thermal Insulation

For hot conditions up to 650°C (1200°F). Up to five times better thermal performance than competing insulation materials.

### // Cost efficient solution

Reduce labour cost. Reduce maintenance costs. The ideal choice for specifiers and contractors.

### // CUI defence

Mitigates the risk of corrosion under insulation (CUI).

### // Easy and reliable installation

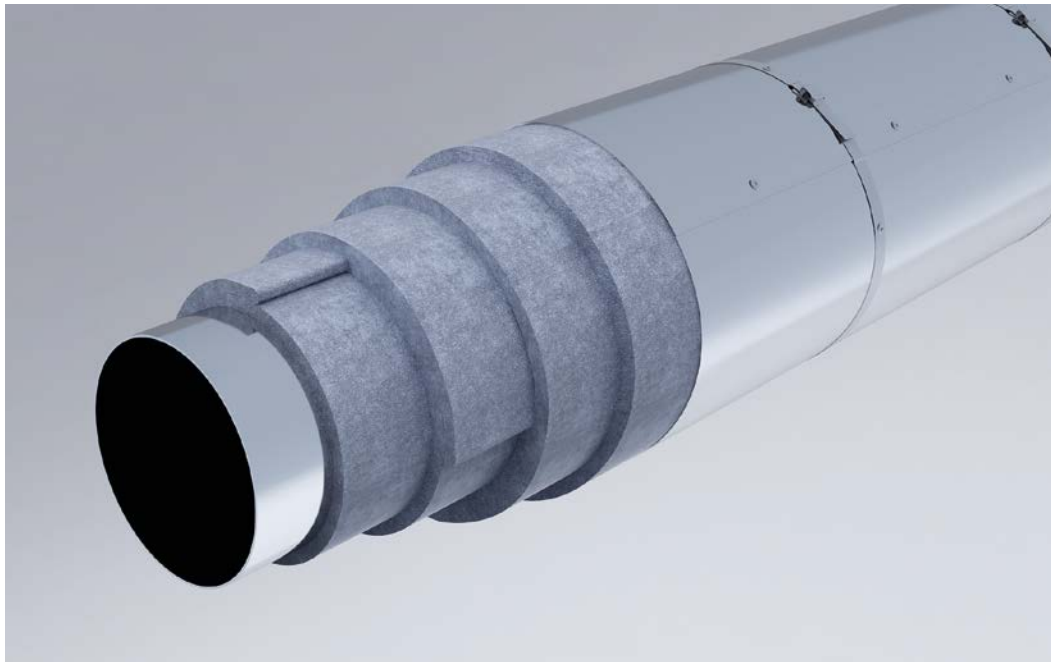
Highly flexible aerogel blanket material. No curing or drying time. No banding systems required to install ArmaGel HTF blankets.

### // Hydrophobic and breathable

Repels liquid water, but allows vapour to escape, helping to keep equipment drier for longer.

### // High temperature application

Fire protection for applications with operating temperature up to 650 °C.



## TECHNICAL DATA - ARMAGEL HTF

Brief description	ArmaGel HTF is a flexible aerogel blanket designed for passive fire protection meeting UL 1709 standard. Jet fire tested according ISO 22899-1. ArmaGel HTF is compliant with ASTM C1728, Type III, Grade 1A.
Material type	Aerogel blanket.
Product colour range	Grey
Special features	ArmaGel HTF provides excellent passive fire protection and superior thermal performance with maximum operational use temperature up to 650 °C (1200 °F).
Product range	Sheets in rolls in 10 mm (0.4 in) thickness and width of 1.5 m (59 in). For further details, please refer to the product range tables at the end of this document.
Applications	Passive fire protection and thermal insulation of pipework and equipment in Energy and industrial process facilities.
Installation	For industrial applications it is recommended to consult the relevant Armacell application manual(s). For further information please contact our Technical Services.

Property	Value / Assessment										Standard / Test method
<b>Operating temperature</b>											
Operating temperature <sup>1,2,3</sup>	Maximum service temperature: 650 °C (1200 °F)										ASTM C411, ASTM C447
<b>Thermal conductivity</b>											
Declared thermal conductivity <sup>4</sup>	θm	24 °C	38 °C	93 °C	149 °C	204 °C	260 °C	316 °C	371 °C	ASTM C177	
	λd ≤ [W/(m·K)]	0.021	0.022	0.023	0.025	0.029	0.032	0.036	0.043		
Declared thermal conductivity <sup>4</sup>	θm	75 °F	100 °F	200 °F	300 °F	400 °F	500 °F	600 °F	700 °F	ASTM C177	
	k ≤ [Btu-in/(h-ft <sup>2</sup> -°F)]	0.14	0.15	0.16	0.18	0.20	0.22	0.25	0.30		
<b>Temperature resistance</b>											
Hot surface performance <sup>5</sup>	Pass										ASTM C411
Linear shrinkage under soaking heat	< 2% in width and length // Pass										ASTM C356
<b>Fire Performance and Approvals</b>											
Surface burning characteristics	≤ 5 flame spread index ≤ 10 smoke development										ASTM E84
<b>Passive fire protection</b>											
Passive fire protection <sup>6</sup>	In passive fire protection applications the outer layer of the material must be protected with an adequate metal jacketing. Please contact Technical Services for guidance.										

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Fire resistance <sup>4,7,8</sup>	<p>Tested configurations for UL1709 compliance :</p> <table border="1"> <thead> <tr> <th>Tested configuration</th> <th>Fire rating</th> <th>Outer diameter [min.]</th> <th>Wall thickness [mm]</th> <th>Hp/A Value [m<sup>-1</sup>]</th> <th>ArmaGel<sup>®</sup> HTF [mm]</th> </tr> </thead> <tbody> <tr> <td>Pipe 8"</td> <td>120</td> <td>219.1</td> <td>3.68</td> <td>276.4</td> <td>10 x 10mm</td> </tr> <tr> <td>Pipe 8"</td> <td>120</td> <td>219.1</td> <td>6.3</td> <td>163.4</td> <td>7 x 10mm</td> </tr> <tr> <td>Pipe 8"</td> <td>120</td> <td>219.1</td> <td>14.2</td> <td>74.8</td> <td>4 x 10mm</td> </tr> <tr> <td>Pipe 8"</td> <td>90</td> <td>219.1</td> <td>6.3</td> <td>163.4</td> <td>5 x 10mm</td> </tr> <tr> <td>Standard steel beam W10x49 (in x lb/ft)</td> <td>120</td> <td>-</td> <td>-</td> <td>177.3</td> <td>3 x 10mm</td> </tr> </tbody> </table> <p>Tested configurations for jet fire compliance (ISO 22899- 1) :</p> <table border="1"> <thead> <tr> <th>Tested configuration</th> <th>Fire rating</th> <th>Outer diameter [min.]</th> <th>Wall thickness [mm]</th> <th>Hp/A Value [m<sup>-1</sup>]</th> <th>ArmaGel<sup>®</sup> HTF [mm]</th> </tr> </thead> <tbody> <tr> <td>Pipe 8"</td> <td>90</td> <td>219.1</td> <td>6.3</td> <td>163.4</td> <td>5 x 10mm</td> </tr> </tbody> </table>	Tested configuration	Fire rating	Outer diameter [min.]	Wall thickness [mm]	Hp/A Value [m <sup>-1</sup> ]	ArmaGel <sup>®</sup> HTF [mm]	Pipe 8"	120	219.1	3.68	276.4	10 x 10mm	Pipe 8"	120	219.1	6.3	163.4	7 x 10mm	Pipe 8"	120	219.1	14.2	74.8	4 x 10mm	Pipe 8"	90	219.1	6.3	163.4	5 x 10mm	Standard steel beam W10x49 (in x lb/ft)	120	-	-	177.3	3 x 10mm	Tested configuration	Fire rating	Outer diameter [min.]	Wall thickness [mm]	Hp/A Value [m <sup>-1</sup> ]	ArmaGel <sup>®</sup> HTF [mm]	Pipe 8"	90	219.1	6.3	163.4	5 x 10mm	UL 1709, ISO 22899-1
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Water vapour sorption	≤ 5% by weight	ASTM C1104																																																
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Hydrophobic	Yes																																																	
Water absorption	Pass	ASTM C1763																																																
<b>Corrosion mitigation</b>																																																		
Corrosiveness to steel	Passed, Mass Loss Corrosion Rate (MLCR) not exceeding that of 5 ppm chloride solution on carbon steel coupon	ASTM C1617, Procedure A																																																
Stress corrosion cracking	Insulation for use over austenitic steel: no cracks, passed	ASTM C692, ASTM C795																																																
<b>Mechanical properties</b>																																																		
Compressive strength <sup>9</sup>	≥3 psi/ 20.7 kPa at 10% compression	ASTM C165																																																
Flexibility of insulation blankets	Flexible	ASTM C1101																																																
<b>Weather and UV resistance</b>																																																		
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<b>Health and environment</b>																																																		
Fungal growth	No growth	ASTM C1338																																																
Health aspects	Neutral, asbestos free.																																																	
<b>Other technical features</b>																																																		
Shelf life <sup>10</sup>	Max. 3 years																																																	
Storage	Material shall be stored indoors, in clean and dry conditions, away from direct sunlight.																																																	

<sup>1</sup>For temperatures below or above those published please contact Technical Services to request the corresponding technical information.

<sup>2</sup>For operating temperatures above 400 °C (752 °F) a metallic foil barrier with 0.05 mm (0.002 inch) thickness must be additionally installed between the two outmost layers of ArmaGel HTF. For details please contact Technical Services.

<sup>3</sup>For live line installations please refer to the ArmaGel HTF application guide.

<sup>4</sup>Measured under a load of 1.5 kPa (0.22 psi).

<sup>5</sup>For operating temperatures above 400 °C (752 °F) a metallic foil barrier with 0.05 mm (0.002 inch) thickness must be additionally installed. For details please contact Technical Services.

<sup>6</sup>All UL fire tests have been officially conducted at a UL laboratory under full witnessing by UL.

<sup>7</sup>For the installation procedure for standard steel beams please contact Technical Services for guidance.

<sup>8</sup>The jet fire test has been officially conducted at a Efectis /France laboratory under full witnessing by Efectis and UL. Fire rating for test criteria (temperature increase on steel pipe below <538°K) was 90 minutes. No integrity failure was noticed during the full test period of 180 minutes.

<sup>9</sup>Test performed with a preload of 13.8 kPa (2 psi).

<sup>10</sup>Shelf life (maximum storage time) is limited to ensure that only currently manufactured products are installed on projects. This limitation is restricted solely to storage of the product and does not affect the lifetime of product after it has been installed.

All data and technical information are based on results achieved under the specific conditions defined according to the testing standards referenced. Despite taking every precaution to ensure that said data and technical information are up to date, Armacell does not make any representation or warranty, express or implied, as to the accuracy, content or completeness of said data and technical information. Armacell also does not assume any liability towards any person resulting from the use of said data or technical information. Armacell reserves the right to revoke, modify or amend this document at any moment. It is the customer's responsibility to verify if the product is suitable for the intended application. The responsibility for professional and correct installation and compliance with relevant building regulations lies with the customer. This document does not constitute nor is part of a legal offer to sell or to contract.

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## ABOUT ARMACELL

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As the inventor of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With more than 3,300 employees and 27 production plants in 19 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for acoustic and lightweight applications, recycled PET products, next-generation aerogel technology and passive fire protection systems.



For more information, please visit:  
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