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HT/ArmaFlex Industrial

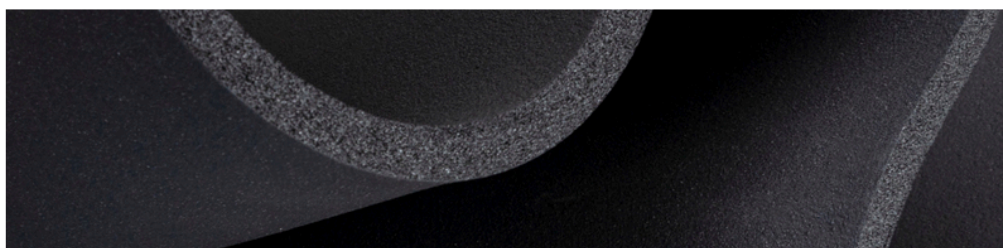
Industrial grade FEF insulation material designed for applications with elevated temperatures in oil and gas industry

- // High density and mechanically robust for superior stability and multi-layer application
- // Enhanced temperature capability
- // Built-in water vapour barrier reduces risk of corrosion under insulation (CUI)
- // Retains its physical characteristics throughout its service life
- // Low maintenance and repair costs
- // Low leachable chloride content (< 30 ppm) to minimise stress corrosion cracking (SCC)
- // Low thermal conductivity to minimise energy losses

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TECHNICAL DATA - HT/ARMAFLEX INDUSTRIAL

Brief description	HT/ArmaFlex Industrial is a flexible, high density and mechanically robust, closed-cell thermal insulation material based on extruded elastomeric foam. The product has been specially developed to provide enhanced thermal resistance of the insulation systems with its low thermal conductivity.
Material type	Factory-made flexible elastomeric foam based on ethylene propylene diene methylene (EPDM), according to EN 14304.
Product colour range	Black
Special features	HT/ArmaFlex Industrial is resistant to elevated operating temperatures. The product is suitable for use in multi-layer applications including ArmaSound Industrial Systems.
Product range	Tubes, 13, 19 and 25 mm thickness, for pipe outer diameters ranging from 18 to 89 mm (¾" to 3" NB). Sheets in rolls, 10, 13, 19 and 25 mm thickness.
Applications	Thermal insulation/protection of pipes, vessels and ducts (including elbows, fittings, flanges, etc.) in offshore, industrial (typically oil and gas) and process equipment facilities. HT/ArmaFlex Industrial is also used as a component of ArmaSound Industrial Systems to provide acoustic insulation on industrial pipework and vessels ensuring reduction of sound transmission.
Installation	For industrial applications it is recommended to consult the relevant Armacell application manual(s). For further information please contact our Technical Services.

Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> EN 14304 (harmonised construction product standard for FEF) Certificate of Fire Approval by Lloyd's Register (Class 1, BS 476 part 7)
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Property	Value / Assessment						Standard / Test method
Temperature range							
Service temperature ¹	Min. °C	Min. °F	Max. °C	Max. °F	EN 14706, EN 14707, EN 14304		
	-50	-58	125	257			
Thermal conductivity							
Declared thermal conductivity	θm	-50 °C [-58 °F]	0 °C [+32 °F]	+50 °C [+122 °F]	+100 °C [+212 °F]	+125 °C [+257 °F]	EN ISO 13787, EN 12667, EN ISO 8497 ²
	λd ≤ [W/(m·K)]	0.039	0.041	0.047	0.057	0.063	
	k ≤ [Btu-in/(h-ft ² -°F)]	0.271	0.284	0.325	0.393	0.438	
	Formula	Equation of declared thermal conductivity as a function of temperature: λd (θm) = 0.04028 + 1.25 x 10 ⁻⁴ x θm + 8 x 10 ⁻⁷ x (θm - 30) ² W/(m·K), where θm is mean temperature in °C.					
Fire Performance and Approvals							
Reaction to fire	D-s3,d0 / D(L)-s3,d0						EN 13501-1, EN 13823, EN ISO 11925-2
Surface burning characteristics	Class A, <25 Flame Spread Index						ASTM E84
Surface flammability ^{3,4}	IMO Part 5						IMO 2010 FTP Code, Part 5
Fire performance							
Practical fire behaviour	Self-extinguishing, does not drip, does not spread flames.						
Resistance to water vapour							
Water vapour diffusion resistance factor ⁵	μ ≥ 3,000 (sheets)						EN 12086, EN 13469 ⁶
Water vapour permeability	≤ 6.51 x 10 ⁻¹¹ g/(m·s·Pa) (≤0.045 Perm-inch)						EN 12086, EN 13469 ⁶
Resistance to water							
Water absorption ³	≤ 0.1% by volume (total submersion for 2 hours)						ASTM C209
Water absorption by vacuum	≤ 4% by mass (total submersion for 2 x 180 seconds, vacuum pressure 17.2 kPa or 2.5 psi)						ASTM D1056

Property	Value / Assessment	Standard / Test method
Corrosion mitigation		
Leachable (water-soluble) chlorides	≤ 30 ppm (mg/kg or µg/g)	EN 13468, ASTM C871 ⁷
pH-value ³	7 to 9	ISO 10523
Stress corrosion cracking ^{3,8}	No cracks under magnifying glass on test coupons after evening, cleaning and rebending.	ASTM C692
Physical attributes		
Density	Sheets: 70 to 85 kg/m ³ (4.4 to 5.3 lb/ft ³) Tubes: 60 to 75 kg/m ³ (3.7 to 4.7 lb/ft ³)	ISO 845, ASTM D1622
Dimensions and tolerances	According to EN 14304, for detailed values, please refer to product range tables.	EN 822, EN 823, EN 13467
Mechanical properties		
Tear strength	≥0.4 kNm (≥2.3 lbf/in)	ISO 34-1 ⁹
Compression deflection		
Compression deflection 25%	≥ 15kPa (≥ 2.2 psi) at 25% deflection	ISO 6916-1 ¹⁰
Acoustic performance		
System acoustic insertion loss	When used as part of a system: HT/ArmaFlex Industrial complies to ISO 15665 Classes A to C and Shell DEP 31.46.00.31-Gen Class D. Minimum acoustic service temperature (interface temperature to pipework or underlying thermal insulation layers) is -40 °C (-40 °F).	ISO 3741, ISO 15665 ¹¹
Weather and UV resistance		
Weather resistance	In all industrial applications, the outer layer of the material must be protected with an adequate covering like Arma-Chek R, metal jacketing or preformed UV-cured Glass-Reinforced Plastic (GRP) cladding. For further information, please contact Technical Services.	
Health and environment		
Health aspects	Neutral, SDS available on request.	
Other technical features		
Adhesion and sealing ^{12,13}	ArmaFlex HT625 adhesive should be used for reliable adhesion of joints and seams. HT/ArmaFlex tape can be used for application.	
Application conditions ^{14,15}	Application temperature should be maintained at +5°C to +35 °C (+41°F to +95°F) and at a maximum relative humidity of 80%.	
Closed-cell content	≥ 90% (declared on the basis of the water absorption test.)	
Shelf life ¹⁶	Maximum of 3 years.	
Storage	Material shall be stored indoors, in clean and dry conditions, away from direct sunlight.	

¹For use in temperatures beyond the published value, please contact Technical Services.

²Equivalent methods ASTM C177 and C518.

³Based on single test results. Can be used for information / reference only.

⁴Meets the criteria of floor coverings and primary deck coverings.

⁵For further information regarding water vapour transmission resistance, please contact Technical Services.

⁶Equivalent method to ASTM E96.

⁷Specimen prepared according to EN 13486: neither cut, ground nor blended. Test temperature +100°C, leaching time 0.5 hours as specified in the standard for product maximum service temperature.

⁸The coupons from type 304 stainless steel, 1.5 mm thick. 28 days drip test using deionized or distilled water at around +100°C.

⁹Minimum value in Machine Direction (MD) and in Cross Direction (CD). Method B, procedure (b), angle test piece with a nick.

¹⁰Equivalent method to ASTM D1056.

¹¹Equivalent method to ASTM E1222.

¹²During storage of the product, blooming on the surfaces may occur. This blooming does not affect the technical properties of the material, but can affect the adhesion properties. Therefore, the surface needs to be cleaned (wiped off) before adhesives can be applied.

¹³For further information, please contact our Customer Service.

¹⁴For environmental conditions outside the given range, please contact Technical Services.

¹⁵Application temperature (temperature of installation) refers to the ambient temperature during application and the surface temperature of the substrate to which the product is installed.

¹⁶Shelf 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.

Tube – standard. Black

13.0 mm nominal insulation thickness						19.0 mm nominal insulation thickness					
Pipe Ø [mm]	Item	Inner diameter (minimum) [mm]	Inner diameter (maximum) [mm]	EAN	Content [metric]	Pipe Ø [mm]	Item	Inner diameter (minimum) [mm]	Inner diameter (maximum) [mm]	EAN	Content [metric]
18	HTI-13X018	19	22	76122073782 21	98 m	28	HTI-19X028	29	32	76122073768 90	48 m
22	HTI-13X022	23	26	76122073761 73	84 m	35	HTI-19X035	36	39	76122072974 54	32 m
28	HTI-13X028	29	32	76122073761 66	64 m	48	HTI-19X048	49	52	76122073757 63	22 m
35	HTI-13X035	36	39	76122073762 72	50 m	60	HTI-19X060	61	64	76122072974 61	16 m
60	HTI-13X060	61	64	76122073756 19	28 m	76	HTI-19X076	77	80	76122073701 19	18 m
76	HTI-13X076	77	80	76122073700 96	24 m	89	HTI-19X089	90	93	76122072974 78	16 m
89	HTI-13X089	90	93	76122073757 56	18 m	-	-	-	-	-	-

Other information

Thickness tolerance	13 mm nominal thickness ± 1.5 mm 19-25 mm nominal thickness ± 2.5 mm
Length tolerance	± 1.5%
Reaction to fire	D-s3, d0 / DI-s3, d0
Regulation	Tube tolerances according to EN 14304.
Remarks	Refer to minimum and maximum inner diameter details for inner diameter tolerances. Steel pipe outside diameter is in accordance with European standards for steel pipes with the exception of Outside Diameter 54 for copper pipe. For further dimensions please contact our Customer Service Centre.

Tube – standard. Black

25.0 mm nominal insulation thickness

Pipe Ø [mm]	Item	Inner diameter (minimum) [mm]	Inner diameter (maximum) [mm]	EAN	Content [metric]
22	HTI-25X022	23	26	7612207297485	36 m
28	HTI-25X028	29	32	7612207297492	32 m
35	HTI-25X035	36	39	7612207297508	24 m
42	HTI-25X042	43	46	7612207236620	20 m
48	HTI-25X048	49	52	7612207297515	16 m
60	HTI-25X060	61	64	7612207297522	16 m
76	HTI-25X076	77	80	7612207297539	12 m
89	HTI-25X089	90	93	7612207236538	12 m

Other information

Thickness tolerance	13 mm nominal thickness ± 1.5 mm 19-25 mm nominal thickness ± 2.5 mm
Length tolerance	± 1.5%
Reaction to fire	D-s3, d0 / DI-s3, d0
Regulation	Tube tolerances according to EN 14304.
Remarks	Refer to minimum and maximum inner diameter details for inner diameter tolerances. Steel pipe outside diameter is in accordance with European standards for steel pipes with the exception of Outside Diameter 54 for copper pipe. For further dimensions please contact our Customer Service Centre.

Tube – standard. Black

Item	Thickness [mm]	Width [m]	Length [m]	Content [metric]
HTI-10-99/E	10	1	10	10 m ²
HTI-13-99/E	13	1	8	8 m ²
HTI-19-99/E	19	1	6	6 m ²

Other information

Thickness tolerance	13 mm nominal thickness \pm 1.5 mm 19-25 mm nominal thickness \pm 2.5 mm
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Length tolerance	\pm 1.5%
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Reaction to fire	D-s3, d0 / DI-s3, d0
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Regulation	Tube tolerances according to EN 14304.
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Remarks	Refer to minimum and maximum inner diameter details for inner diameter tolerances. Steel pipe outside diameter is in accordance with European standards for steel pipes with the exception of Outside Diameter 54 for copper pipe. For further dimensions please contact our Customer Service Centre.
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ABOUT ARMACELL

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 25 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.

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