

Environmental Product Declaration

Benefits, Expectations and Fulfilments
Puma Energy C320 Binders

2025 - AUS

Going further
— for better performing roads



Our commitment to sustainability

With an unrivalled supply chain, robust quality management and high performing bituminous products, we support our partners and customers across the globe to deliver better performing roads for a sustainable future.

Puma Bitumen's ambition is to ensure the long-term sustainability of the business, while also helping advance the United Nations Sustainable Development Goals and contribute to global action to tackle climate change. A cornerstone of the strategy is aimed at growing its portfolio of sustainable products that relate to a circular economy. Our Environmental, Social, and Governance (ESG) strategy is shaped around three key pillars: reducing environmental impact; enabling socio-economic progress; and ensuring responsible business practices.

We continue to invest significantly in sustainability of our bitumen shipping fleet, energy resources of our storage terminals and manufacturing facilities.

At Puma Bitumen we strive going further for a more sustainable roads.

Introduction

Developing low carbon binders

Through rigorous R&D Puma Energy Bitumen has developed a biogenic bitumen component. Dosed into our Paving Grade Binders, the biogenic bitumen component introduces a negative carbon component to conventional binders, while maintaining at least equal quality and technical performance.

The biogenic bitumen technology allows carbon captured from the atmosphere by trees to be permanently stored in road pavements. This significantly reduces the overall carbon footprint of bitumen, and the asphalt products that contain it. The biogenic material is sustainably sourced, in a process certified under the International Sustainability & Carbon Certification (ISCC) system.

Life-cycle assessment

CALCULATION RULES

EPD Type

- Paving Grade Binder is used for asphalt or spray seal
- The material is for Puma Energy paving grade binders incorporating biogenic bitumen component is certified
- Only module A1, A2 and A3 are declared



Environmental product declaration

This environmental product declaration is based on a life cycle assessment of the supply chain covering the base bitumen, polymers, and biogenic bitumen component. This environmental product declaration is valid for Puma Bitumen Terminals in Australia.

This EPD is valid for C320 binders. The table below shows headline numbers for products.

C320 is a standard Puma Energy PMB product.

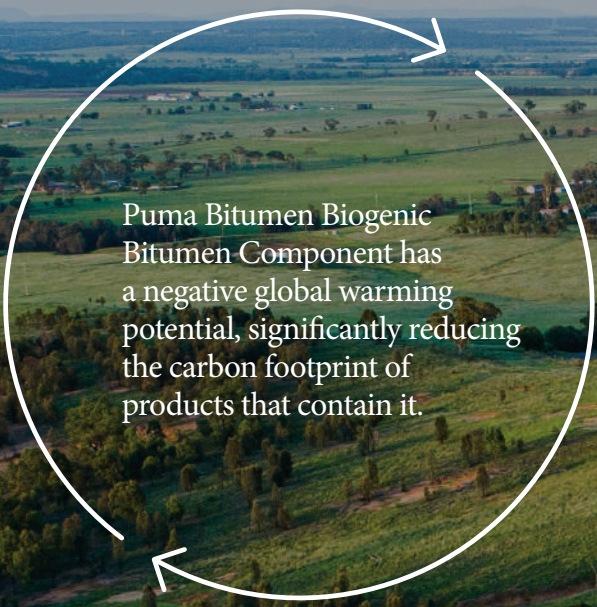
CARBONBIND® C320 includes a biogenic bitumen component.

The full life cycle assessment data for each of these products is presented in the next section of this EPD.

PRODUCTS	C320	CARBONBIND® C320
GWP total [kg CO2-eq]	473	274
GWP relative to OLEXOBIT S25E [kg CO2-eq]	0	-199
Life cycle assessment	pg. 7	pg. 10

Data on this certificate have been generated by The Right Environment Ltd. using SimaPro. As a general rule, a comparison or evaluation of EPD data is only possible when all of the data records to be compared have been drawn up in accordance with EN 15804 and the building context and/or product-specific performance features are taken into consideration. EPDs of construction products may not be comparable if the requirements in EN 15804 section 5.3 are not met, the EPDs are not seen in a building context, and other requirements (e.g. background LCI data, assumptions around onsite emission measurements, type of EPD, reference service life, boundary conditions and functionality) are not equivalent.

Assessment



Puma Bitumen Biogenic Bitumen Component has a negative global warming potential, significantly reducing the carbon footprint of products that contain it.

An Environmental Product Declaration (EPD) is a transparent, objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle. EPDs satisfy all of the requirements of Product Category Rules (PCR) and follow international standards, including ISO 14044, ISO 14025, and ISO 21930.

Life cycle assessment is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service. For instance, in the case of a manufactured product, environmental impacts are assessed from raw material extraction and processing (cradle), through the product's manufacture, distribution and use, to the recycling or final disposal of the materials composing it (grave).

This EPD uses the EN15804:2012+A2 as the core PCR. It has not been third-party reviewed and is therefore a self-declared EPD.

Life cycle assessment C320

Limitations

Results can be considered to be conservative and worst case. Carbon offsetting is not allowed in the EN 15804 and hence are not considered in the calculations. No benefits and load beyond the system boundaries have been declared. The product declared does contain biogenic carbon. The product declared does not include recycled content. There is no packaging.

LIFE CYCLE STAGES

	Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
	X	MND*	MND	MND	MND	MND	MND	MND	MND

*MND = Module not assessed/declared

ENVIRONMENTAL PROFILE - CORE PARAMETERS

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Global warming potential Total, GWP	kg CO ₂	4.73E+02	MND	MND	MND	MND	MND	MND	MND	MND
Global warming potential Fossil, GWP	kg CO ₂	4.72E+02	MND	MND	MND	MND	MND	MND	MND	MND
Global warming potential Biogenic, GWP	kg CO ₂	3.86E-01	MND	MND	MND	MND	MND	MND	MND	MND
Global warming potential Land use change, GWP	kg CO ₂	8.26E-03	MND	MND	MND	MND	MND	MND	MND	MND
Depletion potential of the stratospheric ozone layer, ODP	kg CFK-11	5.51E-04	MND	MND	MND	MND	MND	MND	MND	MND
Acidification potential of land and water resources, AP	mole of H ⁺	8.26E-03	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, freshwater, EP	kg P	3.39E-04	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, marine water, EP	kg N	6.02E-01	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, land, EP	mole of N	6.59E+00	MND	MND	MND	MND	MND	MND	MND	MND
Formation potential of tropospheric ozone photochemical oxidants, POCP	NM VOC	3.12E+00	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of abiotic resources, elements*	kg Sb	2.44E-05	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of abiotic resources, fossil fuels *	MJ	4.82E+04	MND	MND	MND	MND	MND	MND	MND	MND
Water scarcity, WDP *	m ³	2.97E+03	MND	MND	MND	MND	MND	MND	MND	MND

*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.

ENVIRONMENTAL PROFILE - ADDITIONAL PARAMETER

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Particulate matter emissions	incidences	2.38E-05	MND	MND	MND	MND	MND	MND	MND	MND
Ionizing radiation**	kBq U235	5.34E-01	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, ecosystems (ETP-fw) *	CTUe	1.38E+04	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, humans, no-cancer (HTP-c) *	CTUh	5.02E-08	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, humans, no-cancer (HTP-c) *	CTUh	4.10E-06	MND	MND	MND	MND	MND	MND	MND	MND
Soil Quality Index *	Pt	2.13E+02	MND	MND	MND	MND	MND	MND	MND	MND

* 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.

** 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.

RESOURCE INPUT (USE OF)

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Renewable primary energy, excluding renewable resources used as raw materials	MJ, ncv	6.92E+01	MND	MND	MND	MND	MND	MND	MND	MND
Renewable primary energy resources used as raw materials	MJ, ncv	1.55E+00	MND	MND	MND	MND	MND	MND	MND	MND
Total renewable primary resources	MJ, ncv	7.07E+01	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable primary energy, excluding resources used as materials	MJ, ncv	4.79E+04	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable primary energy used as raw materials	MJ, ncv	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Total non renewable primary energy resources	MJ, ncv	4.79E+04	MND	MND	MND	MND	MND	MND	MND	MND
Secondary material	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Input of fresh water	m ³	7.02E+01	MND	MND	MND	MND	MND	MND	MND	MND

*NCV = Net Calorific Value

WASTE CATEGORIES (DISPOSED)

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Non hazardous waste disposed	kg	5.37E+00	MND	MND	MND	MND	MND	MND	MND	MND
Radioactive waste disposed	kg	1.19E-02	MND	MND	MND	MND	MND	MND	MND	MND

FURTHER OUTPUT MATERIAL FLOWS

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Materials for recycling	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Materials for energy recovery	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Exported electric energy	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Exported thermal energy	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND

BIOGENIC CARBON

			Product Stage
Product	kg CO2	0.00E+00	0.0%
Packaging	kg CO2	0.00E+00	0%

Life cycle assessment CARBONBIND C320

Limitations

Results can be considered to be conservative and worst case. Carbon offsetting is not allowed in the EN 15804 and hence are not considered in the calculations. No benefits and load beyond the system boundaries have been declared. The product declared does contain biogenic carbon. The product declared does not include recycled content. There is no packaging.

LIFE CYCLE STAGES

	Product Stage	Delivery	Installation	Use and maintenance	End-of-life					Module D
	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4		D
	X	MND	MND	MND	MND	MND	MND	MND	MND	MND

*MND = Module not assessed/declared

ENVIRONMENTAL PROFILE - CORE PARAMETERS

	Product Stage	Delivery	Installation	Use and maintenance	End-of-life					Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Global warming potential Total, GWP	kg CO2	2.74E+02	MND	MND	MND	MND	MND	MND	MND	MND
Global warming potential Fossil, GWP	kg CO2	4.54E+02	MND	MND	MND	MND	MND	MND	MND	MND
Global warming potential Biogenic, GWP	kg CO2	-1.80E+02	MND	MND	MND	MND	MND	MND	MND	MND

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ENVIRONMENTAL PROFILE - CORE PARAMETERS CONT...

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Global warming potential Land use change, GWP	kg CO ₂	1.83E-02	MND	MND	MND	MND	MND	MND	MND	MND
Depletion potential of the stratospheric ozone layer, ODP	kg CFK-11	5.15E-04	MND	MND	MND	MND	MND	MND	MND	MND
Acidification potential of land and water resources, AP	mole of H ⁺	1.83E-02	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, freshwater, EP	kg P	5.66E-04	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, marine water, EP	kg N	6.02E-01	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication potential, land, EP	mole of N	6.58E+00	MND	MND	MND	MND	MND	MND	MND	MND
Formation potential of tropospheric ozone photochemical oxidants, POCP	NM VOC	3.03E+00	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of abiotic resources, elements *	ks Sb	1.05E-04	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of abiotic resources, fossil fuels *	MJ	4.51E+04	MND	MND	MND	MND	MND	MND	MND	MND
Water scarcity, WDP *	m ³	2.84E+03	MND	MND	MND	MND	MND	MND	MND	MND

*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.

ENVIRONMENTAL PROFILE - ADDITIONAL PARAMETER

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Particulate matter emissions	incidences	2.33E-05	MND	MND	MND	MND	MND	MND	MND	MND
Ionizing radiation**	kBq U235	6.67E-01	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, ecosystems (ETP-fw) *	CTUe	1.33E+04	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, humans, no-cancer (HTP-c) *	CTUh	5.12E-08	MND	MND	MND	MND	MND	MND	MND	MND
Toxicity, humans, no-cancer (HTP-c) *	CTUh	4.02E-06	MND	MND	MND	MND	MND	MND	MND	MND
Soil Quality Index *	Pt	2.44E+02	MND	MND	MND	MND	MND	MND	MND	MND

* 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.

** 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.

RESOURCE INPUT (USE OF)

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Renewable primary energy, excluding renewable resources used as raw materials	MJ, ncv	6.86E+01	MND	MND	MND	MND	MND	MND	MND	MND
Renewable primary energy resources used as raw materials	MJ, ncv	1.39E+01	MND	MND	MND	MND	MND	MND	MND	MND
Total renewable primary resources	MJ, ncv	8.25E+01	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable primary energy, excluding resources used as materials	MJ, ncv	4.49E+04	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable primary energy used as raw materials	MJ, ncv	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Total non renewable primary energy resources	MJ, ncv	4.49E+04	MND	MND	MND	MND	MND	MND	MND	MND
Secondary material	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Non renewable secondary fuels	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Input of fresh water	m3	6.71E+01	MND	MND	MND	MND	MND	MND	MND	MND

*NCV = Net Calorific Value

WASTE CATEGORIES (DISPOSED)

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Non hazardous waste disposed	kg	5.67E+00	MND	MND	MND	MND	MND	MND	MND	MND
Radioactive waste disposed	kg	1.15E-02	MND	MND	MND	MND	MND	MND	MND	MND

FURTHER OUTPUT MATERIAL FLOWS

		Product Stage	Delivery	Installation	Use and maintenance	End-of-life				Module D
Parameter	Unit	A1, A2, A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Materials for recycling	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Materials for energy recovery	kg	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Exported electric energy	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND
Exported thermal energy	MJ	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND

BIOGENIC CARBON

		Product Stage	
Product	kg CO2	1.79E+02	4.9%
Packaging	kg CO2	0.00E+00	0%

Let's talk

We tailor our solutions to each of our customers and would love to talk to you about how we can help meet your own particular bitumen needs.

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