ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Product name:
PVC Shred and PVC Regranulate

Producer:
Molle Group Sp. z o.o. Sp.k.

Issued on 15 July 2025
Valid until 15 July 2030

EPD Number: EPD-P 01.07.2025

GENERAL INFORMATION

EPD OWNER

Manufacturer / EPD Holder	Molle Group Sp. z o.o. Sp.k.
Address	ul. Przemysłowa 61, 32-765 Rzezawa, Poland
Contact details	Beata Mirek b.mirek@molle.com.pl

PRODUCT IDENTIFICATION

Product name	1. PVC Shred 2. PVC Regranulate
Place(s) of production	Rzezawa, Poland

EPD INFORMATION

EPD Poland program operator	Multicert Sp. z o.o. Ul. Mydlarska 47, 04-690 Warszawa, Poland www.epd.org.pl, epd@epd.org.pl
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804+A2 serves as the core PCR.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☒ External verification
EPD verifier	Daniel Wałach, Ph.D.
EPD number	EPD-P 01.07.2025
Registration:	EPD Polska www.epd.org.pl
Publishing date	15 July 2025
EPD valid until	15 July 2030
Reasons for performing LCA	B2B
Accountability	The EPD Holder is responsible for the information provided and evidence. Multicert Sp. z o.o. does not hold responsibility for the manufacturer information, life cycle assessment data nor supporting evidence.

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

COMPANY INFORMATION

HOLDER OF THE EPD

Molle Group Sp. z o.o. Sp.k.
ul. Przemysłowa 61,
32-765 Rzezawa, Polska

COMPANY PROFILE

Molle Group Sp. z o.o. Sp.k. is a Polish manufacturer of PVC regranulates and PVC shred, based in Rzezawa, specializing in the processing of plastic waste, primarily polyvinyl chloride (PVC). The company has been active on the market for over 10 years, offering high-quality secondary raw materials used in the plastics industry. Molle's products are used in injection molding and extrusion serving the production of pipes, profiles and other PVC-based products.

Thanks to the use of advanced recycling technologies and cooperation with renowned suppliers of machinery and technical solutions, Molle Group ensures high repeatability and purity of the processed material. The company's portfolio includes both rigid and soft PVC regranulates, as well as homogenized PVC shred derived from the recycling of window profiles and other post-industrial waste. The products are available in various quality grades, tailored to the specific needs of customers primarily in the construction and energy sectors.

In 2024, Molle Group obtained a membership certificate in the European Recovinyl® system, part of the VinylPlus® program – a sustainable development initiative of the PVC sector. This membership confirms the company's commitment to circular economy practices, traceability of secondary raw materials, and responsible management of PVC recycling data, in accordance with the EN 15343 standard. Participation in Recovinyl® and reporting via the RecoTrace® platform ensure additional transparency and environmental credibility of the company's products.

Molle Group's operations are based on the principles of the circular economy. All raw materials used in production are 100% recycled, which significantly reduces the carbon footprint compared to virgin materials. The company actively contributes to reducing the amount of plastic waste sent to landfills, supporting the transformation of the PVC industry towards a more sustainable and resource-efficient model.

PRODUCT INFORMATION

PRODUCT DESCRIPTION

PVC Shred and PVC Regranulate

Molle Group Sp. z o.o. Sp.k. specializes in the recycling of mechanically recovered PVC and offers two main types of secondary raw materials: PVC regranulate (both rigid and flexible) and homogenized PVC shred. These products are primarily derived from processed waste such as window profiles and other post-industrial materials containing PVC.

PVC regranulate comes in the form of uniform granules of a defined fraction, ready for use in processing methods such as injection molding and extrusion. PVC shred consists of irregularly shaped particles (flakes) and can be used either as feedstock for regranulation or directly in technical applications.

These products feature consistent mechanical properties, comply with circular economy principles, and serve as an alternative to virgin materials in various industrial processes.

PRODUCT APPLICATION

PVC regranulates and shred offered by Molle Group are primarily used in the construction and energy sectors (flexible PVC). Typical applications include:

PVC Regranulate:

- Production of installation pipes, ventilation ducts, and cable covers
- Extrusion of window profiles, construction profiles, skirting boards and fittings
- Manufacturing of wall panels and finishing elements
- Molding of assembly and technical components not visible in structural applications

PVC Shred:

- Feedstock for regranulation
- Filler material in sandwich panels and composite boards
- Component in the production of cost-effective technical and infrastructure profiles
- Applications in products with lower aesthetic requirements

PRODUCT STANDARDS

The product complies with the following standards:

- EN 15343:2007 – Plastics – Recycled Plastics – Traceability of recycling processes and quality assessment of recyclates
- EN 12608-1:2020 – Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors – Part 1: Classification, requirements and test methods
- EN 13245-1:2008 – Plastics – Unplasticized polyvinyl chloride (PVC-U) profiles for building applications – Part 1: Designation of exposure levels
- EN 13476 series – Plastics piping systems for non-pressure underground drainage and sewerage – Structural wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE).

PRODUCT RAW MATERIAL COMPOSITION

Product Raw Material Composition For PVC Shred

Material	Amount % (by weight)
Post-industrial – post-consumer PVC	100%

Product Raw Material Composition For PVC Regranulate

Material	Amount % (by weight)
Post-industrial – post-consumer PVC	>99%
Pigments + chemical additives	<1%

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1% (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The declared products are PVC Shred and PVC Regranulate, both produced from post-industrial and post-consumer PVC waste, mainly originating from window profiles. The input material is considered to enter the system without any associated environmental burdens, as impacts related to its previous product system.

The system boundaries include modules A1–A3 and cover the supply of raw materials and auxiliary inputs (including electricity and water), the processing of input material, and packaging of the final product. The production process involves sorting of PVC waste, followed by crushing and mechanical shredding to produce homogenized PVC Shred. PVC Regranulate is produced by additionally processing the material through melting and granulation. All production steps are powered by electricity from the national grid from renewable energy sources.

Packaging materials used for distribution—such as wooden pallets and film including stretch film—are included within the system boundaries.

The model also includes the treatment of waste generated during production and packaging, based on European Union waste management statistics.

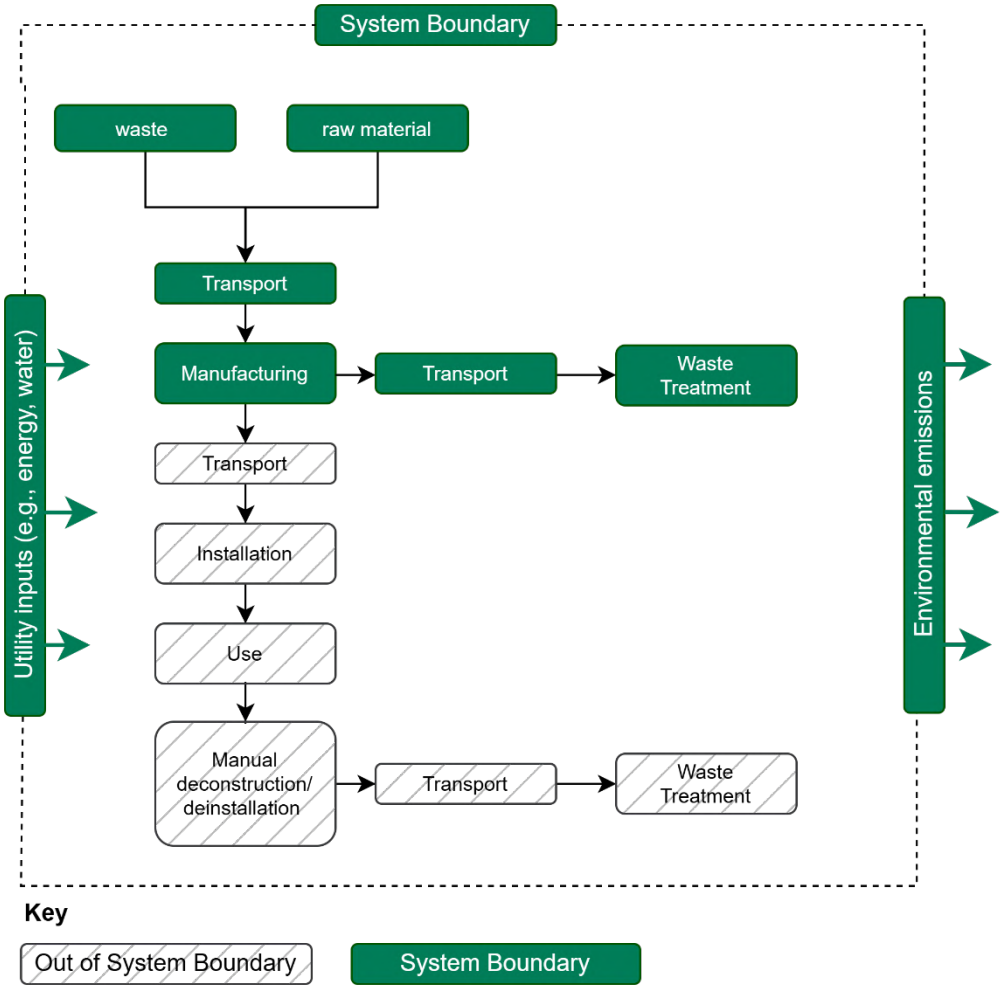

Figure 1 – System Boundary Diagram for PVC Shred/ PVC Regranulate

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Reference year:	2024

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.0
Biogenic carbon content in packaging, kg C	0.0003

SYSTEM BOUNDARY

In accordance with EN 15804, this EPD is limited to modules A1–A3 (cradle to gate). The exclusion of subsequent life cycle stages (C and D) is justified, as the following conditions are met:

- "*The product is further processed or integrated into other products, making it impossible to define a clear End-of-Life scenario;*
- *The product is no longer identifiable at the end of its life due to physical or chemical transformation;*
- *The product does not contain biogenic carbon.*"

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / Deinstallation	Transport	Waste processing	Disposal	Reuse / Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the *EN 15804:2012+A2:2019*. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy, and water use related to company management and sales activities are excluded.

ESTIMATES AND ASSUMPTIONS

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

- **Module (A1-A3):** All relevant data provided by the manufacturer have been included in the assessment. The products are made from post-industrial – post-consumer PVC, mainly originating from window profiles. The input material enters the system without environmental burdens, as the impacts related to its previous life cycle are allocated to an earlier product system. The average transport distances for each input material were calculated based on supplier locations and allocated to the declared unit. Electricity from the national grid is used to power the production processes. Waste generated on site is treated in accordance with standard waste management practices and is included in the model based on EU waste statistics.
- **Module (C1-C4):** Modules C1 to C4 were excluded from this study due to the wide range of potential end uses, which makes it impractical to define a single end-of-life scenario.
- **Module (D):** Module D is not included in this assessment, as it falls outside the defined scope of this study.

ALLOCATION

The allocation is carried out in accordance with the provisions of EN 15804. The information provided for the year 2024 includes all PVC shred / regranulate produced at Molle Group's facilities during that year. The allocation included the following data: LPG, water, electricity, waste, and packaging. For the listed inputs and outputs, the data was compiled by the manufacturer collectively for the entire factory. Due to the similarity in the production processes of other products, a mass allocation approach was used to inventory data for individual products.

Data Quality

For foreground data, the LCA study relies on high-quality primary data gathered by Molle Group Sp. z o.o. Sp.k. All relevant background data sets have been sourced from the LCA for Experts, version 10.9.1.17 – software's database Sphera Managed LCA Content Databases v2025 and from available EPD.

Geographic Representativeness

The specified land or region where the product system is manufactured and managed is Poland, Europe.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – FOR PVC SHRED

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Acidification	mol H+e	2.07E-04	MND	MND	MND	MND
Climate change – total	kg CO_2e	1.42E-01	MND	MND	MND	MND
Climate change – fossil	kg CO_2e	1.42E-01	MND	MND	MND	MND
Climate change – biogenic	kg CO_2e	-6.37E-04	MND	MND	MND	MND
Climate change – LULUC	kg CO_2e	3.07E-04	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	1.36E+00	MND	MND	MND	MND
Eutrophication, aquatic freshwater	kg PO_4e	2.48E-07	MND	MND	MND	MND
Eutrophication, aquatic marine	kg Ne	5.83E-05	MND	MND	MND	MND
Eutrophication, terrestrial	mol Ne	6.37E-04	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg Sbe	1.14E-08	MND	MND	MND	MND
Ozone depletion	kg CFC11e	4.13E-12	MND	MND	MND	MND
Photochemical ozone formation	kg NMVOCe	1.48E-04	MND	MND	MND	MND
Water use	m^3e depr.	-3.32E-04	MND	MND	MND	MND

MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF – FOR PVC SHRED

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Eco-toxicity (freshwater)	CTUe	8.45E-01	MND	MND	MND	MND
Human toxicity, cancer effects	CTUh	1.84E-11	MND	MND	MND	MND
Human toxicity, non-cancer effects	CTUh	6.33E-10	MND	MND	MND	MND
Ionizing radiation, human health	kBq U235e	7.76E-04	MND	MND	MND	MND
Particulate matter	Incidence	1.87E-09	MND	MND	MND	MND

MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

USE OF NATURAL RESOURCES – FOR PVC SHRED

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Total use of non-renewable PER	MJ	1.36E+00	MND	MND	MND	MND
Total use of renewable PER	MJ	4.61E-01	MND	MND	MND	MND
Use of net fresh water	m^3	2.42E-04	MND	MND	MND	MND
Use of renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND
Use of secondary materials	kg	1.05E+00	MND	MND	MND	MND

PER abbreviation stands for primary energy resources
MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

WASTE – FOR PVC SHRED

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Hazardous waste	kg	2.21E-09	MND	MND	MND	MND
Radioactive waste	kg	2.54E-06	MND	MND	MND	MND
Non-hazardous waste	kg	7.04E-03	MND	MND	MND	MND

OUTPUT FLOWS – FOR PVC SHRED

Impact category	Unit	A1-A3	A4_A5	B1-B7	C1-C4	D
Components for reuse	kg	0.00E+00	MND	MND	MND	MND
Materials for recycling	kg	4.74E-02	MND	MND	MND	MND
Materials for energy recovery	kg	0.00E+00	MND	MND	MND	MND
Exported energy, electricity	MJ	4.76E-02	MND	MND	MND	MND
Exported energy, thermal	MJ	8.47E-02	MND	MND	MND	MND

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – FOR PVC REGRANULATE

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Acidification	mol H+e	5.19E-04	MND	MND	MND	MND
Climate change – total	kg CO_2e	3.29E-01	MND	MND	MND	MND
Climate change – fossil	kg CO_2e	3.29E-01	MND	MND	MND	MND
Climate change – biogenic	kg CO_2e	-6.58E-04	MND	MND	MND	MND
Climate change – LULUC	kg CO_2e	3.48E-04	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	3.22E+00	MND	MND	MND	MND
Eutrophication, aquatic freshwater	kg PO_4e	3.12E-07	MND	MND	MND	MND
Eutrophication, aquatic marine	kg Ne	1.27E-04	MND	MND	MND	MND
Eutrophication, terrestrial	mol Ne	1.39E-03	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg Sbe	3.08E-08	MND	MND	MND	MND
Ozone depletion	kg CFC11e	6.91E-12	MND	MND	MND	MND
Photochemical ozone formation	kg NMVOCe	3.36E-04	MND	MND	MND	MND
Water use	m^3e depr.	1.39E-03	MND	MND	MND	MND

MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF – FOR PVC REGRANULATE

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Eco-toxicity (freshwater)	CTUe	1.41E+00	MND	MND	MND	MND
Human toxicity, cancer effects	CTUh	3.95E-11	MND	MND	MND	MND
Human toxicity, non-cancer effects	CTUh	1.12E-09	MND	MND	MND	MND
Ionizing radiation, human health	kBq U235e	9.33E-04	MND	MND	MND	MND
Particulate matter	Incidence	4.84E-09	MND	MND	MND	MND

MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

USE OF NATURAL RESOURCES – FOR PVC REGRANULATE

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Total use of non-renewable PER	MJ	3.22E+00	MND	MND	MND	MND
Total use of renewable PER	MJ	1.43E+00	MND	MND	MND	MND
Use of net fresh water	m^3	6.12E-04	MND	MND	MND	MND
Use of renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND
Use of secondary materials	kg	1.05E+00	MND	MND	MND	MND

For PVC Regranulate

PER abbreviation stands for primary energy resources
MND abbreviation stands for Module Not Declared, MNR stands for Module Not Relevant

WASTE – FOR PVC REGRANULATE

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Hazardous waste	kg	4.47E-09	MND	MND	MND	MND
Radioactive waste	kg	3.86E-06	MND	MND	MND	MND
Non-hazardous waste	kg	8.50E-03	MND	MND	MND	MND

OUTPUT FLOWS – FOR PVC REGRANULATE

Impact category	Unit	A1-A3	A4-A5	B1-B7	C1-C4	D
Components for reuse	kg	0.00E+00	MND	MND	MND	MND
Materials for recycling	kg	4.74E-02	MND	MND	MND	MND
Materials for energy recovery	kg	0.00E+00	MND	MND	MND	MND
Exported energy, electricity	MJ	4.76E-02	MND	MND	MND	MND
Exported energy, thermal	MJ	8.47E-02	MND	MND	MND	MND

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, medium voltage, production mix (Reference product: electricity, medium voltage), Poland, 2024
Electricity CO_2 / kWh	0.669 kg CO_2 / kWh

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EPD VERIFICATION:

The verification procedure for this Environmental Product Declaration (EPD) has been carried out in accordance with the requirements of ISO 14025 standards. Once the verification process is complete, the EPD remains valid for a period of 5 years. There is no need to recalculate the parameters contained in the EPD after this period, provided that the data underlying the declaration have not changed substantially.

EPD CONTRIBUTORS

Manufacturer representative	Beata Mirek, Senior Administrative Specialist
EPD verifier	Daniel Wałach, Ph.D.

Note: The sole ownership, liability, and liability of this declaration are with the owner. Construction product declarations may not be comparable if they do not comply with EN 15804. For detailed information on comparability, please refer to EN 15804 and ISO 14025.

EPD Polska Certificate

CERTIFICATE

TYPE III EPD DECLARATION

(ENVIRONMENTAL PRODUCT DECLARATION)

Reg. No. EPD-P 01.07.2025

This document confirms that the Environmental Product Declaration developed by **Molle Group Sp. z o.o. Sp.k.** for:

1. **PVC Shred**
2. **PVC Regranulate**

manufactured in accordance with standard: **EN 15343:2007** meets the requirements of standards **EN 15804:2012+A2:2019** and **ISO 14025**, and that the data contained therein has been prepared correctly.

The Declaration was published on July 15, 2025 and is valid until July 15, 2030, or until it is deregistered or its publication on the website www.epd.org.pl is discontinued.

Authenticity of this certificate can be confirmed in the public register at www.epd.org.pl

Daniel Wałach, Ph.D.
EPD Polska Verifier

Grzegorz Suwara
CEO Multicert Sp. z o.o.

Warsaw, July 15, 2025