

BREEAM COMPLIANCE PRODUCT CARD

Technical insulation



TECHNICAL
INSULATION



COOLING



AIR
CONDITIONING

Armaflex XG

Armaflex XG is a highly-flexible, closed-cell insulation material with high water vapour diffusion resistance and low thermal conductivity for building equipment and industrial installations¹.



BREEAM International New Construction 2013

BREEAM is a multi-criteria scheme to assess and certify buildings. Established in UK, it emphasises sustainable development by promoting green, healthy and eco-friendly buildings. Features of the buildings which may be assessed are: materials, quality of indoor environments and energy efficiency etc. Nowadays it has become a standard in real estates markets.

BREEAM compliance product card for **Armaflex XG** was prepared to assist designers, architects, engineers, consultants and developers to provide clear information and to facilitate choosing proper product. Appropriate BREEAM categories related to Armaflex XG features were chosen and checked. Armaflex XG compliance and contribution to BREEAM categories are presented below.

 Product compliant

 Product contributes to a better rating

| BREEAM Category | Issue | BREEAM Requirements | Credits | Product compliance |
|--|--------|--|---------|---|
| Insulation | Mat 04 | Construction materials should be responsibly sourced. A responsibly sourced confirmation of „supply chain process“ and „key process“ should be provided. | 1* | Armaflex XG is responsibly sourced which may be confirmed with ISO14001 ² certificates for: - supply chain process (polymer) - key process (insulation production).  |
| Thermal comfort | Hea 03 | A thermal comfort analysis should be carried out to assess if the indoor environment maintains comfortable conditions for building users in terms of appropriate thermal comfort level according to ISO 7730:2005. | 2** | Armaflex XG is a part of building's systems. Adjusting proper design parameters will enable to improve energy efficiency and its supply to the system appliances. For energy efficiency the main parameter of Armaflex XG is thermal conductivity which is product thickness dependant: from $\lambda_{0^{\circ}\text{C}} < 0,035 \text{ W/mK}$ to $\lambda_{0^{\circ}\text{C}} < 0,036 \text{ W/mK}^1$. |
| Reduction of energy use and carbon emissions | Ene 01 | An energy performance should be carried out to assess building energy consumption during operation in comparison with the notional building (parameters defined by national standards). | 15** |  |
| Energy efficient cold storage | Ene 05 | Greenhouse gas emissions from cold storage systems should be reduced by improving their energy efficiency. | 3** | |

For detailed information please refer to the documents provided by manufacturer:

¹ Armaflex XG product card

² ISO 14001 certificates are available for the factories in Muenster (Germany), Środa Śląska (Poland), Begur (Spain) as well as for main polymers production.

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* Armaflex XG has a direct impact on the following categories. While using Armaflex XG with another appropriate products - credits stated above may be awarded. Maximum number of credits influenced by the product for each category was stated above.

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BREEAM International New Construction 2016

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|--|--------|--|---------|---|---|
| Indoor air quality: Minimising sources of air pollution | Hea 02 | At least four of five finishing materials should meet appropriate volatile organic compounds (VOC) emission levels and confirm compliance with testing standards ISO 10580, ISO 16000-9, CEN/TS 16516 or CDPH Standard Method v1.1. For VOC emission limits for insulation were listed in Tables 17 and 18 of BREEAM International NC 2016 Manual. | 3• | Sampling, testing and evaluation were performed according to ISO 16000-9. Insulation meets exemplary level emission limits ² : - Formaldehyde < 0,01 mg/m ³ - Total volatile organic compounds < 0,3 mg/m ³ - Total semi-volatile organic compounds < 0,1 mg/m ³ - Category 1A and 1B carcinogens < 0,001 mg/m ³ |  |
| Responsible sourcing of construction | Mat 03 | Construction materials should be responsibly sourced. A responsibly sourced confirmation of „supply chain process“ and „key process“ should be provided. | 4• | Armaflex XG is responsibly sourced which may be confirmed with ISO14001 ³ certificates for: - supply chain process (polymer) - key process (insulation production). |  |
| Material efficiency | Mat 06 | In order to minimise materials' environmental impact more efficient materials should be used during building design, procurement, construction, maintenance and end of life. | 1** | Armaflex XG as a part of building energy system has the following efficiency features: - a service life is more than 50 years, - it may be damaged only by extraordinary impacts or during installation, - varied packaging: appropriate size and package type (2 m tubes, endless tubes and sheets). Packaging waste is reduced. |  |
| Thermal comfort | Hea 04 | A thermal comfort analysis should be carried out to assess if the indoor environment maintains comfortable conditions for building users in terms of appropriate thermal comfort level according to ISO 7730:2005. | 3** | Armaflex XG is part of building's systems. Adjusting proper design parameters will enable to improve energy efficiency and its supply to the system appliances. For energy efficiency the main parameter of Armaflex XG product is thermal conductivity which is product thickness dependant: from $\lambda_{0^{\circ}\text{C}} < 0,035 \text{ W/mK}$ to $\lambda_{0^{\circ}\text{C}} < 0,036 \text{ W/mK}^1$. |  |
| Reduction of energy use and carbon emissions | Ene 01 | An energy performance should be carried out to assess building energy consumption during operation in comparison with the following requirements: notional building (parameters defined by national standards) and BREEAM best practice building (BREEAM defined parameters). | 15** | |  |
| Energy efficient cold storage | Ene 05 | Greenhouse gas emissions from cold storage systems should be reduced by improving their energy efficiency. | 3** | | |

For detailed information please refer to the documents provided by manufacturer:

¹Armaflex XG product card

²Eurofins Product Testing A/S Attestation and Test report No. 392-2013-GSH-CEFEP_01

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LEED COMPLIANCE PRODUCT CARD

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LEED 2009

for Green Building Design and Construction

LEED is a multi-criteria scheme to assess and certify buildings. Established in USA, it emphasises sustainable development by promoting green, healthy and eco-friendly buildings. Features of the buildings which may be assessed are: materials, quality of indoor environments and energy efficiency etc. Nowadays it has become a standard in real estates markets.




LEED compliance product card for **Armaflex XG** was prepared to assist designers, architects, engineers, consultants and developers to provide clear information and to facilitate choosing proper product. Appropriate LEED categories related to Armaflex XG features were chosen and checked. Armaflex XG compliance and contribution to LEED categories are presented below.



Product compliant



Product contributes to a better rating

| LEED Issue | Credit | LEED Requirements | Points | Product compliance |
|-------------------|--|--|--------|--|
| EA Prerequisite 2 | Minimum Energy Performance | Building's energy performance calculated using computer simulation model should demonstrate a 10% improvement for new buildings, or a 5% for major renovations in comparison to the baseline as a compulsory achievement by using energy efficient measures. | - | Armaflex XG is a part of building's systems. Adjusting proper design parameters will enable to improve energy efficiency and its supply to the system appliances. For energy efficiency the main parameter of the Armaflex XG is thermal conductivity which is product thickness dependant: from $\lambda_{0°C} < 0,035 \text{ W/mK}$ to $\lambda_{0°C} < 0,036 \text{ W/mK}$ ¹ .  |
| EA Credit 1 | Optimize Energy Performance | Building's energy performance calculated using computer simulation model should demonstrate an improvement in comparison to the baseline. Number of points awarded depends on percentage improvement and building type. | 21** | |
| IEQ Credit 3.2 | Construction Indoor Air Quality Management Plan – before occupancy | A building flush-out or IAQ testing should be conducted prior to occupancy to demonstrate contaminant limits are not exceeded. The maximum concentration of formaldehyde in air is: 27 parts per billion while volatile organic compounds (VOC): 500 micrograms per cubic meter. | 1** | Armaflex XG may contribute reducing air contamination. Sampling, testing and evaluation of the product determine low levels of formaldehyde and VOC ² .  |
| IEQ Credit 7.1 | Thermal Comfort | An appropriate level of thermal comfort within the building should be provided by designing HVAC systems in accordance with ASHRAE 55-2004 Thermal Environmental Conditions for Human Occupancy. | 1** | Armaflex XG has got an indirect impact on achieving acceptable range of operative temperature and humidity by providing protection for pipes or air ducts. Therefore it prevents condensation of the humidified air. Water vapour diffusion resistance of Armaflex XG which is product thickness dependant is: from $\mu > 7\,000$ to $\mu > 10\,000$ ¹ .  |
| IEQ Credit 7.2 | Thermal Comfort – Verification | A measurements of relevant environmental variables in potential problem areas indicated by building's occupants should be conducted. Measurements should be carried out in accordance with ASHRAE standard 55-2004. | 1** | |

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² Eurofins Product Testing A/S Attestation and Test report No. 392-2013-GSH-CEFEP_01

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LEED v4

for Building Design and Construction

LEED is a multi-criteria scheme to assess and certify buildings. Established in USA, it emphasises sustainable development by promoting green, healthy and eco-friendly buildings. Features of the buildings which may be assessed are: materials, quality of indoor environments and energy efficiency etc. Nowadays it has become a standard in real estates markets.


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|--|--|--|--------|---|
| EA Prerequisite Minimum Energy Performance | Option 1. Whole-building energy simulation | An energy calculation should be carried out based on a simulation model in accordance to the ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G with errata. An improvement of 5% (new construction projects), 3% (major renovations projects), 2% (core and shell projects) over a baseline should be demonstrated. | - | Armaflex XG is a part of building's systems. Adjusting proper design parameters will enable to improve energy efficiency and its supply to the system appliances. For energy efficiency the main parameter of the Armaflex XG is thermal conductivity which is product thickness dependant: from $\lambda_{0°C} < 0,035 \text{ W/mK}$ to $\lambda_{0°C} < 0,036 \text{ W/mK}$ ¹ . |
| EA Optimize Energy Performance | Option 1. Whole-building energy simulation | Building's energy performance calculated using computer simulation model should demonstrate an improvement in comparison to the baseline. Number of points awarded depends on percentage improvement. | 18** |  |
| EQ Thermal Comfort | Thermal Comfort Design Option 2. ISO and CEN Standards | A thermal comfort analysis should be carried out in accordance to the standards: ISO 7730:2005 and EN 15251:2007. | 1** | |
| EQ Low-Emitting Materials | Option 1. Product category calculations | Up to 7 product categories of finishing materials should be compliant with relevant volatile organic compounds (VOC) emission levels and testing standards: - CDPH Standard Method (2010) or - German AgBB Testing and Evaluation Scheme (2010) or - ISO 16000-3/6/9/11:2010 in conjunction with AgBB or French legislation on VOC emission class labeling or the DIBt testing method (2010). | 3* | Armaflex XG has been tested ² in accordance to: ISO 16000-3/6/9/11:2010 in conjunction with the German AgBB Testing and Evaluation Scheme (2012), DIBt (2010) and French legislation on VOC emission class. Product complies with limit values of the AgBB and DIBt regulations. For the French regulation emission class is A+. |
| EQ Thermal Comfort | Thermal Comfort Design Option 1. ASHRAE Standard 55-2010 | An appropriate level of thermal comfort within the building should be provided by designing HVAC systems in accordance with ASHRAE 55-2010 Thermal Environmental Conditions for Human Occupancy with errata or a local equivalent. | 1** | Armaflex XG has got an indirect impact on achieving acceptable range of operative temperature and humidity by providing protection for pipes or air ducts. Therefore it prevents condensation of the humidified air. Water vapour diffusion resistance of Armaflex XG which is product thickness dependant is: from $\mu > 7000$ to $\mu > 10000$ ¹ . |

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