ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Adolf Würth GmbH & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-AWU-20260070-IBC1-EN
Issue date	11.03.2026
Valid to	10.03.2031

WÜTOP® Trio 330 SK Underlay membrane

Adolf Würth GmbH & Co. KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Adolf Würth GmbH & Co. KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-AWU-20260070-IBC1-EN

This declaration is based on the product category rules:

False ceiling and underlay sheeting, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

11.03.2026

Valid to

10.03.2031

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

WÜTOP® Trio 330 SK Underlay membrane

Owner of the declaration

Adolf Würth GmbH & Co. KG
Reinhold-Würth-Str. 12-17
74653 Künzelsau
Germany

Declared product / declared unit

The declared unit for the WÜTOP® Trio 330 SK is 1 m² of installed vapor barrier surface.

Scope:

The present declaration is an average EPD that applies to all WÜTOP® Trio 330 SK. It is based on production data from a plant in 2023 located in a EU country. For confidentiality reasons, no further details about the specific plants are provided.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The WÜTOP® Trio 330 SK is a roof protection film with two integrated adhesive strips, intended for use as an underlay membrane in pitched roof constructions. It is vapour-permeable and suitable for installation directly on thermal insulation or formwork in ventilated and non-ventilated roof systems. When combined with compatible vapour retarders/barriers and adhesive tapes, it contributes to airtight and windproof building envelopes. For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland), Regulation (EU) No. 305/2011 (Construction Products Regulation – CPR) applies. The product needs a Declaration of Performance taking into consideration:

EN 13859-1:2010 – Flexible sheets for waterproofing – Definitions and characteristics of underlays
Part 1: Underlays for discontinuous roof coverings

EN 13859-2:2010 – Flexible sheets for waterproofing – Definitions and characteristics of underlays
Part 2: Underlays for walls
For the application and use, the respective national provisions apply.

2.2 Application

The product is intended for use as an underlay membrane and roof protection film in pitched roof constructions. It is suitable for installation directly on thermal insulation or formwork in both ventilated and non-ventilated roof systems. The product is designed to contribute to the creation of airtight and windproof building envelopes when combined with compatible vapour retarders/barriers and adhesive tapes.
Typical applications include:

- Underlay for sloped roofs with roof tiles, slates, or similar coverings.
- Use in roof structures requiring high rainproof performance in accordance with ÖNORM B4119 and B3661.
- Applicable for roof slopes starting from 5°.

2.3 Technical Data

Constructional data

Name	Value	Unit
Length acc. to EN 1848-2	50	m
Grammage acc. to EN 1849-2	0.33	kg/m^2
Resistance to water penetration acc. to EN 1928 (class)	W1	-
Water vapor diffusion equivalent air layer thickness acc. to EN 1931	0.08	m
Resistance to air penetration acc. to EN 12114	-	m^3/m^2 h 50Pa
Maximum tensile force acc. to EN 12311-1	570	N/50mm
Elongation acc. to EN 12311-1	15	%
Tear Resistance (nail) acc. to EN 12310-1	380	N/mm
Flexibility at low temperatures acc. to EN 1109	-40	°C
Maximum tensile force after ageing acc. to EN 1297, EN 12311-1	485	N/50mm
Elongation after ageing acc. to EN 1297, EN 12311-1	14	%
Resistance to water penetration after ageing acc. to EN 1297, EN 1928 (class)	W1	-

Performance values of the product according to the Declaration of Performance regarding its essential characteristics in accordance with

EN 13859-2:2014 – Flexible sheets for waterproofing – Definitions and characteristics of underlays
Part 2: Underlays for walls
For the application and use, the respective national provisions apply.

Voluntary information for the product:

Surface weight according to EN 1849-2 (not part of the CE marking).

2.4 Delivery status

Roll length: 50 m
Roll width: 1.5 m

2.5 Base materials/Ancillary materials

Name	Value	Unit
Biocide	none	M-%
Polypropylen	70-80	M-%
Polyethylen (low density)	1-5	M-%
Thermoplastic Polyester Elastomer	10-15	M-%
Polyurethane	1-5	M-%
Printing ink	0-1	M-%
Polyethylen	1-5	M-%

The product/item does not contain any substances from the ECHA list of substances of very high concern (SVHC) that are candidates for authorization in concentrations above 0.1% by mass (as of 20.11.2025).

The product/item/at least one component does not contain any other CMR substances of category 1A or 1B in concentrations above 0.1% by mass in at least one component, which are not listed on the Candidate List.

No biocidal products have been added to this construction product, nor has it been treated with biocidal products. Therefore, it is not considered a treated article within the meaning of the Biocidal Products Regulation (EU) No.

528/2012.

2.6 Manufacture

1. Granulate is processed into a thin functional film on a co-extrusion line.
2. The film is laminated and bonded under heat and pressure.
3. The multilayer laminate (3–6 layers) is cooled, stabilized, and wound into jumbo rolls.
4. In the converting process, the rolls are cut, optionally provided with adhesive strips, and printed.
5. Finished rolls are packaged, labeled, palletized, and prepared for shipment.

2.7 Environment and health during manufacturing

The technical rules according to TRGS 900 (as of 02/2009) regarding maximum workplace exposure limits must be observed. Additional occupational safety measures for health protection in commercial operations are not required.

2.8 Product processing/Installation

The membrane must be fastened at the top and bottom, while ensuring that a ventilation or drainage solution is provided on the exterior side. At construction corners, a vertical overlap of 150 mm must be maintained. Joints without firm backing must be avoided. Each sheet must be installed with an overlap of at least 150 mm on the preceding sheet and sealed using the integrated self-adhesive strips (SK). The adhesive strips must be pressed firmly to achieve a secure and airtight bond. For additional joints or areas without adhesive strips, system-compatible sealing tape provided for the membrane must be used.

2.9 Packaging

The packaging of WÜTOP® Trio 330 SK consists of:

- Wooden pallets
- Cardboard
- Cardboard cores
- Paper
- Stretch film
- Strapping tape

All materials used are recyclable and can be reused or disposed of in accordance with local waste disposal regulations.

2.10 Condition of use

No significant changes in material properties are expected, provided the product is used in accordance with the installation and application guidelines.
It must be ensured that the vapor barrier is not exposed to extreme temperatures or intense UV radiation for extended periods, as this may impair material quality. The product is designed to reliably support heat and moisture regulation within the component without releasing environmentally relevant or health-hazardous substances during use.

2.11 Environment and health during use

The vapor barrier has no negative impact on the environment or health throughout its entire service life. No harmful substances or vapors are released, ensuring that neither air quality nor user health is compromised.

2.12 Reference service life

The reference service life (RSL) of WÜTOP® Trio 330 SK is based on the general lifespan of façade membranes / façade sealing systems as specified in the table 'Service Lives of Building Components for Life Cycle Assessment according to BNB' by the Federal Office for Building and Regional Planning (BBSR). Since the reference service life was not determined in accordance with ISO 15686, it does not represent an RSL as defined by ISO 15686. The stated service life is based on typical usage conditions and proper installation of the vapor barrier.

2.13 Extraordinary effects

Fire

Fire protection

Name	Value
Building material class	E
Burning droplets	d2
Smoke gas development	s3

Water

The WÜTOP® Trio 330 SK safely and reliably drains any moisture that occurs or penetrates. In the event of unforeseen water exposure, the WÜTOP® Trio 330 SK has no significant impact on the environment.

Mechanical destruction

In the event of unexpected mechanical damage to the prodcut, no significant environmental impact is anticipated. The product does not release harmful substances, so its destruction does not result in negative environmental effects.

2.14 Re-use phase

The WÜTOP® Trio 330 SK consists of a combination of different plastics and is generally thermally recovered at the end of its service life.
For the underlying life cycle assessment, only the thermal recovery scenario was considered, as a pure separation of plastics for material recycling is currently not feasible due to technical and economic constraints.

2.15 Disposal

The WÜTOP® Trio 330 SK can be disposed of via standard disposal routes for plastics after its service life. Energy recovery in suitable incineration plants is possible. The waste code according to the European Waste Catalogue is 17 02 03 (plastics). Disposal must comply with local regulations for plastic waste.

2.16 Further information

Further information available at www.wuerth.de.

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to 1 m² of the average installed product. The average was calculated based on the sales shares and transport distances from the production facility to the construction sites in different countries.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	0.33	kg/m^2
Layer thickness	0.001	m

3.2 System boundary

Type of EPD: Cradle-to-gate with options (Modules A1–A3, A4, A5, C1–C4, D).

Module A1–A3: Upstream chains of raw materials and their procurement transport. Production processes including energy and waste flows (cradle to gate). Waste generated is considered up to the end-of-waste status.
Module A4: Transport to the construction site.
Module A5: Installation effort including required fastening materials. Waste treatment of packaging materials. Compensation for losses due to overlaps and offcuts.
Module C1: Manual dismantling of the sealing membrane.
Module C2: Transport to energy recovery facility.
Module C3: Energy recovery (incineration in a municipal waste incineration plant).
Module D: Declaration of recovery potential from thermal recovery in A5 and C3.

For the environmental impact assessment, the use of green electricity was calculated. The proportion of electricity demand covered by green electricity amounts to 100% of the total electricity consumption. The emission factor resulting from the impacts of the individual energy sources ('GWP total') is 0.057 kg CO_2 equivalent per kWh.

3.3 Estimates and assumptions

The incineration of adhesives was modeled using the same dataset as the incineration of plastics contained in the product. For all truck transports, the use of EURO 6 vehicles was assumed.

3.4 Cut-off criteria

All material and energy flows entering the product system were taken into account. It can be assumed that the sum of the neglected mass fractions does not exceed 5% of the results in the impact categories.

3.5 Background data

For creating the underlying LCA model, the software 'Umberto', version 11.15.1 (Rev 0), was used. All background datasets used come from the ecoinvent database 'ecoinvent EN 15804 (2022)', version 3.11.

3.6 Data quality

The data quality was assessed as good in terms of temporal, geographical, and technological representativeness, as well as completeness and plausibility. The primary data for the production process inventory comes from the year 2023. The ecoinvent background datasets used are not older than 10 years.
Note: In ecoinvent datasets, a time period is indicated instead of a reference year, covering the span from the first data collection to the last update. Temporal representativeness is evaluated based on the most recent year of the respective period. It should be noted that the starting year refers to the original inventory, which may be updated with newer inventory data. It is unclear which parts of the datasets have been updated since the original inventory and what significance these updates have for the overall impacts. The datasets are also influenced by changes in the supply chain, i.e., in other datasets, such as the electricity mix used. However, it remains uncertain whether manufacturing processes, methods, and quantities are up to date. It is assumed that this evaluation by ecoinvent is carried out with the last update of the respective datasets. Therefore, this date was used for assessing temporal representativeness.

3.7 Period under review

The data collection referred to the calendar year 2023 (01/01/2023 – 12/31/2023).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

3.9 Allocation

The material input and output flows were collected specifically for the products under review.

The total energy consumption from the calendar year 2023 was allocated based on production consumption measurements.

The recovery potentials from the disposal of packaging and product are reported in Module D.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. All background datasets used originate from the ecoinvent database 'ecoinvent EN 15804 (2022)' version 3.11.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Biogenic carbon is present primarily in the packaging (cardboard, paper, and wooden pallet) and in the product itself in a small amount due to the printing ink.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0.0000726	kg C
Biogenic carbon content in accompanying packaging	0.00763	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Transport to the building site (A4)

Name	Value	Unit
Transport distance Truck	687	km
Transport distance Ship	534	km
Gross weight	15.9	t
Truck loading	5.79	t

Installation into the building (A5)

Name	Value	Unit
Adhesive tape for installation	2.3	g/m²
Loss due to overlap	12.1	%
Loss due to cutting waste	6.0	%
Packaging material for disposal	20,4	g/m²

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type	0.395	kg
Reuse	-	kg
Recycling	-	kg
Energy recovery	0.395	kg
Landfilling	-	kg

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² Underlay membrane and roof protection film WÜTOP® Trio 330 SK

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	1.2E+00	4.69E-02	3.5E-01	0	3.73E-03	9.57E-01	0	-3.42E-01
GWP-fossil	kg CO_2 eq	1.21E+00	4.69E-02	3.4E-01	0	3.73E-03	9.56E-01	0	-3.36E-01
GWP-biogenic	kg CO_2 eq	-9.64E-03	2.88E-05	9.54E-03	0	2.41E-06	6.22E-05	0	-5.28E-03
GWP-luluc	kg CO_2 eq	2E-03	1.62E-05	4.32E-04	0	1.26E-06	7.51E-06	0	-4.68E-04
ODP	kg CFC11 eq	5.29E-07	1.01E-09	1.12E-07	0	8.12E-11	3.03E-10	0	-1.06E-08
AP	mol H^+ eq	4.34E-03	1.53E-04	1.02E-03	0	8E-06	2.19E-04	0	-9.2E-04
EP-freshwater	kg P eq	3.28E-04	3.19E-06	7.25E-05	0	2.59E-07	3.15E-06	0	-1.44E-04
EP-marine	kg N eq	9.22E-04	3.73E-05	2.22E-04	0	1.93E-06	1.24E-04	0	-1.95E-04
EP-terrestrial	mol N eq	9.02E-03	4.06E-04	2.15E-03	0	2.08E-05	1.06E-03	0	-1.79E-03
POCP	kg NMVOC eq	5.53E-03	1.95E-04	1.28E-03	0	1.27E-05	2.66E-04	0	-7.12E-04
ADPE	kg Sb eq	9.74E-06	1.6E-07	2.17E-06	0	1.31E-08	6.67E-08	0	-2.7E-07
ADPF	MJ	3.14E+01	6.62E-01	7.07E+00	0	5.3E-02	1.8E-01	0	-6.63E+00
WDP	m^3 world eq deprived	4.25E-01	3.46E-03	9.94E-02	0	2.81E-04	6.35E-02	0	-1.02E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² Underlay membrane and roof protection film WÜTOP® Trio 330 SK

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.7E+00	1.07E-02	6.12E-01	0	8.74E-04	7.38E-03	0	-8.24E-01
PERM	MJ	2.46E-02	0	-2.46E-02	0	0	0	0	0
PERT	MJ	2.73E+00	1.07E-02	5.87E-01	0	8.74E-04	7.38E-03	0	-8.24E-01
PENRE	MJ	1.7E+01	6.62E-01	4.07E+00	0	5.3E-02	1.76E+01	0	-6.63E+00
PENRM	MJ	1.44E+01	0	3E+00	0	0	-1.74E+01	0	0
PENRT	MJ	3.14E+01	6.62E-01	7.07E+00	0	5.3E-02	1.8E-01	0	-6.63E+00
SM	kg	1.46E-02	0	3.08E-03	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	9.82E-03	7.97E-05	2.27E-03	0	6.48E-06	1.08E-03	0	-2.37E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² Underlay membrane and roof protection film WÜTOP® Trio 330 SK

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5.89E-02	9.59E-04	1.4E-02	0	7.69E-05	1.48E-02	0	-9.01E-03
NHWD	kg	7.04E+00	2.04E-02	1.57E+00	0	1.65E-03	4.44E-01	0	-7.38E-01
RWD	kg	3.12E-05	1.93E-07	6.81E-06	0	1.58E-08	7.75E-08	0	-2.63E-05
CRU	kg	0	0	9.21E-03	0	0	0	0	0
MFR	kg	0	0	1.27E-02	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.02E-01	0	0	1.58E+00	0	0
EET	MJ	3.32E-02	0	1.99E-01	0	0	3.08E+00	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² Underlay membrane and roof protection film WÜTOP® Trio 330 SK

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	4.03E-08	3.42E-09	9.76E-09	0	2.79E-10	1.15E-09	0	-3.41E-09
IR	kBq U235 eq	1.23E-01	7.82E-04	2.68E-02	0	6.4E-05	3.07E-04	0	-1.03E-01
ETP-fw	CTUe	9.46E+00	8.75E-02	6.04E+00	0	7.12E-03	1.88E+00	0	-4.21E-01
HTP-c	CTUh	5.23E-10	7.97E-12	1.19E-10	0	6.27E-13	8.16E-11	0	-4.63E-11
HTP-nc	CTUh	1.02E-08	4.08E-10	2.63E-09	0	3.34E-11	2.86E-09	0	-1.23E-09
SQP	SQP	5.11E+00	3.85E-01	1.19E+00	0	3.18E-02	5.16E-02	0	-5.56E-01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

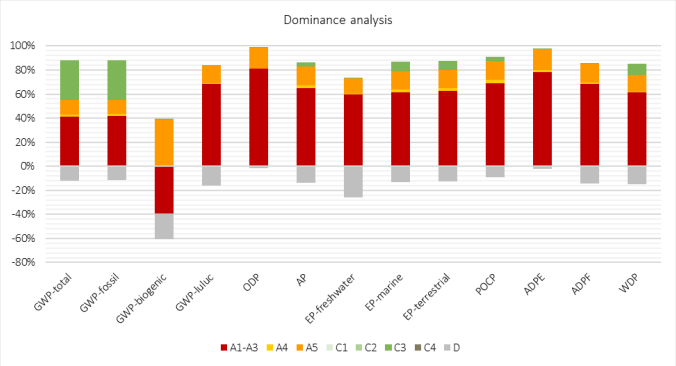
Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

This EPD was created using a software tool.

6. LCA: Interpretation

The following figure shows the relative contributions of the individual modules to the various impact categories of environmental impacts in a dominance analysis.



The manufacturing phase (Modules A1–A3) shows the highest contribution across all impact categories. This is mainly due to the production and processing of raw materials. Electricity consumption during production plays a minor role because the electricity mix used is based on renewable energy.
For GWP-total, the share of A1–A3 is around 50% (excluding Module D), while in all other categories it consistently exceeds 65%.
Transport to the installation site (A4) is of low relevance in all impact categories.
Due to compensation for cutting waste and overlaps, Module A5 has the second-largest contribution in almost all categories (GWP approx. 15%, other categories approx. 15–20%).
The incineration of the product at the end of its life cycle (C3) is the second most important phase for GWP after A1–A3, as thermal recovery occurs and CO_2 emissions are released from the bound carbon.

7. Requisite evidence

No evidence required.

8. References

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