Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 for:

Two-layer waterproofing systems

from

BMI Group Sverige

Programme:	The International EPD® System, www.environdec.com
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EPD Profile

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Product category rules (PCR): The International EPD System PCR for Construction Products and Construction Services 2012:01, version 2.33.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Company information

Description of the organisation

BMI Sweden, with 165 years of experience, is the Swedish market leading producer of roofs and waterproofing systems, and other barrier systems that serve as an outer protection for buildings. With our expertise, we are dedicated to help with design, project solutions and technical advisory for both private homes and commercial buildings. We offer innovative roofing and waterproofing systems designed to transform the way people live and work. Our headquarters are located in Malmö, with production sites also in Örnsköldsvik and Grythyttan. We are certified according to ISO 9001 and ISO 14001. BMI Sweden is part of BMI Group, Europe's largest manufacturer of roofing and waterproofing solutions, with significant presence also in Asia and Africa. BMI Group offers some of the most acknowledged and entrusted brands in the industry, such as Monier, Icopal and Siplast.

Name and location of production site

The two-layer waterproofing systems are produced at BMI Sweden's production site in Malmö, Sweden. Address: BMI Group Sverige, Lodgatan 10, 211 24 Malmö, Sweden.

For more information regarding the products or the organisation, see EPD owner's website: www.bmisverige.se.

EPD Product information

Product name: This EPD covers the products Icopal Base, Top, Base SV, Top SV, Base KL, Top KL and Base K. Base SV and Base are identical products but sold on different markets, and the relationship is the same for Top SV/Top and Base KL/Base K.

Product identification:

Two-layer waterproofing systems are defined in the product standard EN 13707 *Flexible sheets for waterproofing.* **UN CPC code:** 5453 Roofing and waterproofing services

Table 1. Product identification data for the seven products included in this EPD.

	Top KL	Base KL	Base K	Top SV	Base SV	Top	Base
Product identification code	030-1000	040-1000		030-3000	040-3000	030-3000	040-3000
AMA Hus Built in	-	JSE.142		-	JSE.142	-	-
AMA Hus Exposed	JSE.152	JSE.152		JSE.152	JSE.152	-	-
Quality mark	SEP 4000	YEP 2500		SEP 4700	YEP 3500	-	-
SINTEF	-	-	-	-	-	TG 2012	TG 2012
kg/m2	4	2,5	2,5	4,7	3,5	4,7	3,5

Product description:

Top and Base is a two-layer waterproofing system from Icopal, made for roofs with particularly high demands on the waterproofing layer. The system consists of an upper layer (Top) and a lower layer (Base), both based on SBS-modified bitumen. SBS increases the elasticity of the waterproofing layer and provides increased joint strength and service life. Two separate waterproofing layers provide a good protection against leakage. The lower layer can also be used as a temporary seal while the rest of the roof is completed. Waterproofing system Top & Base is available in two versions; SV and K/KL, where SV stands for weldable and K/KL for glued (with hot asphalt) when installed. The seven products included in this LCA can be installed in the following combinations to form a two-layer waterproofing system: Base SV + Top SV, Base + Top, Base KL + Top KL, Base K + Top KL, Base SV + Base SV, Base K + Base K and Base KL + Base KL. Base SV and Base, Top and Top SV and Base K and Base KL are identical products but sold on different markets.

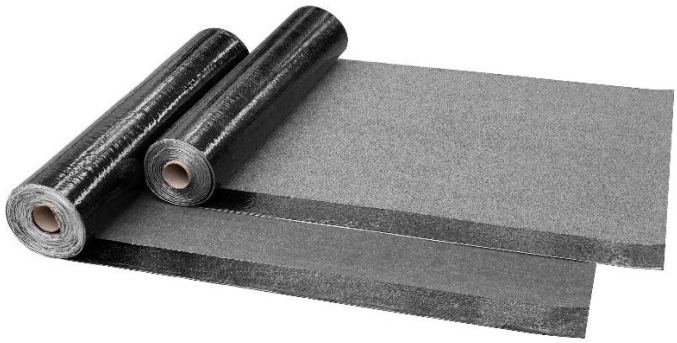

Figure 1. Picture of Icopal's Top & Base two-layer waterproofing system.

LCA information

Declared unit: 1 m^2 of Icopal Top & Base two-layer waterproofing system.

Reference service life: Not applicable.

Time representativeness: The specific data collected regarding manufacturing, packaging, suppliers and transports refer to the production year 2020. The data collection was performed by the EPD owner.

Data sources and LCA software used:
LCA software: SimaPro 9.1.1.1

Database: Ecoinvent 3.6., E.F 2.0 and USLCI. All background data used from generic datasets is less than 10 years old.

Additional data sources: LCI Bitumen (Eurobitume, 2020), supplier specific data from EPDs and specific data collected from BMI Sweden and their suppliers (2020).

Description of system boundaries:
Cradle-to-gate with options, i.e. modules A1-A3 and A5.

Excluded lifecycle stages: Modules A4, B1-B7, C1-C4 and D are not declared in this EPD.

Geographical scope: All inventories are modelled with respect to their specific origin when applicable. The installation scenario is modelled for Sweden.

Allocation methodology: The cut-off method has been applied within the product system. For allocations between product systems, the Polluter-pays allocation method has been used.

Cut-off: All raw materials according to the product formula, including their respective energy demands during extraction and production have been considered, as well as the main packaging materials used to prepare the final product for distribution to customer. All materials and fuels used during installation of the products are also included. Some packaging materials & production solvents that constitute less than 1% of the product weight have been excluded. This cut-off rule does not apply for hazardous material and substances.

Additional information:

This EPD is intended for B2B communication. For further information regarding the underlying LCA, contact LCA practitioner Annika Löwgren: annika.lowgren@dge.se

System diagram

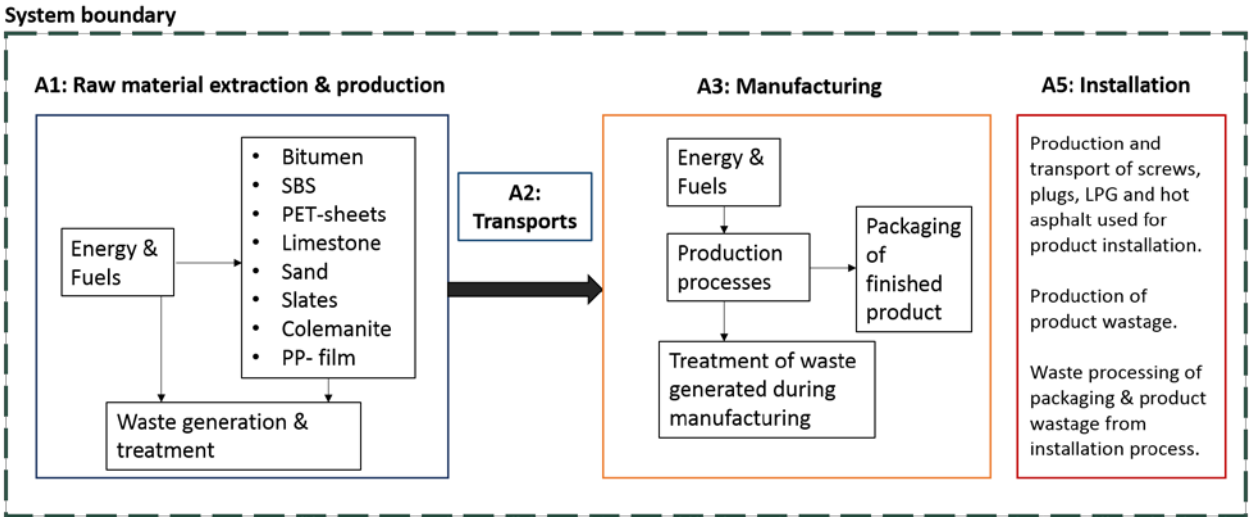

Figure 2. Flow diagram of the assessed life cycle phases of Icopal's Top & Base two-layer waterproofing systems, beginning with raw material extraction and production, followed by transport from suppliers to Malmö and manufacturing at BMI Sweden's production site. The nomenclature A1-A3 and A5 refers to the standard stated by EN 15804. A further description of the life cycle phases included in the assessment is provided in Table 3.

Table 2. Table declaring the life cycle stages included in the LCA. X= included in the LCA, MND= Module Not Declared.

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw materials	Transport	Manufacturing	Transport	Construction-Installation	Use stage	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	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	MND	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Description of life cycle stages A1-A3 and A5: Raw material extraction and production, transportation to manufacturing site, manufacture and installation

Table 3. A detailed description of the life cycle stages included in this LCA.

Stage	Description
A1 Raw materials	The extraction, processing and refining of all raw materials and products (see table 4) that occur upstream from the manufacturing site are included in this module. This also includes the energy generation needed for these processes (extraction, refining and transport of energy from primary energy sources).
A2 Transport	The external transportation to the manufacturing site of all raw materials needed to produce the finished products. The modelling includes transportation on road and water, covering the transport of each raw material to the manufacturing site in Malmö.
A3 Manufacturing	The manufacturing takes place at BMI Sweden's production site in Malmö, Sweden. The bitumen blend is mixed and stored in big holding tanks before being pumped to the production line. The PET-sheet is running through the production line and is applied with different layers of bitumen blends, sand, slates and lastly polypropylene foil is applied on the backside of the weldable products. For both heating and cooling needed during production, coolants and hot oil are used in closed systems and is thus not consumed during the manufacturing process. The finished product is rolled, packed on pallets and supported with additional packaging before sent to customers. The manufacturing process includes the energy- and fuel consumption and emissions on site, production of all packaging materials and treatment of waste generated in the manufacturing process.
A5 Installation	The installation phase is modelled as the standard installation scenario, taking into account the production and transports of LPG, hot asphalt, screws and plugs needed to install the two-layer waterproofing systems properly. It also includes the additional production processes to compensate for the wastage of products that typically occur during installation (modelled as 10%). Finally, this module includes the waste processing of the installation wastage and product packaging.

Content declaration per declared unit

Icopal Top & Base two-layer waterproofing systems

Table 4. Content declaration of the seven products covered in this EPD; Base, Top, Base SV, Top SV, Base K, Base KL and Top KL.

Raw material	Weight % interval per m^2
PET sheet (not reinforced/ reinforced with glass threads/fleece)	5-6%
SBS	4-17%
Bitumen	38-46%
Limestone	5-34%
Colemanite	0-7%
Sand	0-24%
Slates	0-27%
PP foil	0–0,3%

For construction product EPDs compliant with EN 15804, the content declaration shall list substances contained in the products that are listed in the "Candidate List of Substances of Very High Concern for Authorization" when their content exceeds the limits for registration with the European Chemicals Agency: i.e. >0.1 % of the weight of the product. **No such substances are used in the production of the products covered in this EPD.**

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The glass fibre reinforced PET-sheets are made of 100% recycled polyester made from post-consumer recycled PET-bottles.

Environmental performance

1 m^2 Icopal Top & Base Two-layer waterproofing systems

Environmental impact

Table 5. The results from the LCA showing the environmental impacts during module A1-A3 (cradle-to-gate) and A5 (installation) for the two-layer waterproofing systems Base SV + Top SV, Base + Top and Base SV + Base SV. Base SV + Top SV and Base + Top are identical systems but sold on different markets.

IMPACT CATEGORY	UNIT	Base + Top Base SV + Top SV		Base SV + Base SV	
		A1 – A3	A5	A1 – A3	A5
Acidification potential (AP)	kg SO_2 eq.	2,68E-02	3,87E-03	2,02E-02	3,47E-03
Eutrophication potential (EP)	kg PO_4^{3-} eq.	7,75E-03	1,10E-03	5,82E-03	9,48E-04
Global warming potential (GWP100a)	kg CO_2 eq.	5,57E+00	3,37E+00	3,97E+00	3,01E+00
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	5,54E-03	4,23E-04	4,83E-03	3,86E-04
Abiotic depletion potential – Elements	kg Sb eq.	5,04E-05	1,07E-05	2,66E-05	9,42E-06
Abiotic depletion potential – Fossil resources	MJ, net calorific value	2,47E+02	2,82E+01	2,04E+02	2,60E+01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	4,26E-07	1,92E-07	2,96E-07	1,85E-07

Environmental performance

1 m² Icopal Top & Base Two-layer waterproofing systems

Environmental impact

Table 6. The results from the LCA showing the environmental impacts during module A1-A3 (cradle-to-gate) and A5 (installation) for the two-layer waterproofing systems Base KL + Top KL, Base K + Top KL, Base KL + Base KL and Base K + Base K. Base KL + Top KL and Base K + Top KL are identical systems but sold on different markets. The same is true for Base KL + Base KL and Base K + Base K.

IMPACT CATEGORY	UNIT	Base KL + Top KL Base K + Top KL		Base KL + Base KL Base K + Base K	
		A1 – A3	A5	A1 – A3	A5
Acidification potential (AP)	kg SO_2 eq.	2,50E-02	8,08E-03	1,54E-02	7,52E-03
Eutrophication potential (EP)	kg PO_4^{3-} eq.	7,63E-03	1,51E-03	4,40E-03	1,27E-03
Global warming potential (GWP100a)	kg CO_2 eq.	5,99E+00	4,68E+00	3,38E+00	4,20E+00
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	8,63E-03	1,15E-03	3,06E-03	8,72E-04
Abiotic depletion potential – Elements	kg Sb eq.	5,44E-05	9,49E-06	3,61E-05	8,52E-06
Abiotic depletion potential – Fossil resources	MJ, net calorific value	2,15E+02	1,09E+02	1,45E+02	1,05E+02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	4,40E-07	3,71E-07	2,8E-07	3,62E-07

1 m² Icopal Top & Base Two-layer waterproofing systems

Use of resources

Table 7. The results from the LCA showing the resource use during module A1-A3 (cradle-to-gate) and A5 (installation) for the two-layer waterproofing systems Base SV + Top SV, Base + Top and Base SV + Base SV.

PARAMETER		UNIT	Base + Top Base SV + Top SV		Base SV + Base SV	
			A1 – A3	A5	A1 – A3	A5
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	14,4	0,85	12,9	0,77
	Used as raw materials	MJ, net calorific value	11,4	1,14	20,6	2,06
	TOTAL	**MJ, net calorific value**	**25,8**	**1,99**	**33,5**	**2,83**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	87,4	11,5	69,0	11,3
	Used as raw materials	MJ, net calorific value	162	17,3	140	15,1
	TOTAL	**MJ, net calorific value**	**249**	**28,8**	**209**	**26,4**
Secondary material		**kg**	0,14	0,007	0,28	0,014
Renewable secondary fuels		MJ, net calorific value	-	-	-	-
Non-renewable secondary fuels		MJ, net calorific value	-	-	-	-
Net use of fresh water		**m³**	0,03	0,009	0,02	0,007

1 m² Icopal Top & Base Two-layer waterproofing systems

Use of resources

Table 8. The results from the LCA showing the resource use during module A1-A3 (cradle-to-gate) and A5 (installation) for the two-layer waterproofing systems Base KL+ Top KL, Base K + Top KL, Base KL + Base KL and Base K + Base K.

PARAMETER		UNIT	Base KL + Top KL Base K + Top KL		Base KL + Base KL Base K + Base K	
			A1 – A3	A5	A1 – A3	A5
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	15,5	1,39	14,0	1,31
	Used as raw materials	MJ, net calorific value	2,3	0,23	2,3	0,23
	TOTAL	**MJ, net calorific value**	**17,8**	**1,62**	**16,3**	**1,54**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	99,2	16,9	60,2	16,6
	Used as raw materials	MJ, net calorific value	127	93,1	91,8	89,6
	TOTAL	**MJ, net calorific value**	**227**	**110**	**152**	**106**
Secondary material		**kg**	-	-	-	-
Renewable secondary fuels		MJ, net calorific value	-	-	-	-
Non-renewable secondary fuels		MJ, net calorific value	-	-	-	-
Net use of fresh water		**m³**	0,04	0,01	0,03	0,02

1 m² Icopal Top & Base Two-layer waterproofing systems

Waste production

Table 9. The results from the LCA showing the waste generation during module A1-A3 (cradle-to-gate) and A5 (installation) for the Top & Base two-layer waterproofing systems.

IMPACT CATEGORY	UNIT	Base + Top Base SV + Top SV		Base SV + Base SV		Base KL + Top KL Base K + Top KL		Base KL + Base KL Base K + Base K	
		A1-A3	A5	A1-A3	A5	A1-A3	A5	A1-A3	A5
Hazardous waste disposed	kg	1,75E-02	8,74E-04	2,10E-02	1,05E-03	1,37E-02	6,87E-04	1,22E-02	6,08E-04
Non-hazardous waste disposed	kg	3,41E-01	2,48E-01	1,77E-01	2,40E-01	4,48E-01	3,97E-01	3,90E-01	3,94E-01
Radioactive waste disposed	kg	5,44E-04	4,17E-05	3,58E-04	3,24E-05	6,92E-04	2,43E-04	6,55E-04	2,41E-04

1 m² Icopal Top & Base Two-layer waterproofing systems

Output flows

Table 10. The results from the LCA showing the output flows of module A1-A3 (cradle-to-gate) and A5 (installation) for the Top & Base two-layer waterproofing systems.

IMPACT CATEGORY	UNIT	Base + Top Base SV + Top SV		Base SV + Base SV		Base KL + Top KL Base K + Top KL		Base KL + Base KL Base K + Base K	
		A1-A3	A5	A1-A3	A5	A1-A3	A5	A1-A3	A5
Components for reuse	kg	0	0	0	0	0	0	0	0
Materials for recycling	kg	3,30E-01	1,65E-02	3,25E-01	1,62E-02	3,33E-01	1,66E-02	3,32E-01	1,66E-02
Materials for energy recovery	kg	8,01E-02	9,02E-01	8,01E-02	7,82E-01	8,01E-02	7,32E-01	8,01E-02	5,82E-01
Energy recovery	MJ	0	0	0	0	0	0	0	0

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