# INSULATION FOR THE OIL AND GAS INDUSTRY

## ArmaFlex® LTD

FEF installation for cryogenic and low temperature applications

- // Improved flexibility at low temperatures over traditional insulation materials
- // Mitigates the risk of corrosion under insulation (CUI)
- // Protects against mechanical impact and shock
- // Low thermal conductivity
- // Low glass transition temperature
- // Easy installation even to complex shapes
- // Less wastage compared to rigid / pre-fabricated pieces



















### **TECHNICAL DATA - ARMAFLEX LTD**

Brief description										erial based on extruded areas of LNG facilities.			
Material type	Synthetic Diene Terpolymer rubber based foam. Factory made flexible elastomeric foam (FEF) according to EN 14304.												
Colour	Blue												
Special features	A high-performance thermal insulation material designed to meet the demands of cryogenic-temperature environments. ArmaFlex® LTD is part of ArmaFlex® Cryogenic Systems, providing low temperature flexibility to the system.												
Material special information	ArmaFlex® LTD is suitable for a range of operating conditions down to -180°C including liquefied natural gas (LNG) installations. However, it is not recommended for application to process pipelines and equipment carrying liquid oxygen, or to gaseous oxygen lines and equipment running above 1.5 MPa (218 psi) pressure or running above +60°C (+140°F) operating temperature. For detailed information or advice please refer to Technical Services.												
Product range	Tubes, 25 mm th	ickness, for	pipe outer	diameter	s ranging f	rom 18 to	89 mm (¾	" to 3" NB). Sheets in	n rolls, 25 m	nm thickness.			
Applications	Cryogenic thermal insulation / protection of pipes, vessels and equipment (incl. elbows, fittings, flanges etc.) in production plants for petrochemicals, industrial gases, LNG, agricultural chemicals and other process equipment facilities. In all instances Armacell ES Technical Services shall be contacted to conduct a thorough technical review of the proposed use and operating environment.												
Installation	For industrial applications it is recommended to consult the relevant Armacell installation instructions and application manuals. Please contact Technical Services.												
Regulation / approval compliance		EN 14304 (harmonized construction product standard for FEF). Certificate of Fire Approval by Lloyd's Register (Class 1, BS 476 part 7).											
Property	Value/Assessment Special Remark												
Temperature range													
Service temperature*1	Max. service temperature +110 °C +230 °F							Tested according to EN 14706, EN 14707					
	Min. service temperature -180 °C -292 °F							and EN 14304					
Thermal conductivity													
Declared thermal	λ ≤ 0.040 W/(m·k	() at 0 °C								Declared according to EN ISO 13787 Tested according to			
conductivity (metric units)	θ <sub>m</sub> -180	-100	-50	0	+50	+100	+110	[°C]					
	$\lambda_{d} \leq 0.020$	0.031	0.036	0.040	0.045	0.052	0.054	[W/(m·K)]		EN 12667 and			
	Equation of declared thermal conductivity as a function of temperature: $\lambda \left(\theta_{m}\right) = 0.04 + 9 \times 10^{-5} \times \theta_{m} + 1.5 \times 10^{-7} \times \theta_{m}^{2} + 1.5 \times 10^{-9} \times \theta_{m}^{3} \text{ W/(m·K)}, \text{ where } \theta_{m} \text{ is mean temperature in °C}$								ıre in °C	<ul> <li>EN ISO 8497 (Equivalent methods ASTM C177 and C518)</li> </ul>			
Declared thermal conductivity	λ < 0.277 Btu·in/(h·ft2·°F) at 32 °F							_					
(imperial units)	θ <sub>m</sub> -292	-148	-58	+32	+122	+212	+230	[°F]					
	λ <sub>d</sub> ≤ 0.138	0.215	0.247	0.277	0.312	0.361	0.372	[Btu·in/(h·ft²·°F)]		_			
Water vapour diffusion (transm	ission) resistance												
Water vapour diffusion resistance factor	For details on sy	stem perfor	mance plea	ase conta	ct our Cust	omer Ser\	vice Centre	<u>)</u> .					
Water vapour permeability													
Fire performance & approvals										•			
International standards	Class A, < 25 Flame Spread Index							Tested according to ASTM E84					
	Class 1 Approved by Lloyds Register								Tested according to BS 476 part 7				
Reaction to fire (Euroclass)	Euroclass E									Classified according to EN 13501-1 Tested according to EN ISO 11925-2			
General fire performance	Self-extinguishing, does not drip, does not spread flames.												
Density													
Density	65 to 80 kg/m³		4.1 to 5.	.0 lb/ft³						Tested according to ISO 845, ASTM D1622			

#### Mechanical properties

Compression deflection	≥ 10 kPa	≽ 1.5 psi	at 25% deflection	Tested according to ISO 6916-1 (equivalent method ASTM D1056)	
Corrosion mitigation				-	
Leachable (water-soluble) chlorides	≤ 80 ppm (mg/kg or μg/g)			Tested according to EN 13468 and ASTM C871	
pH-value	7 to 9	Tested according to ISO 10523			
Stress corrosion cracking	No cracks under magnifying	Tested according to ASTM C692			
Other technical features					
Dimensional tolerances	According to EN 14304, for de	Tested according to EN 822, EN 823 and EN 13467			
Weather resistance	In all industrial applications Arma-Chek R, metal jacketin information please consult To				
Health aspects	Neutral, MSDS available on r				
Water absorption*3	≤ 0.1% by volume (total subm	Tested according to ASTM C209			
Closed cell content	> 90 %	declared on the basis	of the water absorption test		
Glass transition temperature*3	Below -70 °C	Below -94 °F			
Application conditions*5	Application temperature:*6 Max. relative humidity:	+5 °C to +35 °C 80%	+41 °F to +95 °F		
Sealing and adhesion	ArmaFlex Adhesive 520 or Ad				
Storage	Material shall be stored indoors, in clean and dry conditions, away from direct sunlight.				
Shelf (storage) life*7	Max. 3 years.				

- For temperatures below or above those published please contact Technical Services to request for the corresponding technical information.

  Specimen preparation in accordance with 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.

- temperature.

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

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

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

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

  Shelf life (maximum storage time) is limited in order to make sure that only currently manufactured products are applied 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.



#### Sheets

Item	Nominal Thickness [mm]	Nominal Width x Length [m]	m²/carton	
LTD-25-99/E	25	1x4	4	
Tolerances for sheets According to EN 14304	Thickness tolerances	25 mm nominal thickness	± 2 mm	
	Width tolerances		± 2 %	
	Length tolerances		± 1.5 %	

#### Tubes

STEEL PIPE Nominal	Nominal	Outside	Pipe max. Outside	Inner Diameter of	Nominal Insulation Thickness:	
Pipe Size NPS	Diameter DN	Diameter OD*	Diameter	Insulation Tube min/max	25mm	
[inch]		[mm]	[mm]	[mm]	Item	m/ carton
3/8	10	17.2	18	19.5 - 21.0	LTD-25X018	36
1/2	15	21.3	22	23.5 - 25.0	LTD-25X022	32
3/4	20	26.9	28	29.5 - 31.5	LTD-25X028	24
1	25	33.7	35	36.5 - 38.5	LTD-25X035	24
11/4	32	42.4	42.4	44.0 - 46.0	LTD-25X042	20
11/2	40	48.3	48.3	50.0 - 52.0	LTD-25X048	18
2	50	60.3	60.3	62.0 - 64.0	LTD-25X060	12
21/2	65	76.1	76.1	78.0 - 80.0	LTD-25X076	10
3	80	88.9	89	91.0 - 94.0	LTD-25X089	8
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Tolerances for tubes According to EN 14304	Thickness tolerances	25 mm nominal thickness	± 2.5 mm
	Inner diameter tolerances		see ID min/max in the table above
	Length tolerances		± 1.5 %

st In accordance with European standards for steel pipes. For further dimensions please contact Technical Services.

#### Accessories

Item	Article description	Units/Carton		
ADH520/2,5E	2.5 litre tin	20 litre		
ADH520/1,0E	1 litre tin	12 litre		
ADH-HT625/1,0	1 litre tin	12 litre		

All data and technical information are based on results achieved under the specific conditions defined according to the testing standards referenced 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 regulations and project specification lies with the customer. Armacell takes every precaution to ensure the accuracy of the data provided in this document and all statements, technical information and recommendations contained within are believed to be correct at the time of publication. By ordering/preceiving product you accept the **Armacell General Terms and Conditions of Sale** applicable in the

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### ABOUT ARMACELL

As the inventors of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal, acoustic 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 3,100 employees and 24 production plants in 16 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for high-tech and lightweight applications and next generation aerogel blanket technology.

