Emerald ECO LABEL

An Environmental Product Declaration (EPD) for Asphalt Mixtures

Material Supplier Name

Company Information

Elam Construction is an asphalt mixture producer.

Roland Hot Plant asphalt plant
2353 River Road
Grand Junction, CO 81505
USA

Material Supplier Address

Product Description

This EPD reports the potential environmental impacts and additional environmental information for an asphalt mixture, which falls under the United Nations Standard Products and Services Code 30111509. Asphalt mixtures are typically incorporated as part of the structure of a roadway, parking lot, driveway, airfield, bike lane, pedestrian path, railroad track bed, or recreational surface.

Mix Name: 12-922 5/8" PG64-22 w/Lime

Specification Entity: DEFAULT

Specification: DEFAULT

Gradation Type: Not Reported

Mix Design Method: None

Nominal Maximum Aggregate Size: Not Reported

Performance Grade of Asphalt Binder: Not Reported

Customer [Project/Contract] Number: Not Reported

This mix producer categorizes this product as a Hot Mix Asphalt (HMA) asphalt mixture. This asphalt mixture was produced within a temperature range of 141 to 141°C (285.0 to 285.0°F). Energy and environmental impacts are based on a plant's average performance over a 12-month period and are not adjusted for mix-specific production temperatures.

EPD Declaration #

Product Category Rule / Standard Used for EPD Development

This declaration is an EPD in accordance with ISO 14025:2006[1] and ISO 21930:2017[2]. The PCR is *Product Category Rules for Asphalt Mixtures*[3,4]. This EPD transparently describes the potential environmental impacts associated with the identified life cycle stages of the described product.

Declaration Number: 48.133.276 v1 **Software Version:** 2.0.0

EPD Expiration Date

Date of Issue: April 19, 2022 **Period of Validity:** March 31, 2027

This EPD is valid for asphalt mixtures produced at the location indicated on this page. Data used to inform this EPD reflect plant operations from a 12-month period beginning on March 10, 2021.

This EPD can be found at https://asphaltepd.org/epd/d/rQUDQ/

LCA performed by: Ben Ciavola, PhD

EPD Publication Date

Product Ingredients

The product ingredients as identified in the mix design are provided in the table below.

TABLE 1. PRODUCT INGREDIENTS

COMPONENT	MATERIAL	WEIGHT %
Aggregate	Natural Stone	23
Aggregate	Natural Stone	35
Aggregate	Natural Stone	22
RAP	Reclaimed Asphalt Pavement	15
Binder	Unmodified	4
Mix Additive	Antistrip Agents - Hydrated lime	< 1%

*Indicates that this material is a data gap. Upstream data associated with extraction and processing is not accounted for in this EPD.

Regulated Hazardous Substances

Regulated hazardous substances, if applicable, are listed on the safety data sheet (SDS) associated with this asphalt mixture. The chemical names and composition of the mix from the SDS are provided here for transparency.

TABLE 2. REGULATED HAZARDOUS SUBSTANCES

CHEMICAL NAME	CAS NO.	WEIGHT %
No SDS declared, mix may include unknown regulated hazardous substances.		

TABLE 3. ENVIRONMENTAL IMPACT SUMMARY TABLE

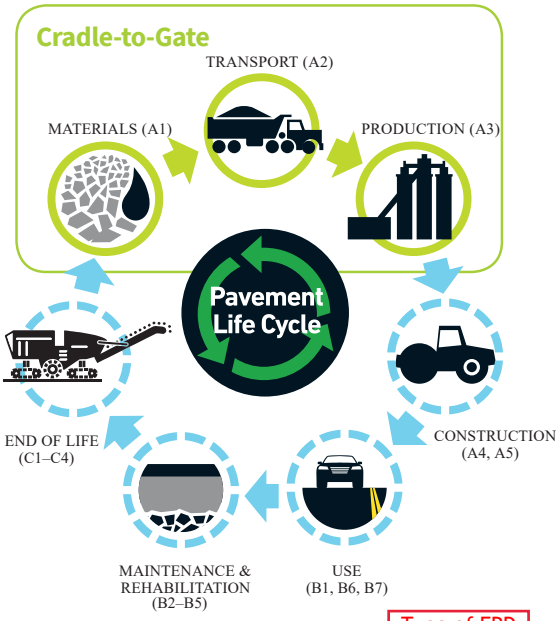
IMPACT CATEGORY	POTENTIAL IMPACT PER METRIC TONNE ASPHALT MIXTURE (PER TON ASPHALT MIXTURE)
Global warming potential (GWP-100)	61.70 (55.98) kg CO2 Equiv.
Ozone depletion potential (ODP)	1.92e-07 (1.74e-07) kg CFC-11 Equiv.
Eutrophication potential (EP)	1.04e-02 (9.43e-03) kg N Equiv.
Acidification potential (AP)	1.67e-01 (1.51e-01) kg SO2 Equiv
Photochemical ozone creation potential (POCP)	3.35 (3.04) kg O3 Equiv.

Methodological Framework

DECLARED UNIT

EPD Declared Unit

The declared unit is 1 metric tonne (1 short ton) of an asphalt mixture (UNSPSC Code 30111509: Asphalt Based Concrete), which is defined as "a plant-produced composite material of aggregates, asphalt binder, and other materials." [3]



LIFE CYCLE STAGES AND INFORMATION MODULES

This is a cradle to gate EPD. It covers the raw material supply, transport, and manufacturing life cycle stages (modules A1-A3). It does not include construction (placement and compaction), use, maintenance, rehabilitation, or the end-of-life life cycle stages (modules A4-5, B1-7, and C1-4).[3]

Materials (A1): This stage includes raw material extraction and manufacturing (e.g., quarry operations for aggregates, petroleum extraction and refinery operations for asphalt binder production, etc.) based on the relative proportion of ingredients in the mix design.

Transport (A2): This stage includes transport of raw materials to the asphalt plant based on actual transportation distances and modes for ingredients in the mix design.

Production (A3): This stage comprises plant operations involved in the production of asphalt mixtures, including generation of electricity and heat used during asphalt mix production (e.g., extraction, refining, and transport of fuels). Data for this stage is plant specific.

Type of EPD

LIFE CYCLE INVENTORY

This EPD was created using plant-specific data for asphalt mix production of the production stage (A1-A3). Potential variations due to asphalt mixture design, supplier locations, manufacturing processes, efficiencies, and energy consumption are accounted for in this EPD. All upstream data sources are prescribed in the Product Category Rules (PCR) and are publicly available and freely accessible to enhance transparency and comparability. Use of the prescribed data sources improves comparability among the EPDs developed by limiting variability due to differences in the upstream data within the system boundaries.[3]

ALLOCATION PROCEDURES

Impacts from upstream production and transportation of raw materials are subdivided based on the relative material quantities (percentages) in the mix design. For conventional asphalt plants that produce both hot-mix asphalt (HMA) and warm-mix asphalt (WMA) mixtures, allocation of energy and other resources for asphalt mix production is on a mass basis. Mix-specific production temperatures are not used to separately allocate energy inputs to HMA and WMA mixtures. For conventional asphalt plants that also produce asphalt mixtures at ambient temperatures using cold central plant recycling (CCPR) technologies, HMA and WMA mixtures are subdivided from CCPR mixtures by segregating burner fuel consumption from CCPR mixtures.

For input materials that are manufactured using processes that produce one or more co-products, the prescribed upstream datasets allocate the material production impacts according to principles outlined in the PCR for Asphalt Mixtures and ISO 21930. Examples of these processes include petroleum refining (which produces multiple co-products including asphalt binder, petroleum fuels, and other products) and iron and steel manufacturing (which produces iron and steel along with slag aggregates).

Waste materials and other outputs such as byproducts generated during asphalt mixture production exit the asphalt mixture product system burden free. Materials, energy, and environmental impacts are not allocated to waste materials or byproducts.

CUT-OFF PROCEDURES

Secondary (recycled) materials are evaluated using the cut-off approach. The cut-off boundary is defined as the point beginning after secondary materials are transported to a central storage or processing location. Material flows and potential environmental impacts associated with the previous product system, including deconstruction, demolition, disposal, and transport to the processing location, are not accounted for in this EPD because the recycled materials are modeled as entering the asphalt mixture product system burden-free. In some cases, limitations in upstream datasets require these recovery and transportation processes to be included, which is a conservative approach.

Processing of secondary materials for use in asphalt mixtures and transport to the asphalt plant are included in modules A1 and A2, respectively. Processing and transport of secondary fuels to the asphalt plant are included in module A3.

LIMITATIONS

This EPD reports the results of a cradle to gate life cycle assessment (LCA) for asphalt mixtures. This EPD may be used as a data input for full LCAs to compare the environmental impacts of different asphalt roadway, parking lot, or recreational pavement design alternatives.

COMPARABILITY

EPDs that comply with the PCR for Asphalt Mixtures (and, by extension, ISO 21930) are comparable if the mixtures are expected to meet similar functional and design performance criteria as specified by the customer, such as meeting the same customer specification.

Comparability may be limited by the presence of data gaps. EPDs with data gaps should not be compared to each other unless the composition and quantity of material ingredients with data gaps is known to be the same for all products being compared.

When asphalt mixtures have different performance expectations, the asphalt mixtures can only be compared by using EPDs as a data input for an LCA study that includes additional life cycle stages relevant to the functional unit defined in the LCA.

LIFE CYCLE ASSESSMENT

The information presented in this EPD can be used to model the environmental impacts of asphalt mixtures purposed to be part of (but not limited to) roadway, parking lot, or recreational pavements. This EPD alone does not provide the environmental impacts of the entire pavement structure itself and does not make any statements that the product covered by the EPD is better or worse than any other product.

LIFE CYCLE IMPACT ASSESSMENT RESULTS

The life cycle impact assessment results are relative expressions and do not predict actual impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. Calculations are based on the TRACI v2.1 impact assessment methodology.

TABLE 4. LIFE CYCLE IMPACT INDICATORS

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
GWP-100	Global warming potential, incl. biogenic CO2	kg CO2 Equiv.	40.83 (37.04)	3.14 (2.85)	17.74 (16.09)	61.70 (55.98)
ODP	Ozone depletion potential	kg CFC-11 Equiv.	9.89e-08 (8.97e-08)	1.90e-08 (1.72e-08)	7.44e-08 (6.75e-08)	1.92e-07 (1.74e-07)
EP	Eutrophication potential	kg N Equiv.	7.82e-03 (7.10e-03)	9.36e-04 (8.49e-04)	1.64e-03 (1.49e-03)	1.04e-02 (9.43e-03)
AP	Acidification potential	kg SO2 Equiv.	1.21e-01 (1.10e-01)	1.60e-02 (1.45e-02)	2.92e-02 (2.65e-02)	1.67e-01 (1.51e-01)
POCP	Photochemical ozone creation potential	kg O3 Equiv.	1.98 (1.79)	0.52 (0.47)	0.86 (0.78)	3.35 (3.04)

Notes:

GWP-100 – Global warming potential. The warming (relative to CO_2) that chemicals contribute to the atmospheric greenhouse effect by trapping the earth's heat. The impact scores for GWP-100 are based on a 100-year time horizon. As prescribed in Section 7.2.7 of the PCR for Asphalt Mixtures, this EPD does not assign a negative flow of CO_2 to GWP-100 when biogenic CO_2 enters the product system through biofuels and bio-based materials unless this information is provided in upstream datasets, in which case the amounts are indicated in Table 7. However, a positive flow of CO_2 is assigned to GWP-100 when biogenic CO_2 is emitted through the combustion of biofuels. This is a conservative approach that may over-estimate GWP-100. Bio-based materials tend to be used in small quantities in asphalt mixtures (<1% by weight of the mix) and biofuels are rarely used for asphalt mixture production, so the impacts are low in most cases. Biogenic carbon uptake for certain biofuels is provided as additional environmental information in Table 9. The location-based accounting method, is used for calculating upstream impacts of purchased electricity. Potential GHG emission reductions associated with the market-based accounting method, if applicable, are provided as Additional Environmental Information in Table 8.

ODP – Ozone depletion potential. The potential damage that chemicals such as chlorofluorocarbons (CFCs) cause to the earth's stratospheric ozone layer, which filters out harmful ultraviolet radiation from the sun. Impact scores for ODP are based on the quantity of ozone-depleting chemicals released to air, normalized to an equivalent mass of CFC-11.

EP – Eutrophication potential. The potential nutrient enrichment to water bodies caused by chemicals that are released to the water or air and subsequently deposited. Impact scores for EP are based on the quantity of nutrients released, normalized to an equivalent mass of N.

AP – Acidification potential. The potential formation of acid rain caused by releases of chemicals to the air. Impact scores for AP are based on the number of hydrogen ions that can be theoretically formed per mass unit of the chemical being releases as compared to SO_2.

POCP – Photochemical ozone creation potential. The release of hydrocarbons and nitrogen oxides that react with sunlight to produce photochemical oxidants, which can cause or aggravate health problems, plant toxicity, and deterioration of certain materials. Impact scores for POCP are based on the quantity of chemicals with POCP equivalency factors released to the air, normalized to an equivalent mass of O_3.

Materials and Resources

TABLE 5. RESOURCE USE INDICATORS

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
RPR_E	Renewable primary resources used as an energy carrier (fuel)	MJ	8.08 (7.33)	0.00 (0.00)	0.01 (0.01)	8.09 (7.34)
RPR_M	Renewable primary resources with energy content used as material	MJ	0.00 (0.00)	N/A	N/A	0.00 (0.00)
$NRPR_E$	Non-renewable primary resources used as an energy carrier (fuel)	MJ	581 (527)	42 (38)	290 (263)	912 (828)
$NRPR_M$	Non-renewable primary resources with energy content used as material	MJ	1640 (1488)	N/A	N/A	1640 (1488)
SM	Secondary (recycled) materials	kg	150 (136)	N/A	0	150 (136)
RSF	Renewable secondary fuels	MJ	N/A	N/A	0.00 (0.00)	0.00 (0.00)
NRSF	Non-renewable secondary fuels	MJ	N/A	N/A	0.00 (0.00)	0.00 (0.00)
RE	Recovered energy	MJ	N/A	N/A	0.00 (0.00)	0.00 (0.00)
FW	Consumption of fresh water	m^3	5.50e+00 (4.99e+00)	N/A	7.36e-11 (6.67e-11)	5.50e+00 (4.99e+00)
ADP_{fossil}	Abiotic depletion potential for fossil resources	MJ	2209 2004	8 7	252 229	2469 2240

Notes:

RPR_E – First use bio-based materials used as an energy source. Hydropower, solar, and wind power used in the technosphere are also included in this indicator. Calculations for A3 are based on the regional grid energy mix for the balancing authority and does not account for on-site renewable energy generation.

RPR_M – First use bio-based materials used as materials (e.g., bio-based additives, bio-based asphalt extenders, etc.).

$NRPR_E$ – First use non-renewable materials such as peat, oil, gas, coal, and uranium used as an energy source.

$NRPR_M$ – First use non-renewable primary resources such as oil, gas, and coal used for products (e.g., asphalt binder, plastic-based products, etc.).

SM – Materials recycled from previous use or waste (e.g., reclaimed asphalt pavement (RAP), recycled asphalt shingles (RAS), ground tire rubber (GTR), etc.). These include both renewable and non-renewable material, with or without energy content, depending on the status of the material when it was originally extracted from the environment.

RSF – Renewable materials with energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g., chipped waste wood, yellow grease).

NRSF – Non-renewable materials with energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g., recycled fuel oil, tire-derived fuel, etc.).

RE – Energy recovered from disposal of waste in previous systems, such as energy recovery from combustion of landfill gas or energy recovered from other systems using energy sources.

FW – This indicator is often not included in upstream (background) datasets for raw materials and energy. For Module A1, 84% of the material inputs, by total weight of the mix, are accounted for. Upstream datasets for transportation (A2) and energy inputs (A3) do not account for consumption of fresh water.

ADP_{fossil} – Abiotic depletion potential for fossil resources.

TABLE 6. WASTE AND MATERIAL FLOW INDICATORS

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
Waste Categories						
HWD	Hazardous waste disposed	kg	N/A	N/A	0.00 (0.00)	0.00 (0.00)
NHWD	Non-hazardous waste disposed	kg	N/A	N/A	0.00 (0.00)	0.00 (0.00)
RWD-HL	High-level radioactive waste disposed	kg or m^3	N/A	N/A	0.00 (0.00)	0.00 (0.00)
RWD-LL	Intermedial- and low-level radioactive waste disposed	kg or m^3	N/A	N/A	0.00 (0.00)	0.00 (0.00)
Other Material Flows						
CRU	Components for reuse	kg	N/A	N/A	N/A	N/A
MFR	Materials for recycling	kg	N/A	N/A	0.00 (0.00)	0.00 (0.00)
MFER	Materials for energy recovery	kg	N/A	N/A	0.00 (0.00)	0.00 (0.00)
REE	Recovered energy exported from the product system	MJ	N/A	N/A	0.00 (0.00)	0.00 (0.00)

Notes:

N/A – Not determined due to inconsistencies in upstream datasets.

HWD – Module A3 only includes waste materials generated by asphalt plant operations and does not include waste from upstream production of electricity and fuels.

NHWD – Module A3 only includes waste materials generated by asphalt plant operations and does not include waste from upstream production of electricity and fuels.

RWD-HL – Module A3 only includes waste materials generated by asphalt plant operations and does not include waste from upstream production of electricity and fuels. Waste materials from asphalt plant operations are not radioactive.

RWD-LL – Module A3 only includes waste materials generated by asphalt plant operations and does not include waste from upstream production of electricity and fuels. Waste materials from asphalt plant operations are not radioactive.

CRU – Module A3 only includes output flows generated by asphalt plant operations and does not include output flows from upstream production of electricity and fuels. Output flows from asphalt plant operations are not reused as components for other product systems.

MFR – Secondary material for use in the next product system. Module A3 only includes output flows generated by asphalt plant operations and does not include output flows from upstream production of electricity and fuels.

MFER – Secondary fuels for use in the next product system. Module A3 only includes output flows generated by asphalt plant operations and does not include output flows from upstream production of electricity and fuels. Output flows from asphalt plant operations are inert and do not involve energy recovery.

REE – Module A3 only includes output flows generated by asphalt plant operations and does not include output flows from upstream production of electricity and fuels. Recovered energy is not exported from asphalt plant operations.

Additional Environmental Information

ADDITIONAL INVENTORY INDICATORS DESCRIBING EMISSIONS AND REMOVALS OF CARBON THAT ARE ACCOUNTED FOR IN GWP-100

For transparency, the following indicators provide additional information regarding processes that are accounted for in the GWP-100 value reported in Table 4. Many publicly available upstream inventories lack the necessary information to calculate these indicators which may result in incomplete data.

TABLE 7. CARBON INDICATORS ACCOUNTED FOR IN GWP-100

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
GHG_{LUC}	GHG emissions from land use change	kg CO_2 eq	0.00	0.00	0.00	0.00
BCPR	Biogenic carbon removals associated with biogenic carbon content contained within bio-based products	kg CO_2	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BCPE	Biogenic carbon emissions associated with biogenic carbon content contained within bio-based products	kg CO_2	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BCWR	Biogenic carbon emissions from combustion of waste from renewable resources used in production processes	kg CO_2	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BCWN	Carbon emissions from combustion of waste from non-renewable resources used in production processes	kg CO_2	0.00 (0.00)	N/A	0.00 (0.00)	0.00 (0.00)
CCAL	Carbon emissions from calcination	kg CO_2	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
CCAR	Carbon removals from carbonation	kg CO_2	0.00	0.00	0.00	0.00

Notes:

GHG_{LUC} – Available upstream inventories for materials (A1) and transport (A2) either lack data for GHG emissions from land-use change or indicate very low contributions to this indicator. For example, the asphalt binder dataset from Wildnauer et al. (2019) indicates that GHG emissions from land-use change represent just 0.04% of GHG emissions associated with asphalt binder manufacturing. Similarly, GHG emissions from land-use change associated with asphalt mixture production (A3) are considered negligible due to the relatively small size of an asphalt plant (typically five acres or less).

BCPR and BCPE – This indicator is reported for materials (A1) when data is provided in upstream inventories, for example biobased asphalt binder or mixture additives. The value is zero for transport (A2) and production (A3).

BCWR – This indicator is reported for materials (A1) and transport (A2) when data is provided in upstream inventories. Module A3 may be reported for some, but not all, waste renewable resources due to limitations in upstream datasets.

BCWN – This indicator is reported for materials (A1) when data is provided in upstream inventories. The value is typically zero for transport (A2). Module A3 may be reported for some, but not all, waste non-renewable resources due to limitations in upstream datasets.

END-OF-LIFE CONSIDERATIONS FOR PAVEMENT LCA STUDIES

This is a cradle to gate EPD and does not include life cycle stages beyond the gate of the plant. According to the cut-off rules, transportation of RAP from the pavement rehabilitation jobsite to the initial storage or processing location (module C2) is not included. When this EPD is used as a data input for an LCA study that includes the end-of-life stage, the recommended default value for transportation of RAP from the pavement rehabilitation site to the initial storage or processing location is 53km (33 miles).

GREENHOUSE GAS (GHG) EMISSION REDUCTIONS ASSOCIATED WITH RENEWABLE ENERGY PURCHASES AND NOT ACCOUNTED FOR IN GWP-100

This plant may use market-based instruments to purchase renewable energy such as the use of on-site renewable power generation, power purchase agreements (PPAs), or renewable energy certificates (RECs). As required by the *PCR for Asphalt Mixtures*, these market-based instruments are not included in the calculation of GWP-100 that is reported in the Life Cycle Impact Assessment Results. However, the potential GHG emission reduction from purchasing renewable energy through market-based instruments is provided here as ΔGHG_{RE}. Negative values indicate a net reduction in GHG emissions that is not accounted for in the GWP-100 value reported in Table 4.

TABLE 8. GHG EMISSION REDUCTIONS ASSOCIATED WITH RENEWABLE ENERGY PURCHASES AND NOT ACCOUNTED FOR IN GWP-100

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
ΔGHG_{RE}	GHG emission reduction from renewable energy purchases (market-based accounting method)	kg CO_2 Equiv.	N/A	N/A	0.00 (0.00)	0.00 (0.00)

Notes:

N/A – Not determined due to lack of information in upstream datasets.

BIOGENIC CARBON UPTAKE ASSOCIATED WITH BIOFUELS THAT IS NOT ACCOUNTED FOR IN GWP-100

As indicated in Table 4, this EPD does not assign a negative flow of CO_2 to GWP-100 when biogenic CO_2 enters the product system through biofuels. For transparency, this value is reported here for liquid biofuels. Negative values indicate a net reduction in GHG emissions that is not accounted for in the GWP-100 value reported in Table 4.

TABLE 9. BIOGENIC CARBON UPTAKE ASSOCIATED WITH BIOFUELS AND NOT ACCOUNTED FOR IN GWP-100

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
$BC_{Biofuel}$	Biogenic carbon uptake into biofuel feedstocks	kg CO_2 Equiv.	N/A	N/A	0.00 (0.00)	0.00 (0.00)

Notes:

N/A – Not determined due to lack of information in upstream datasets.

SAFETY DATA SHEET (SDS)

A safety data sheet (SDS) is a document produced in alignment with the UN's Globally Harmonized System of Classification and Labeling of Chemicals (GHS) that the manufacturer, importer, or distributor of a chemical product is required to provide to downstream users. The purpose of an SDS is to ensure that all workers who handle chemicals have the hazard information they need to safely use, handle, and store them.

No SDS declared, mix may include unknown regulated hazardous substances.

RELEASE OF DANGEROUS SUBSTANCES FROM CONSTRUCTION PRODUCTS

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for asphalt fumes of 5 mg/m^3 over a 15-minute time weighted average. Studies of worker exposure to asphalt fumes during asphalt paving operations indicate that exposures are well below the REL during typical asphalt paving operations (NASEM, 2014). In some applications, for example when paving in an enclosed or semi-enclosed area like a tunnel or a subterranean parking garage, personnel involved with asphalt paving operations may potentially be exposed to asphalt fumes in excess of the REL. In these situations, paving contractors should consider either using warm-mix asphalt technologies to reduce paving application temperatures or implementing additional engineering controls or personal protective equipment to reduce occupational exposures below the REL.

References

1. ISO 14025:2006 *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*. International Organization for Standardization, Geneva, Switzerland. https://www.iso.org/standard/38131.html.
2. ISO 21930:2017 *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*. International Organization for Standardization, Geneva, Switzerland. https://www.iso.org/standard/61694.html.
3. *Product Category Rules (PCR) for Asphalt Mixtures, version 2.0, April 2022*. National Asphalt Pavement Association, Greenbelt, Maryland. https://www.asphaltpavement.org/epd.
4. *Product Category Rules (PCR) for Asphalt Mixtures: Annex 1: Prescribed Upstream (Secondary) Data Sources, version 2.0, April 2022*. National Asphalt Pavement Association, Greenbelt, Maryland. https://www.asphaltpavement.org/epd.
5. Wildnauer, M., E. Mulholland, and J. Liddie (2019). *Life Cycle Assessment of Asphalt Binder.* Asphalt Institute, Lexington, Kentucky. https://www.asphaltinstitute.org/engineering/life-cycle-assessment-of-asphalt-binder/.

DECLARED PRODUCT	12-922 5/8" PG64-22 w/Lime, an asphalt mix.
DECLARATION OWNER EPD Owner / Company	Elam Construction Jim Doody (970) 712-6634 None
PROGRAM OPERATOR	National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD, 20770 Toll-free: (888) 468-6499 www.asphaltpavement.org/epd
LCA AND EPD TOOL DEVELOPER	Benjamin Ciavola, Ph.D., Trisight 322 Shelden Ave. Ste. 14, Houghton, MI 49931 http://trisightengineering.com
INDEPENDENT VERIFIERS Third Party Reviewed? Yes / No	John Beath Environmental, LLC The data and declarations produced by the EPD tool was externally, independently verified in accordance with ISO14025, ISO21930, and the referenced PCR. Trisha Montalbo https://goaspha.lt/3u7MIqk
PRODUCT CATEGORY RULE	Product Category Rules (PCR) for Asphalt Mixtures, version 2.0 National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD, 20770 Toll-free: (888) 468-6499 www.asphaltpavement.org/epd
PCR REVIEW	PCR confirmed by PCR Review Panel Led by Joep Meijer, TheRightenvironment https://goaspha.lt/3NJbyVx