ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:

Rubberized Asphalt Product

1 ton of the 790-11 hot rubberized asphalt product at factory gate.

Program	International EPD System
Program Operator	EPD International AB www.environdec.com
EPD Registration Number	S-P-07609
Publication Date	2022-11-17
Valid Until	2027-11-16

PROGRAM INFORMATION

PROGRAM OPERATOR

EPD International AB

https://environdec.com/about-us/the-international-epd-system-about-the-system

DECLARATION HOLDER

Henry Company

https://henry.com/contact

999 North Pacific Coast Highway, Suite 800
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310-955-9200

The EPD owner, Henry Company has the sole ownership, liability, and responsibility for the EPD.

LCA CONSULTANT

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GENERAL INFORMATION

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	EPD International AB Box 21060, SE-100 31 Stockholm, Sweden, Email – info@environdec.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD® SYSTEM VERSION 4.0
MANUFACTURER NAME AND ADDRESS	Henry Company 999 North Pacific Coast Highway, Suite 800 El Segundo, CA 90245 310-955-9200
DECLARATION NUMBER	S-P-07609
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	1 ton of the 790-11 hot rubberized asphalt product at factory gate
REFERENCE PCR AND VERSION NUMBER	PCR – 2019:14 Construction products (EPD International), version 1.2.4
UNCPC Code	5453 (Roofing & waterproofing services)
DATE OF ISSUE	2022-11-10
PERIOD OF VALIDITY	2027-11-09
EPD SCOPE	Cradle to Gate
YEAR(S) OF REPORTED MANUFACTURER PRIMARY DATA	2021
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.3.0.3 Multiuser
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent 3.8
The PCR review was conducted by	PCR review was conducted by: The Technical Committee of the International EPD® System. See https://environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact
This declaration was independently verified in accordance with ISO 14025: 2006 - ☐ INTERNAL ☒ EXTERNAL	
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by -	Vijay Thakur Intertek Deutschland GmbH
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by -	Hudai Kara PhD, Metsims Sustainability Consulting www.metsims.com
EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g., identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison	

COMPANY INFORMATION

Henry® Company is a leading innovator of Building Envelope Systems® and develops integrated air/vapor barrier, roofing and waterproofing systems to ensure superior building performance. **S**ince its incorporation in 1981, Henry Company has grown beyond its roots in Southern California into a national supplier of air and vapor barrier, roofing and waterproofing products. In 1998, Henry Company expanded through the acquisition of Monsey Bakor Inc., a leading manufacturer of roof coatings, cements and driveway maintenance products. The acquisition extended Henry's reach across all of North America, making Henry one of the largest North American manufacturers of roof coatings and cements. In 2018, Henry Company acquired Fortifiber Corporation, a leading manufacturer of moisture control systems for Residential and Light Commercial construction. The acquisition of Fortifiber provides Henry customers a one-stop-shop for Building Envelope Systems for any construction type, in any geography, from the foundation to the roof system. https://henry.com/about/

Intertek Deutschland GmBhx, a consultancy group specializing in scientific and regulatory affairs (hereinafter referred to as “Intertek”), has been entrusted to carry out the life cycle assessment study and developing an Environmental Product Declaration document as per ISO 14040/44, ISO 14024 and the applicable PCR. The LCA model was created using the SimaPro software system. https://www.intertek.com/assuris/

PRODUCT INFORMATION

For this analysis, Henry 790-11 hot rubberized asphalt product is considered. This product is used as a waterproofing and roofing membrane on horizontal and vertical surfaces. It is ideal for highway bridge decks, underground parking, ramps, podium decks, railway bridge decks, parking decks, plaza decks, tunnels, planters, reflective polls and protected wall and roof membrane assemblies. The product formulation is composed of a specially selected blend of refined asphalts, synthetic rubber and mineral stabilizers modified to promote unsurpassed adhesion. Figure 1 provides a picture of the product.

FIGURE 1 HENRY 790-11 HOT RUBBERIZED ASPHALT PRODUCT

The primary data related to the manufacturing of the product was collected from the Quebec site in Canada, which provided the data for period of 1st Jan 2021 to 31st Dec 2021. The manufacturing process starts with mixing of Asphalt with Polymer with subsequent addition of crumb rubber and limestone to the mixture, the new mixture is stirred for 15 minutes and after that it is pumped into the packaging. The raw materials are sourced and transported from within Canada geography except the polymer which is sources from US geography. All the packaging materials are sourced within Canada except liner material which is sourced from US.

Manufacturing at the site involves the use of electricity which is sourced from the grid, and it is based on hydro power generation. Natural gas is used for heating purposes. The manufacturing process emits air emissions such as asphalt and NOx which are measured and calculated for the reporting period.

REFERENCE PERIOD OF EPD

The reference period for the primary data (foreground data) used within this EPD is calendar year 2021 (data for period of 1st Jan 2021 to 31st Dec 2021).

GEOGRAPHICAL SCOPE

The geographical scope of this EPD is Quebec (Canada).

ELECTRICITY MIX

Electricity is sourced from Grid which is based on hydro power generation. The dataset used for electricity from hydro based power generation has GWP impacts of 0.005 kg CO_2 eq./kWh.

LIFE-CYCLE ASSESSMENT & RESULT ANALYSIS

GOAL OF STUDY

The goal of this study was to generate an environmental product declaration (EPD) of hot rubberized asphalt product to better understand the associated lifecycle environmental impacts and to allow a Type III EPD to be generated and made public via the International EPD® System.

DECLARED UNIT

In this assessment the cradle to gate life cycle of the product is covered and quantified and the functional unit for the study is defined based on PCR as:

"1 ton of Henry 790-11 hot rubberized asphalt product at factory gate"

SYSTEM BOUNDARY

The system boundary of a product system determines the unit processes to be included in the LCA study and which data as inputs and/or outputs to/from the system can be omitted. In this LCA study the system boundary was defined as cradle-to-gate which comprised extraction of raw materials, transportation of raw materials to manufacturing plant and the manufacturing of the product itself. This study discloses the environmental impacts of the product with below options as per the PCR 2019:14 Construction products (EN 15804: A2)-

a. Module A1-A3 (Cradle to Gate)

This type of disclosure is possible only if the following three conditions are valid:

- The product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life,
- The product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- The product or material does not contain biogenic carbon.

The hot rubberized asphalt product meets above all conditions and therefore end of life and other life cycle stages are excluded from the assessment.

PRODUCT COMPOSITION

Material	Contribution (%)
Limestone	44%
Base Oil	7%
Rubber	4%
Asphalt	41%
Polymer	4%

PACKAGING COMPOSITION

Material	Contribution (%)
Box	48%
Liner	50%
Shroud	1%
Wooden Pallet	1%

INVENTORY & IMPACT ASSESSMENT

The LCA study addresses global, regional, and local environmental impact categories. A list of relevant impact categories and category indicators is defined and associated with the inventory data. The environmental impacts per declared unit were reported in the EPD according to the requirements of EN15804+A2:2019.

For the category of Global Warming Potential (GWP), contributing elementary flows are characterized using factors reported by the Intergovernmental Panel on Climate Change (IPCC) in 2013 with a 100-year time horizon. The additional parameters use data were provided from the inventory analysis. They describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water. The parameters describing waste categories and other material flows are also derived from Life Cycle Inventory.

ALLOCATION

For cases where there is more than one product in the system being studied, PCR 2019:14 Construction products prescribes the following procedure for the allocation of material and energy flows and environmental emissions.

- In the first instance, allocation should be avoided, by process sub-division.
- Where these methods are not applicable, the ISO 14040/44 requires that allocation reflects the physical relationships of the different products or functions. Allocation based on physical relationships such as mass or energy is a practical interpretation of this and is an approach often used in LCA
- For some processes, allocation based on mass is not considered appropriate (when the difference between revenue of product and co-product is too high) and, in these cases, economic allocation is used.

In this study, allocation procedures for multi-product processes followed the ISO & PCR approach above. In terms of generic data, the main database used, Ecoinvent v3.8 (cut-off), defaults to an economic allocation for most processes. However, in some cases a mass-based allocation is used, where there is a direct physical relationship. The allocation approach of specific Ecoinvent modules is documented on their website and method reports (see www.ecoinvent.org).

In this study a “cut-off” method (aka recycled content or 100:0 approach) was applied to all cases of end-of-life allocation, including in the case of generic data, where the Ecoinvent v3.8 with a cut-off by classification end-of-life allocation method was used. In this approach, environmental burdens and benefits of recycled / reused materials are given to the product system consuming them, rather than the system providing them and are quantified based on recycling content of the material under investigation. This is a common approach in LCA for materials where there is a loss in inherent properties during recycling, the supply of recycled material exceeds demand and recycled content of the product is independent of whether it is recycled downstream.

CUT OFF CRITERIA

The cut off criteria were set out in the original study for the recording of material flows and to avoid the need to pursue trivial inputs/outputs in the system. These are outlined below:

1. All known mass and energy flows shall be reported; no known flows shall be deliberately excluded.
2. All energetic inputs to the process stages were recorded, including fuels, electricity, steam and compressed air
3. Each excluded material flow must not exceed 1% of mass, energy or environmental relevance, for each unit process.
4. The sum of the excluded material flows in the system must not exceed 5% of mass, energy or environmental relevance.

COMPARABILITY

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g., identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison.

MODULES

	Production			Construction process stage		Use stage							End of Life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	US, CA	CA	CA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	Not applicable			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation- sites	Not applicable			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X – Modules declared, ND – Modules not declared

LCA INFORMATION

The environmental performance of the assessed product is declared and reported using the parameters as specified in PCR 2019:14 Construction products, version 1.2.4. These LCIA results and other environmental results are presented in the table below per declared unit to three significant figures and broken down into life cycle stages A1 (Raw Material Supply), A2 (Transport of raw materials) & A3 (manufacturing of the product).

CORE ENVIRONMENTAL IMPACT INDICATORS

As per the PCR, the EPD shall contain a core set of pre-determined environmental impact indicators. Table below presents information on environmental impacts expressed with the impact category indicators of LCIA using characterization factors. These core environmental impact indicators shall be included in each module declared in the EPD.

Table- LCA impact result for core environmental impact indicators for 1 ton of the product

Environmental Impacts Indicators	*Units*	*Raw Materials & Packaging (A1)*	*Transport (A2)*	*Manufacturing (A3)*	*Total (A1-A3)*
Climate Change - Total	kg CO_2 eq.	6.09E+02	7.93E+01	3.12E+01	7.20E+02
Climate Change - Fossil	kg CO_2 eq.	6.38E+02	7.92E+01	3.13E+01	7.49E+02
Climate Change - Biogenic	kg CO_2 eq.	-3.06E+01	4.07E-02	-5.16E-02	-3.06E+01
Climate Change - Land Use & Land Use Changes	kg CO_2 eq.	8.86E-01	4.14E-02	7.79E-03	9.35E-01
Ozone Depletion	kg CFC-11 eq.	1.30E-04	1.64E-05	1.03E-05	1.56E-04
Acidification	mol H+ eq.	3.59	2.36E-01	1.03E-01	3.93
Eutrophication, freshwater	kg P eq.	1.25E-01	6.99E-03	6.38E-04	1.33E-01
Eutrophication, marine	kg N eq.	6.02E-01	4.59E-02	2.15E-02	6.69E-01
Eutrophication, terrestrial	mol N eq.	6.08	4.99E-01	2.34E-01	6.81
Photochemical ozone formation	kg NMVOC eq.	2.47	1.87E-01	7.37E-02	2.73
Resource use, fossils [1]	MJ	1.69E+04	1.15E+03	4.56E+02	1.85E+04
Resource use, minerals and metals [1]	kg Sb eq.	3.30E-03	3.77E-04	1.71E-05	3.69E-03
Water use [1]	m^3 deprived	3.05E+02	4.51	4.38E-01	3.10E+02

Disclaimer note 1 - The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Note: LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

Table below presents additional information on environmental impacts expressed with the impact category indicators of LCIA using characterization factors. These additional environmental impact indicators shall be calculated and included in the project report for each module declared and may be included in the EPD.

Table - Additional environmental impact indicators for 1 ton of the product

Environmental Impacts Indicators	*Units*	*Raw Materials & Packaging (A1)*	*Transport (A2)*	*Manufacturing (A3)*	*Total (A1-A3)*
Particulate matter	disease inc.	4.72E-05	5.33E-06	5.61E-07	5.30E-05
Ionizing radiation [1]	kBq U-235 eq.	5.41E+01	5.27	7.07E-02	5.95E+01
Ecotoxicity, freshwater [2]	CTUe	1.33E+04	1.07E+03	7.51E+01	1.44E+04
Human toxicity, non-cancer [2]	CTUh	5.42E-06	9.48E-07	6.16E-08	6.43E-06
Human toxicity, cancer [2]	CTUh	2.69E-07	3.58E-08	1.02E-08	3.15E-07
Land use [2]	Pt	5.15E+03	6.55E+02	2.34E+01	5.83E+03

Disclaimer 1 - 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.

Disclaimer 2 - The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Additionally for improved transparency of the description of the environmental performance of construction products through the environmental impact indicators, below three groups of indicators and environmental information based on LCI shall be declared.

A- PARAMETERS DESCRIBING RESOURCE USE

The following environmental parameters use data from the inventory analysis. They describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water. The parameters are required and shall be specified as follows in the EPD:

Table- Parameters describing resource use per ton of the product

Parameters	*Units*	*Raw Materials & Packaging (A1)*	*Transport (A2)*	*Manufacturing (A3)*	*Total (A1-A3)*
Use of renewable primary energy excluding used as raw materials	MJ, net calorific value	9.66E+02	1.61E+01	3.99E+02	1.38E+03
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0.00	0.00	0.00	0.00
Total use of renewable primary energy resources	MJ, net calorific value	9.66E+02	1.61E+01	3.99E+02	1.38E+03
Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	1.81E+04	1.22E+03	5.06E+02	1.98E+04

Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	0.00	0.00	0.00	0.00
Total use of non-renewable primary energy resources	MJ, net calorific value	1.81E+04	1.22E+03	5.06E+02	1.98E+04
Use of secondary material	kg	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ, net calorific value	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ, net calorific value	0.00	0.00	0.00	0.00
Net use of freshwater	m^3	8.18	1.47E-01	2.10E-02	8.35

B- PARAMETERS DESCRIBING WASTE CATEGORIES

Waste flows	*Units*	*Raw Materials & Packaging (A1)*	*Transport (A2)*	*Manufacturing (A3)*	*Total (A1-A3)*
Hazardous waste disposed	kg	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	kg	0.00	0.00	0.00	0.00
Radioactive waste disposed	kg	0.00	0.00	0.00	0.00

C- ENVIRONMENTAL INFORMATION DESCRIBING FINAL OUTPUT FLOWS

Final output flows	*Units*	*Raw Materials & Packaging (A1)*	*Transport (A2)*	*Manufacturing (A3)*	*Total (A1-A3)*
Components for re-use	kg	0.00	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00
Exported energy MJ per energy carrier	MJ	0.00	0.00	0.00	0.00

Additional information on biogenic carbon content should be discloses as below in the EPD.

BIOGENIC CARBON CONTENT AT THE FACTORY GATE

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	Kg C	0.00
Biogenic carbon content in accompanying Packaging	Kg C	0.00
Note- 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2 kg		

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Intertek's Total Sustainability Assurance (TSA) proposition recognizes that with increasing value chain complexity, our clients need a trusted partner and integrative sustainable solutions. Powered by our independent technical expertise and supply chain management tools our sustainability services enable our customers to uniquely and authentically demonstrate their end-to-end commitment to sustainability, building stakeholder trust and corporate value.

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