**Type III Environmental Product Declaration ITB No. 151/2021**

Issue date: 09.02.2021
Valid to: 09.02.2026

# Tubolit insulation products

## Tubolit S Plus and Tubolit DG


### Owner of the EPD

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**ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org**

**Basic information**

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the environmental impacts of the declared construction materials. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

**Life cycle analysis (LCA):** A1-A5, C2, C4 and D according to EN 15804 (Cradle to Gate with options)
**The year of preparing the EPD:** 2021
**Product standard:** EN 14313
**Service Life:** 50 years for standard products
**PCR:** ITB-PCR A (PCR based on EN 15804)
**Declared unit:** 1 $m^3$ of the Tubolit insulation products
**Reasons for performing LCA:** B2B
**Representativeness:** British products

## MANUFACTURER

**Armacell** has been manufacturing in the UK since the 1960s and is still the only elastomeric foam producer in Great Britain. Manufactured at our Oldham plant, AF/ArmaFlex Class O is the first elastomeric insulation to meet British Standards on product fire safety. The facility is also one of the principle locations for Tubolit domestic pipe insulation and ArmaSound RD production. The Oldham plant is ISO 9001 and ISO 14001 certified and all thermal insulation products produced in the UK meet the CE marking regulations.

**Armacell International GmbH** is a producer of flexible insulation foams for the equipment insulation market and a provider of engineered foams which operates two main businesses:

- Advanced Insulation develops flexible foams for the insulation of technical equipment utilised for the transport of energy - such as heating, ventilation & air conditioning (HVAC) and heating & plumbing (H&P) in residential and commercial construction, process lines in the heavy- and oil & gas industry, equipment in transportation, as well as, acoustics.
- Engineered Foams develops high-performance foams for the use in a broad range of end markets including transportation, automotive, wind energy, sports and construction.

## PRODUCT DESCRIPTION AND APPLICATION

**Tubolit insulation products** are flexible, closed-cell extruded materials made of polyethylene. The specification and application of the Tubolit insulation products are listed in Table 1.

Table 1. Specification of Tubolit S Plus and Tubolit DG products manufactured by Armacell UK.

| **Product name** | **Features:**<br>T: thickness<br>D: density<br>C: conductivity at 40°C<br>P: colour | **Material information** | **Application** | **Declaration of performances** | **Certificate of conformity** |
|---|---|---|---|---|---|
| Tubolit S Plus | T: 0.4 mm<br>D: 55 kg/m3<br>C: 0.045 W/mK<br>P: blue | Foam material based on polyethylene. Factory made polyethylene foam (PEF) according to EN 14313. Foil coating on outer surface for additional protection of insulation surface. Foil coating on inner surface for better sleeve-on installation. | Insulation / protection of pipes (heating system pipes, domestic hot and cold water pipes) and other parts of heating and plumbing installations (incl. elbows, fittings, flanges, etc). | 0551-CPR-2013-040,<br>0550-CPR-2013-040 | 0551-PEF-12-1-R5-F.e ,<br>0550-PEF-12-1-R3-F.e |

| | | | | | |
|---|---|---|---|---|---|
| Tubolit DG | T: 0.9-30 mm<br>D: 25 kg/m3<br>C: 0.04 W/mK<br>P: grey | Foam material based on polyethylene. Factory made polyethylene foam (PEF) according to EN 14313. Insulation / protection of pipes (heating system pipes, domestic hot and cold water pipes) and other parts of heating and plumbing installations (incl. elbows, fittings, flanges, etc). | Insulation / protection of pipes (heating system pipes, domestic hot and cold water pipes) and other parts of heating and plumbing installations (incl. elbows, fittings, flanges, etc). | 0551-CPR-2013-037, 0550-CPR-2013-037 | 0551-PEF-12-1-R5-F.e , 0550-PEF-12-1-R3-F.e |

## LIFE CYCLE ASSESSMENT (LCA) – general rules applied

**Allocation**

The allocation rules used for this EPD are based on product mass basis in accordance with ITB PCR A. Production of Tubolit S Plus and Tubolit DG products is a line process in the production plant of Armacell UK factory in Oldham (United Kingdom). Allocation of environmental burdens was done on product mass basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA. Impacts from the global line production of the Armacell UK were inventoried and 97.98% were allocated to the production of the Tubolit insulation productsModule A2 includes transport of raw materials from their suppliers to Armacell UK factory in in Oldham (United Kingdom). Water and energy consumption and generated wastes are allocated to module A3.

**System boundary**

The life cycle analysis of the declared products covers “Product Stage”, A1-A5, C2, C4 and D modules (Cradle-to-Gate - with options) in accordance with EN 15804:2012+A1:2013 and ITB PCR A. The details of the system limits are provided in the backgroud report. Energy and water consumption, emissions to air, soil and water as well as information on generated wastes were inventoried and were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804:2012+A1:2013, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

**A1 and A2: Raw materials supply and transport**

Polyethylene, wax, talc, chalk, blowing agent, copolymer and other chemicals, packaging materials (stretch foil, wooden palette, carton boxes) come from both British and foreign suppliers. Means of transport include trucks with load: <10t, 10 – 16t and >16t. For calculation purposes British and European fuel averages were applied.

**A3: Production**

The production of Tubolit S Plus and Tubolit DG is a line process performed by three automated production lines in factory in Oldham what is presented in Fig. 1. Polyethylene and additives are weighed, mixed and then extruded with the addition of a blowing agent. After cooling and cutting product is being packed and transferred for seasoning. Afterwards ready to use product is prepared for transport to Customer.

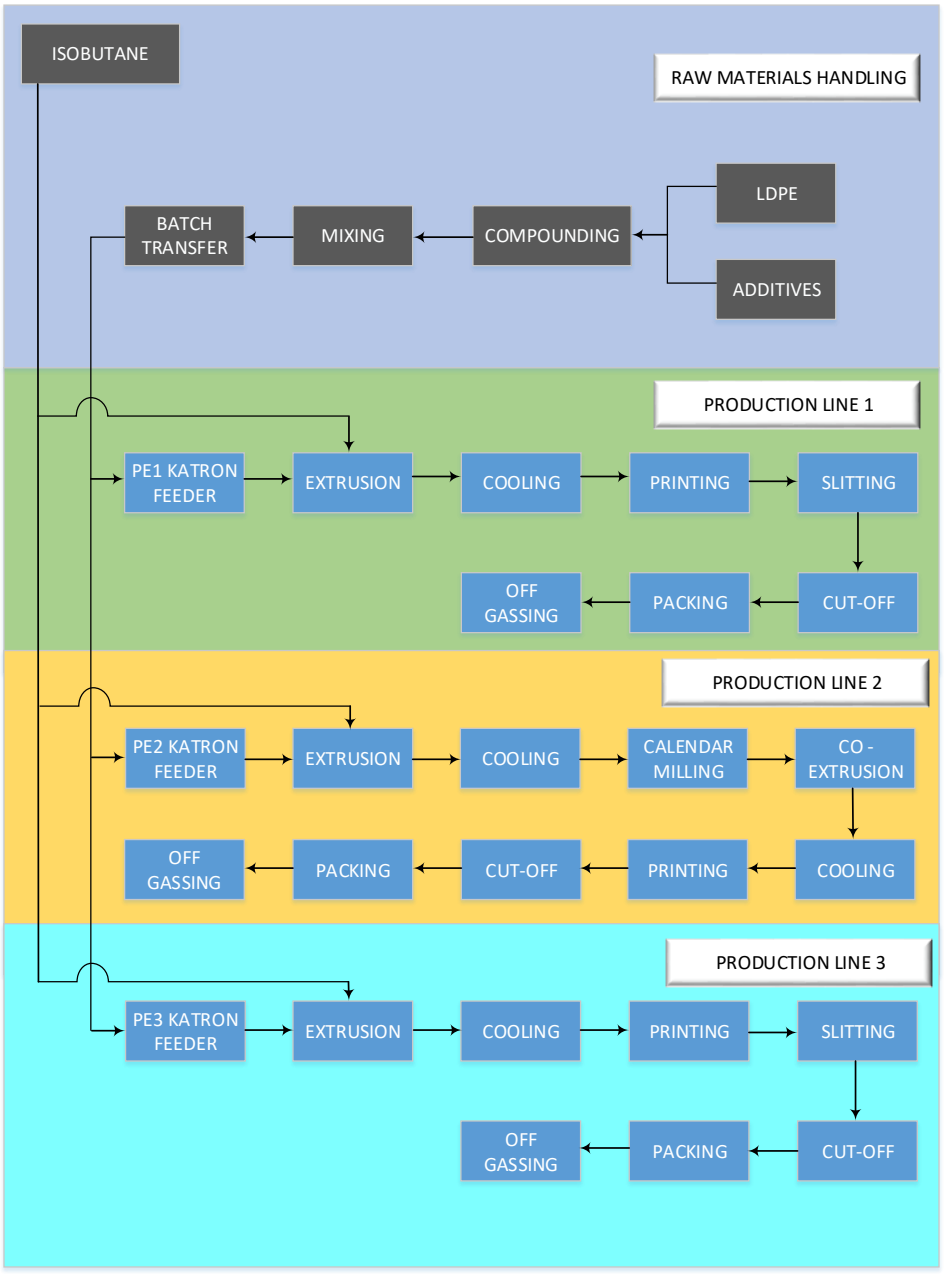


*Fig. 1. A scheme of manufacturing of Tubolit S Plus and Tubolit DG products by Armacell UK.*

**A4: Transport to construction site**

Tubolit S Plus and Tubolit DG products are delivered to British as well as foreign construction sites. An average distance of 750 km from the factory gate to a construction site is assumed. Means of transport include 24t loaded lorry with 85% capacity utilization and fuel consumption of 35 L per 100 km.

**A5: Installation process**

Considered environmental burdens are associated with the use of electrical tools and ancillary materials recommended by Producer (see the producer's manual). A loss of 1% of the Tubolit insulation products is assumed.

**C2, C4 and D Modules: End-of-life scenario**

At the end of life Tubolit S Plus and Tubolit DG products are deconstructed with the use of electrical tools. It is assumed that 98% of the polyethylene foam is recovered, of which 65% undergo incineration, 35% is forwarded to landfill in the form of mixed construction and demolition wastes. In module C2 transport distance of 75 km on > 10t loaded lorry with 85% capacity utilization and fuel consumption of 25 L per 100 km is considered. Environmental burdens declared in module C4 are associated with waste-specific emissions to air and groundwater via landfill gas incineration and landfill leachate. Benefits resulting from the recycling of the polyethylene foam and heat production (alternative for heavy fuel oil) are included in module D.

Table 2. End-of-life scenario for Tubolit S Plus and Tubolit DG products manufactured by Armacell UK.

| Material | Material recovery | Energy recovery | Landfilling |
|---|---|---|---|
| Polyethylene foam | 98% | 65% | 35% |

**Data collection period**

The data for manufacture of the declared products refer to period between 01.01.2019 – 31.12.2019 (1 year). The life cycle assessments were prepared for United Kingdom as reference area.

**Data quality**

The values determined to calculate the LCA originate from verified Armacell UK inventory data.

**Calculation rules**

LCA was done in accordance with ITB PCR A document.

**Databases**

The data for the processes come from the following databases: Ecoinvent v.3.7, specific EPDs, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit.

## LIFE CYCLE ASSESSMENT (LCA) – Results

**Declared unit**

The declaration refers to declared unit (DU) – 1 $m^3$ of Tubolit S Plus and Tubolit DG products manufactured by Armacell UK.

Table 3. System boundaries for the environmental characteristic of Tubolit S Plus and Tubolit DG products manufactured by Armacell UK.

| Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product stage | | | Construction press | | Use stage | | | | | | | End of life | | | | Benefits and loads beyond the system boundary |
| Raw material supply | Transport | Manufacturing | Transport to construction site | Construction-installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction demolition | Transport | Waste processing | Disposal | Reuse-recovery-recycling potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| MD | MD | MD | MD | MD | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MD | MNA | MD | MD |

# Tubolit S Plus

| Environmental impacts: (DU) 1 m³ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Global warming potential | kg $CO_2$ eq. | 2.17E+02 | 2.30E+00 | 3.60E+01 | 1.56E+01 | 5.93E+00 | 1.86E+00 | 1.09E+02 | -1.38E+02 |
| Depletion potential of the stratospheric ozone layer | kg CFC 11 eq. | 4.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.17E-07 | 0.00E+00 | 2.32E-07 | -1.89E-05 |
| Acidification potential of soil and water | kg $SO_2$ eq. | 2.29E+00 | 3.98E-02 | 2.47E-02 | 2.29E-02 | 3.84E-02 | 1.56E-03 | 1.33E-02 | -9.52E-01 |
| Formation potential of tropospheric ozone | kg Ethene eq. | 9.24E-02 | 2.77E-03 | 1.41E-04 | 1.67E-03 | 3.42E-03 | 1.00E-04 | 1.09E-03 | -3.63E-02 |
| Eutrophication potential | kg $(PO_4)^{3-}$ eq. | 1.98E-01 | 7.02E-03 | 2.76E-03 | 4.04E-03 | 7.05E-03 | 2.77E-04 | 5.04E-03 | -4.85E-02 |
| Abiotic depletion potential (ADP-elements) for non-fossil resources | kg Sb eq. | 9.58E-04 | 0.00E+00 | 1.33E-04 | 0.00E+00 | 4.55E-05 | 0.00E+00 | 5.15E-06 | -4.22E-05 |
| Abiotic depletion potential (ADP-fossil fuels) for fossil resources | MJ | 7.02E+03 | 3.14E+01 | 5.75E+02 | 2.13E+02 | 1.70E+02 | 2.53E+01 | 2.32E+01 | -1.72E+03 |
| **Environmental aspects on resource use: (DU) 1 m³** | | | | | | | | | |
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Use of renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) | MJ | 6.25E+02 | 2.20E+00 | 9.15E+01 | 1.49E+01 | 1.22E+01 | 1.77E+00 | 8.86E-01 | -1.27E+01 |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Use of non-renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) | MJ | 7.37E+03 | 3.30E+01 | 6.04E+02 | 2.23E+02 | 1.70E+02 | 2.66E+01 | 2.34E+01 | -1.83E+03 |
| Use of secondary material | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.36E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of renewable secondary fuels | MJ | 0.00E+00 | 1.65E+00 | 0.00E+00 | 1.12E+01 | 1.65E-02 | 1.33E+00 | 0.00E+00 | 0.00E+00 |
| Use of non-renewable secondary fuels | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Net use of fresh water | $m^3$ | INA | INA | INA | INA | INA | INA | INA | INA |
| **Other environmental information describing waste categories: (DU) 1 m³** | | | | | | | | | |
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Hazardous waste disposed | kg | 1.32E-02 | 9.86E-09 | 0.00E+00 | 1.80E-09 | 1.00E-03 | 1.29E-10 | 1.32E-04 | -1.31E-03 |
| Non-hazardous waste disposed | kg | 9.43E+00 | 4.41E-06 | 3.15E-02 | 8.06E-07 | 3.34E-01 | 5.76E-08 | 2.14E+01 | -1.26E+00 |
| Radioactive waste disposed | kg | 2.24E-03 | 2.55E-08 | 0.00E+00 | 4.66E-09 | 1.19E-04 | 3.33E-10 | 9.70E-05 | -1.22E-03 |
| Components for re-use | kg | 0.00E+00 | 0.00E+00 | 1.37E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling | kg | 0.00E+00 | 0.00E+00 | 1.55E+00 | 0.00E+00 | 1.55E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for energy recover | kg | 8.56E-03 | 0.00E+00 | 4.64E-01 | 0.00E+00 | 2.08E-03 | 0.00E+00 | 3.43E+01 | 0.00E+00 |
| Exported energy | MJ per energy carrier | INA | INA | INA | INA | INA | INA | INA | INA |

# Tubolit DG

| Environmental impacts: (DU) 1 m³ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Global warming potential | kg $CO_2$ eq. | 8.07E+01 | 1.19E+00 | 1.40E+01 | 7.09E+00 | 4.33E+00 | 8.44E-01 | 4.95E+01 | -6.25E+01 |
| Depletion potential of the stratospheric ozone layer | kg CFC 11 eq. | 2.24E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.12E-07 | 0.00E+00 | 1.06E-07 | -8.60E-06 |
| Acidification potential of soil and water | kg $SO_2$ eq. | 1.11E+00 | 1.64E-02 | 9.62E-03 | 1.04E-02 | 2.63E-02 | 7.09E-04 | 6.06E-03 | -4.33E-01 |
| Formation potential of tropospheric ozone | kg Ethene eq. | 4.63E-02 | 1.19E-03 | 1.50E-04 | 7.59E-04 | 2.94E-03 | 4.55E-05 | 4.95E-04 | -1.65E-02 |
| Eutrophication potential | kg $(PO_4)^{3-}$ eq. | 9.13E-02 | 2.89E-03 | 1.07E-03 | 1.83E-03 | 5.92E-03 | 1.26E-04 | 2.29E-03 | -2.21E-02 |
| Abiotic depletion potential (ADP-elements) for non-fossil resources | kg Sb eq. | 1.93E-04 | 0.00E+00 | 5.19E-05 | 0.00E+00 | 3.71E-05 | 0.00E+00 | 2.34E-06 | -1.92E-05 |
| Abiotic depletion potential (ADP-fossil fuels) for fossil resources | MJ | 2.14E+03 | 1.62E+01 | 2.24E+02 | 9.67E+01 | 1.17E+02 | 1.15E+01 | 1.06E+01 | -7.84E+02 |
| **Environmental aspects on resource use: (DU) 1 m³** | | | | | | | | | |
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Use of renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) | MJ | 5.90E+02 | 1.13E+00 | 3.56E+01 | 6.77E+00 | 1.13E+01 | 8.06E-01 | 4.03E-01 | -5.76E+00 |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Use of non-renewable primary energy resources used as raw materials | MJ | INA | INA | INA | INA | INA | INA | INA | INA |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) | MJ | 2.24E+03 | 1.70E+01 | 2.35E+02 | 1.02E+02 | 1.15E+02 | 1.21E+01 | 1.07E+01 | -8.34E+02 |
| Use of secondary material | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.36E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of renewable secondary fuels | MJ | 0.00E+00 | 8.51E-01 | 0.00E+00 | 5.08E+00 | 8.51E-03 | 6.04E-01 | 0.00E+00 | 0.00E+00 |
| Use of non-renewable secondary fuels | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Net use of fresh water | $m^3$ | INA | INA | INA | INA | INA | INA | INA | INA |
| **Other environmental information describing waste categories: (DU) 1 m³** | | | | | | | | | |
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **A4** | **A5** | **C2** | **C4** | **D** |
| Hazardous waste disposed | kg | 7.06E-03 | 1.38E-08 | 0.00E+00 | 8.19E-10 | 9.38E-04 | 5.85E-11 | 6.00E-05 | -5.97E-04 |
| Non-hazardous waste disposed | kg | 4.02E+00 | 6.19E-06 | 1.21E-02 | 3.66E-07 | 2.80E-01 | 2.62E-08 | 9.72E+00 | -5.74E-01 |
| Radioactive waste disposed | kg | 1.21E-03 | 3.58E-08 | 0.00E+00 | 2.12E-09 | 1.08E-04 | 1.51E-10 | 4.41E-05 | -5.54E-04 |
| Components for re-use | kg | 0.00E+00 | 0.00E+00 | 5.40E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling | kg | 0.00E+00 | 0.00E+00 | 5.91E-01 | 0.00E+00 | 5.91E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for energy recover | kg | 4.55E-03 | 0.00E+00 | 3.75E-01 | 0.00E+00 | 9.53E-04 | 0.00E+00 | 1.56E+01 | 0.00E+00 |
| Exported energy | MJ per energy carrier | INA | INA | INA | INA | INA | INA | INA | INA |

**Verification**

The process of this EPD verification is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after this validity period, if the underlying data have not changed significantly.

| The basis for LCA analysis was EN 15804 and ITB PCR A |
|---|
| Independent verification corresponding to ISO 14025 (subclause 8.1.3.)<br>☒ external ☐ internal |
| External verification of EPD: Ph.D. Halina Prejzner<br>Input data verification, LCI audit, LCA: Ph.D. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl<br>Verification of LCA: Ph.D. Eng. Michał Piasecki, m.piasecki@itb.pl |

**Normative references**


- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations – Type III Environmental Declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- EN 15942:2012 Sustainability of construction works - Environmental product declarations - Communication format business-to-business
- EN 14313:2OO9+41:2013 Thermal insulation products for building equipment and industrial installations - Factory made polyethylene foam (PEF) products – Specification
- GOV.UK. Electricity statistics. DUKES 2020 Chapter 5: Electricity (available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904805/DUKES_2020_Chapter_5.pdf.


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# CERTIFICATE № 151/2021
# of TYPE III ENVIRONMENTAL DECLARATION

Product:

**Tubolit insulation products: Tubolit S Plus and Tubolit DG**

Manufacturer:

**Armacell UK**

Mars Street, OL9 6LY Oldham, United Kingdom

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

**PN-EN 15804+A1**

**Sustainability of construction works.**
**Environmental product declarations.**
**Core rules for the product category of construction products.**

This certificate, issued for the first time on 9th February 2021 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Acting Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director
for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, February 2021