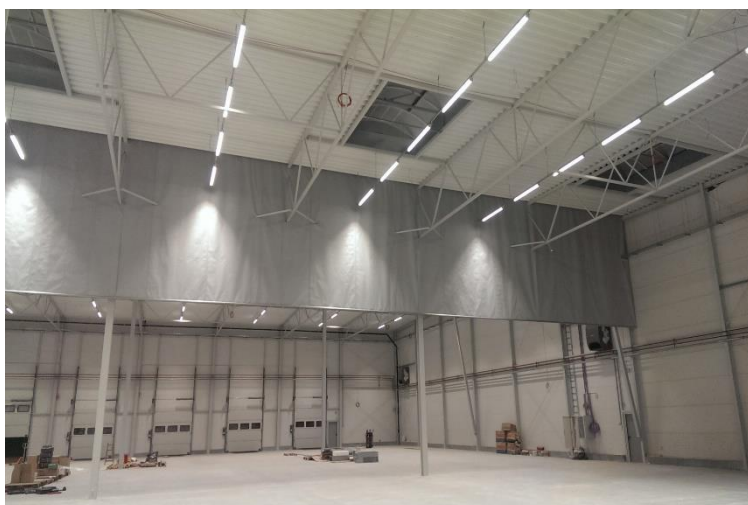




Issuance date: 28.03.2024

Validity date: 28.03.2029

Smoke curtains



Owner of the EPD:

NGR Technologie Sp. z o.o.
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EPD Program Operator:

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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 + A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 + A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804 + A2 (Cradle-to-Gate with options)

The year of preparing the EPD: 2024

Product standard: EN 12101-1: 2020

Service Life: 25 years

PCR: ITB-PCR A, v. 1.6

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Polish, European

MANUFACTURER



Fig. 1 A view of NGR Technologie Sp. z o.o. production plant located in Grodzisk Wielkopolski (Poland).

NGR Technologie Sp. z o.o. is a provider of solutions for fire, sound and bulletproof protection. The company was established in 2006. Production site NGR Technologie is located in Grodzisk Wielkopolski (Fig. 1). NGR Technologie actively operates on the international market. They have implemented over 3000 projects in 35 countries. The company offers wide range of fire gates for construction sector.

PRODUCTS DESCRIPTION AND APPLICATION

According to EN 12101-1, the smoke curtain is a partition that limits the movement of the hot fire gases mixed with smoke and regulates the movement of smoke and fire gases within the building. Thus, it is used to create smoke reservoirs by restricting the spread of smoke and collecting it in a specific area, it can be used to separate smoke reservoirs, direct smoke into a specific area, channel its flow and prevent and delay the flow of smoke into other areas or air voids (a curtain can be used to separate, for example, the space of a corridor, a shop premises, escalator, staircase or crane shaft or as a sealing screen at the boundaries of air voids).

Ultra-light curtains with a weight of 0.5 kg/m^2 in D 120 and DH 120 version. Grey color, close to RAL 7024. Opened by electric drive, closed by gravity or electric drive on a guaranteed voltage.



Fig. 2 Smoke curtain after assembly produced by NGR Technologie.

Selected characteristics of smoke curtains :

| | |
|---------------------|--|
| CE certificate: | ASB DH 120: 1396-CPR-0125 NSC&NSCA D 120: 1488-CPR-0112/W |
| Construction type: | Fixed – NSC (SSB) Automatic – NSCA (ASB1, ASB2, ASB3, ASB4) |
| Class resistance: | D 120 / DH 120 |
| Weight: | approx. 0.5 kg/m ² |
| Maximum dimensions: | no limitations |

More information can be found on NGR Technologie Sp. z o.o. website:
<https://www.ngr-technologie.eu>

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Declared Unit

The declaration refers to declared unit (DU) – 1 kg of smoke curtains

Allocation

The allocation rules used for this EPD are based on general ITB PCR A, v. 1.6. Smoke curtains production is a line process with multiple co-products in one factory located in Grodzisk Wielkopolski (Poland). Allocation is done on product mass basis.

All impacts from raw materials extraction and processing are allocated in A1 module of EPD. 99% of impacts from line production were inventoried and allocated to all smoke curtains production. Municipal waste and waste water of whole factory were allocated to module A3. Energy supply was inventoried for whole production process. Emissions in NGR Technologie were measured and were allocated to module A3. Packaging materials were taken into consideration. They are recycled in a closed loop.

System limits

The life cycle analysis (LCA) of the declared products covers product stage – modules A1-A3, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804 + A2 and ITB PCR A, v. 1.6. The details of systems limits are provided in product technical report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilised thermal energy, internal fuel and electric power consumption, direct production waste, water consumption and all available emission measurements.

It can be assumed that the total sum of omitted processes does not exceed 5 % of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

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

Raw materials such as steel elements, fabric of fibre glass with polyurethane coating and silica needle mat come from local and foreign suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include small (< 10 t), average (10 – 16 t) and big (> 16 t) trucks are applied. European standards for average combustion were used for calculations.

Module A3: *Production*

The Fig. 3 shows scheme of smoke curtains process production by NGR Technologie. Raw materials such as steel elements, fabric of fibre glass with polyurethane coating and silica needle mat are delivered to factory located in Grodzisk Wielkopolski, where are manufacturing in a few step process including processing of metal sheets, cutting and sewing of elastic curtain. Then the gates are packing, palleting and shipment. The facility is ISO 9001 certified.



Fig. 3. A scheme of smoke curtains process production by NGR Technologie (Poland)

Modules C1-C4 and D: End-of-life (EoL)

In the adapted scenario, deconstruction of the smoke curtains is performed with the use of electrical tools (module C1). The resulting waste is transported to a waste processing plant distant 100 km, on 16-32 t lorry EURO 5 (module C2). It is assumed that at the EoL cycle, 98 % of steel is recovered by sorted, crushed and forwarded to recycling (module C3) while the residues undergo landfilling (2 %) in the form of inert mixed construction and demolition wastes (module C4). In turn, 70 % of waste fabrics are processing by material (reuse/recycling) and energy recovery (incineration) while 30 % fabrics are landfilling. Module D presents credits resulting from the recycling of the primary steel.

Table 1. End-of-life (EoL) scenario for the smoke curtains offered by NGR Technologie.

| Material | Waste processing (material / energy recovery) | Landfilling |
|----------|---|-------------|
| steel | 98 % | 2 % |
| fabric | 70 % | 30 % |

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by smoke curtains using the inventory data, ITB database, Ecoinvent database v. 3.10 and KOBiZE. No specific data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good. Polish electricity was calculated based on Ecoinvent v 3.10 supplemented by actual national KOBiZE data. Polish electricity mix used (production) is 0.685 kg CO₂/kWh (KOBiZE 2023).

Data collection period

Primary data provided by NGR Technologie covers a period of 01.01.2022 – 31.12.2022 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

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Assumptions and estimates

The impacts of the representative of smoke curtains were aggregated using weighted average. Impacts were inventoried and calculated for all products in smoke curtains product group and they were presented in Tables 3-6.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804 + A2.

Databases

The data for the processes comes from Ecoinvent v. 3.10 and ITB-Database. Specific data quality analysis was a part of external audit. Polish electricity mix used (production) is 0.685 kg CO₂/kWh (KOBiZE 2023).

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of smoke curtains manufactured by NGR Technologie

Table 2. System boundaries for the environmental characteristic of smoke curtains manufactured by NGR Technologie

| Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed) | | | | | | | | | | | | | | | | |
|--|-----------|---------------|--------------------------------|-----------------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|---------------------------|-----------|------------------|----------|---|
| Product stage | | | Construction process | | Use stage | | | | | | | End of life | | | | Benefits and loads beyond the system boundary |
| Raw material supply | Transport | Manufacturing | Transport to construction site | Construction-installation process | 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 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MD | MD | MD | MD | MD |

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Table 3. LCA results for 1 kg of smoke curtains - environmental impacts

| Indicator | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|------------------------|-----------|----------|----------|-----------|----------|----------|----------|----------|-----------|
| Global Warming Potential | eq. kg CO ₂ | 1.35E+00 | 1.46E-02 | 8.57E-02 | 1.45E+00 | 1.14E-02 | 1.67E-02 | 2.02E-01 | 3.93E-02 | -6.32E-01 |
| Greenhouse gas potential - fossil | eq. kg CO ₂ | 1.87E+00 | 1.46E-02 | 8.39E-02 | 1.97E+00 | 1.13E-02 | 1.66E-02 | 1.04E-01 | 2.61E-04 | -6.25E-01 |
| Greenhouse gas potential - biogenic | eq. kg CO ₂ | -5.41E-01 | 4.65E-05 | 5.47E-04 | -5.40E-01 | 7.26E-05 | 5.68E-05 | 9.84E-02 | 3.91E-02 | -5.70E-03 |
| Global warming potential - land use and land use change | eq. kg CO ₂ | 4.22E-03 | 6.94E-06 | 2.87E-05 | 4.26E-03 | 3.99E-06 | 6.52E-06 | 2.31E-05 | 9.88E-08 | -5.93E-04 |
| Stratospheric ozone depletion potential | eq. kg CFC 11 | 1.97E-06 | 2.47E-09 | 8.50E-09 | 1.98E-06 | 2.19E-10 | 3.85E-09 | 6.17E-09 | 3.86E-11 | -5.57E-09 |
| Soil and water acidification potential | eq. mol H ⁺ | 8.68E-03 | 5.08E-05 | 8.38E-04 | 9.57E-03 | 1.21E-04 | 6.75E-05 | 4.55E-04 | 2.38E-06 | -2.52E-03 |
| Eutrophication potential - freshwater | eq. kg P | 7.45E-04 | 1.11E-06 | 1.33E-04 | 8.79E-04 | 2.07E-05 | 1.12E-06 | 8.58E-06 | 1.33E-08 | -3.11E-04 |
| Eutrophication potential - seawater | eq. kg N | 1.90E-03 | 1.45E-05 | 1.28E-04 | 2.04E-03 | 1.72E-05 | 2.04E-05 | 2.55E-04 | 1.01E-06 | -5.49E-04 |
| Eutrophication potential - terrestrial | eq. mol N | 2.08E-02 | 1.56E-04 | 1.07E-03 | 2.20E-02 | 1.48E-04 | 2.22E-04 | 1.95E-03 | 1.10E-05 | -5.73E-03 |
| Potential for photochemical ozone synthesis | eq. kg NMVOC | 8.42E-03 | 5.46E-05 | 1.05E-03 | 9.52E-03 | 4.14E-05 | 6.80E-05 | 5.10E-04 | 1.68E-05 | -1.89E-03 |
| Potential for depletion of abiotic resources - non-fossil resources | eq. kg Sb | 1.17E-05 | 6.24E-08 | 1.16E-07 | 1.18E-05 | 1.65E-08 | 5.89E-08 | 6.15E-07 | 2.65E-10 | -3.13E-06 |
| Abiotic depletion potential - fossil fuels | MJ | 2.61E+01 | 2.12E-01 | 2.00E+00 | 2.83E+01 | 1.86E-01 | 2.47E-01 | 5.99E-01 | 4.68E-03 | -7.87E+00 |
| Water deprivation potential | eq. m ³ | 1.03E+00 | 1.09E-03 | 2.68E-02 | 1.06E+00 | 3.79E-03 | 1.14E-03 | 1.14E-02 | 1.32E-05 | -2.73E-01 |

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Table 4. LCA results for 1 kg of smoke curtains - the resource use

| Indicator | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|----------------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials | MJ | 7.05E+00 | 3.55E-03 | 8.79E-02 | 7.15E+00 | 1.35E-02 | 3.54E-03 | -1.16E+00 | -5.80E-01 | -1.15E+00 |
| Consumption of renewable primary energy resources used as raw materials | MJ | 4.78E+00 | 0.00E+00 | 0.00E+00 | 4.78E+00 | 0.00E+00 | 0.00E+00 | 1.16E+00 | 5.80E-01 | 0.00E+00 |
| Total consumption of renewable primary energy resources | MJ | 1.18E+01 | 3.55E-03 | 8.79E-02 | 1.19E+01 | 1.35E-02 | 3.54E-03 | 4.29E-03 | 5.80E-05 | -1.15E+00 |
| Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials | MJ | 1.30E+01 | 2.12E-01 | 1.68E+00 | 1.49E+01 | 1.97E-01 | 2.47E-01 | 4.26E-02 | 4.68E-03 | -7.87E+00 |
| Consumption of non-renewable primary energy resources used as raw materials | MJ | 2.64E+00 | 0.00E+00 | 3.93E-01 | 3.04E+00 | 0.00E+00 | 0.00E+00 | 4.51E-01 | 0.00E+00 | 0.00E+00 |
| Total consumption of non-renewable primary energy resources | MJ | 1.57E+01 | 2.12E-01 | 2.08E+00 | 1.80E+01 | 1.97E-01 | 2.47E-01 | 4.94E-01 | 4.68E-03 | -7.87E+00 |
| Consumption of secondary materials | kg | 4.12E-01 | 8.96E-05 | 1.80E-04 | 4.12E-01 | 1.50E-05 | 8.27E-05 | 4.18E-04 | 1.45E-06 | 8.22E-01 |
| Consumption of renewable secondary fuels | MJ | 1.28E-01 | 1.07E-06 | 7.03E-07 | 1.28E-01 | 8.23E-08 | 9.11E-07 | 2.08E-05 | 1.58E-08 | -1.03E-04 |
| Consumption 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 | 0.00E+00 |
| Net consumption of freshwater resources | m ³ | 2.30E-02 | 2.87E-05 | 1.27E-04 | 2.32E-02 | 6.06E-05 | 3.10E-05 | 2.07E-04 | 2.81E-06 | -8.10E-03 |

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Table 5. LCA results for 1 kg of smoke curtains – additional impacts indicators

| Indicator | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|-------------------|-----|-----|-----|-------|-----|-----|-----|-----|-----|
| Particulate matter | disease incidence | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Potential human exposure efficiency relative to U235 | eg. kBq U235 | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Potential comparative toxic unit for ecosystems | CTUe | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Potential comparative toxic unit for humans (cancer effects) | CTUh | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Potential comparative toxic unit for humans (non-cancer effects) | CTUh | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Potential soil quality index | dimensionless | INA | INA | INA | INA | INA | INA | INA | INA | INA |

INA – Indicator Not Assessed

Table 6. LCA results for 1 kg of smoke curtains – waste categories

| Indicator | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---------------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Hazardous waste neutralized | kg | 2.76E-01 | 2.41E-04 | 2.52E-04 | 2.76E-01 | 3.86E-08 | 2.77E-04 | 4.91E-03 | 5.11E-06 | -3.92E-01 |
| Non-hazardous waste neutralised | kg | 5.12E+00 | 4.83E-03 | 1.21E-01 | 5.24E+00 | 1.10E-03 | 4.92E-03 | 1.24E-01 | 3.39E-02 | -1.51E+00 |
| Radioactive waste | kg | 3.76E-05 | 1.08E-06 | 3.58E-06 | 4.22E-05 | 1.60E-07 | 1.70E-06 | 2.77E-06 | 1.64E-08 | -2.66E-05 |
| Components for re-use | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling | kg | 5.57E-03 | 9.55E-07 | 4.93E-02 | 5.49E-02 | 1.13E-06 | 7.64E-07 | 8.10E-01 | 1.10E-08 | -2.32E-04 |
| Materials for energy recovery | kg | 2.52E-04 | 7.78E-09 | 2.34E-08 | 2.52E-04 | 1.58E-09 | 6.18E-09 | 4.69E-08 | 8.86E-11 | -1.67E-06 |
| Energy exported | MJ | 3.92E-02 | 2.11E-04 | 3.61E-03 | 4.31E-02 | 5.41E-04 | 2.74E-04 | 6.86E-03 | 1.57E-07 | -2.04E-02 |

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Verification

The process of verification of this EPD 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 5 years, if the underlying data have not changed significantly.

| |
|--|
| The basis for LCA analysis was EN 15804 + A2 and ITB PCR A |
| Independent verification corresponding to ISO 14025 (subclause 8.1.3) <input checked="" type="checkbox"/> external <input type="checkbox"/> internal |
| External verification of EPD: Halina Prejzner, PhD Eng LCA, LCI audit and input data verification: Mateusz Kozicki, PhD Verification of LCA: Michał Piasecki, PhD, D.Sc. Eng |

Note 1: The declaration owner has the sole ownership, liability and responsibility for the information provided and contained in EPD. Declarations within the same product category but from different programs may not be comparable. Declarations of construction products may not be comparable if they do not comply with EN 15804 + A2. For further information about comparability, see EN 15804 + A2 and ISO 14025. Depending on the application, a corresponding conversion factor such as the specific weight per surface area must be taken into consideration.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (17065/17025 certified). ITB-EPD program is recognized and registered member of The European Platform – Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A v. 1.6 General Product Category Rules for Construction Products
- EN 12101-1:2020 Smoke and heat control systems - Part 1: Specification for smoke barriers
- 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 + A2: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- KOBiZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej, 2023



Instytut Techniki Budowlanej

00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department

02-656 Warsaw, Ksawerów 21

CERTIFICATE No 617/2024 of TYPE III ENVIRONMENTAL DECLARATION

Products:

Smoke curtains

Manufacturer:

NGR TECHNOLOGIE Sp. z o.o.

ul. Zielonogórska 8, 62-065 Grodzisk Wielkopolski, Poland

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

EN 15804+A2

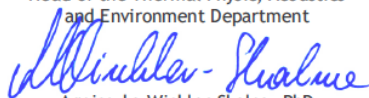
Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

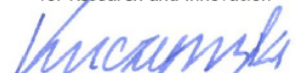
This certificate, issued on 28th March 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, March 2024