



Global GreenTag^{Cert}™ EPD Program

Compliant to EN 15804:2012+A1 2013



Polyflor Ltd

Heterogeneous Safety Flooring

Polysafe Wood fx PUR

**Teesside Manufacturing Fleck Way, Teesside
Industrial Estate Thornaby-on-Tees TS17 9JZ UK**





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EPD Verification and LCA Details



EPD Scope	Cradle to Gate
EPD Number	PLF S1 2021EP
Issue Date	10 th August 2021
Valid Until	10 th August 2026



Demonstration of Verification

CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Independent external verification of the declaration and data, according to ISO 14025:2010

- External  10th Aug 2021 Third Party Verifier^a by Shloka Ashar, Sustainability Consultant
LCA Reviewed by Shloka Ashar, Sustainability Consultant
- Internal  22/09/21 EPD Reviewed by David Baggs, Global GreenTag Pty Ltd

a: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

The EPD is property of declared manufacturer. Different program EPDs may not be comparable as e.g. Australian transport is often more than elsewhere. Comparability is further dependent on the product category rules used and the source of the data. Further explanatory information is found at info@globalgreentag.com or contact: certification1@globalgreentag.com.

This EPD discloses potential environmental outcomes compliant with EN 15804 for business-to-business communication.

EPD Program Operator	LCA and EPD Producer	Declaration Owner
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Product Information

Product name	Polyflor Heterogeneous flooring
Product codes	Polysafe Wood fx PUR
Declared Unit	The declared product per kilogram
Product Specifications	Heterogeneous 2.0 mm gauge flooring
Standards	EN 13845: 2017 - Polyvinyl chloride floor coverings with particle based enhanced slip resistance - Specification.
Manufacturing site	Fleck Way, Teesside Industrial Estate, Thornaby-on-Tees, TS17 9JZ, UK
Factory warranty	10 years
Representation Site & Geography	United Kingdom, Europe, Pacific Rim and Australasia.

	Property	Conformance to Standard	Polysafe Wood fx PUR	
Functional & Technical Performance	Performance	EN 13845	Conforms	
	Reaction to Fire	EN 13501-1 Class	Bfl-S1	
	Use Area	EN 685/ISO 10874	23, 34 & 43	
	Slip Resistance	DIN51130	R10	
	VOC Emissions	Indoor Air Comfort		Eurofins Gold certified
		AgBB/ABG		Pass

Data quality, range & variability	Cut-off criteria and data quality complies with EN 15804 Significant differences of average LCIA results are declared
Primary Data	Data was collected in accordance with EN ISO 14044:2006, 4.3.2, from primary sources including the manufacturer, suppliers and their publications on standards, locations, logistics, technology, market share, management systems and commitments to improved environmental performance.
No Chemicals of Very High Concern	Contains no substances in the “Authorised or Candidate Lists of Substances of Very High Concern (SVHCs)” with the European Chemicals Agency



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Program Description

EPD type	Cradle to gate (A1 to A3) as defined by EN 15804 and depicted in Figure 1
System boundary	The system boundary with nature includes material and energy system input processing plus manufacture and transport to factory gate plus waste arising.
Service Life	The reference service life is unspecified for cradle to gate scope
Comparability	Construction product EPDs may not be comparable if not EN15804 compliant
Stages included	A1, A2, A3 as depicted and denoted by x in Figure 1
Stages excluded	A4-5, B1-7, C1-1& D as depicted and denoted by MND in Figure 1
Product stages included	<p>Stages are included from A1 raw material acquisition, extraction, refining and processing plus reuse of scrap or material from previous systems; electricity generated from all sources with extraction, refining & transport; plus, secondary fuel energy and recovery processes.</p> <p>Also, A2 transport internal and to the factory gate as well as A3 manufacture of product packaging, inputs, ancillary material and system flows leaving at end-of-waste boundary as coproducts</p>

Information Modules

As Figure 1 shows an x marking LCA and EPD results to be shown summed for modules A1-3. Modules A4 to C4 and D are not declared marked MND which does not indicate zero inventory or impact.

Model Phase	Actual		Scenarios												Potential				
	Produce			Construct		Building Fabric					Building Use		End of life			Beyond Boundary			
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1, D2	D3	
Unit Operations	Resource supply	Transport	Manufacturing	Transport	Construction	Use	Maintain	Repair	Replace	Refurbish	Operating Energy	Operating Water	Demolish	Transport	Process Waste	Disposal	Reuse	Recovery	Recycling
Cradle to Gate	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 1 Life Cycle Phases and Declared Stages in Cradle to Grave Boundary



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Base Material Origin and Detail

Table 1 lists product composition by function, component, source and mass share amount.

Table 1 Base Material Components %w/w

Function	Component	Source	Polysafe Wood fx PUR
Binder	Polyvinylchloride	UK, EU	>48<51
Plasticiser	Diocetyl terephthalate	South Korea	21<24
Filler	Dolomite	UK	>25<28
Safety Grip	Alumina	UK	>4<8
Carrier	Fibreglass PVA Crenette	EU	>1<3
Plasticiser	Epoxidized soybean oil	global	>1<3
Stabiliser	Calcium Zinc Soaps	EU	>1<3
Viscosity depressant	Fatty acid esters	UK	>1<2
Coating	Polyurethane	UK, EU	>0.5<1.5
UV stabiliser	Hydroxyoctyloxy benzophenone	UK	>0.1<0.2
Print pattern	Pigmented inks	EU	>0.5<1.0
White	Titania	UK	>0.3<0.8
Other	Catalyst, colour, defoamer	UK, EU	>0.1<0.6



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Scope and System Boundary

Figure 2 shows included processes in a cradle to gate system boundary and dashed lines defining excluded scenarios to end of life fate to recycling or to landfill grave.

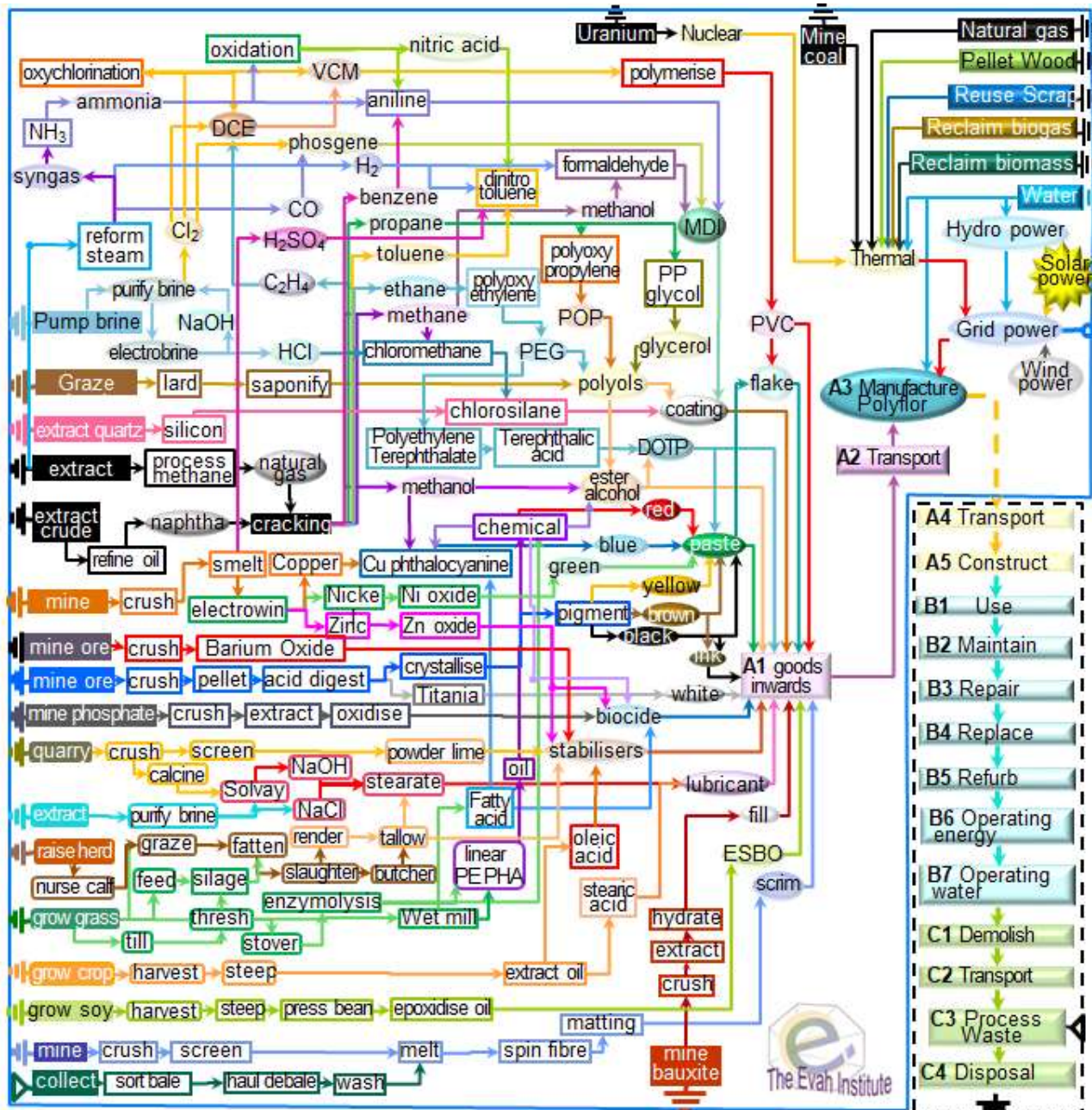


Figure 2 Process Flow Chart in Cradle to Gate System Boundary



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Environmental Impact Terminology

Environmental impacts contributing to risks of social and ecological issues and collapse are tabled below with **common names** and remedies given for each indicator listed in subsequent results tables.

<p>Global warming potential (GWP)</p>	<p>Greenhouse gases absorb infra-red radiation. This heat reduces thermal energy differentials, from equator to poles, forcing ocean current and wind circulation to blend and regulate climate. Weakly blended “lumpier” weather has more frequent, extreme heat wave, fire-storm, cyclone, rain-storm, flood and blizzard events. Accumulation of carbon dioxide, natural gas methane, nitrous oxides and volatile organic compounds from burning fossil fuels causes global warming. Forest and wilderness growth absorbing air-borne carbon in biomass can drawdown such accumulation. Urgent renewable energy reliance is vital in time to avoid imminent tipping points and the worsening “climate emergency”.</p>
<p>Ozone depletion potential (ODP)</p>	<p>Stratospheric ozone layer loss weakens the planet’s solar shield so more shorter wavelength ultraviolet (UVB) light reaching earth increases malignant melanoma and skin cancer in humans and animals, and damages plants. Chlorofluorocarbons, hydrochlorofluorocarbons (HCFC), chlorobromomethane, hydrobromofluorocarbons, carbon tetrachloride, methyl chloroform, methyl bromide and halon gas cause ozone layer loss. To repair the “ozone hole” reliance on ozone-safe aerosols and solvents is essential to avoid further its depletion and enable accumulation of naturally-formed ozone</p>
<p>Acidification potential of land and water (AP)</p>	<p>Acidification of land and water reduces soil and waterway pH, impedes nitrogen fixation vital for plant growth and inhibits natural decomposition. It increases rates and incidence of fish kills, forest loss and deterioration of buildings and materials. Chief synthetic causes of “acid rain” are emissions of sulphur and nitrogen oxides, hydrochloric and hydrofluoric acids and ammonia from burning <u>fossil fuels</u> polluting rain and snow precipitation world-wide.</p>
<p>Eutrophication potential (EP)</p>	<p>Eutrophication from excessively high macronutrient levels added to natural waters promotes excessive plant growth that severely reduces oxygen, water and habitat security for aquatic and terrestrial life across related ecosystems. Chief synthetic cause of “algal blooms” is nitrogen (N, NOx, NH₄) and phosphorus (P, PO₄³⁻) in rain run-off across over-fertilised land catchments.</p>
<p>Photochemical ozone creation potential (POCP)</p>	<p>Tropospheric photochemical ozone near ground level, “smog”, is created from natural and synthetic compounds in UV sunlight. Low concentration smog damages vegetation and crops. High concentration smog is hazardous to human health. Chief synthetic causes are nitrogen oxides, carbon monoxide and volatile organic compounds (VOC) pollutants. Avoidance of reliance on the dirtiest coal fuels and volatile chemicals has reduced smog incidence globally.</p>
<p>Abiotic depletion potential elemental (ADPE)</p>	<p>Abiotic depletion of finite mineral resources increases time, effort and money required to obtain more resources to the point of extinction of naturally viable reserves. This can limit access to available, valuable and scarce elements vital for human-life. The “extinction rebellion” movement calls on adults to secure reserves, biodiversity and climate for current youth and future generations.</p>
<p>Abiotic depletion potential fossil fuel (ADPF)</p>	<p>Abiotic depletion of resources by consuming finite oil, natural gas, coal and nuclear fossil fuel reserves leaves current and future generations suffering limited available, accessible, plentiful, essential valuable as well as scarce raw material, medicinal, chemical, feedstock and fuel stock. Approaching “peak oil” acknowledges fossil fuel reserves are finite and decision-makers need to act to avoid market instability, insecurity and or oil and gas wars.</p>



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Cradle to Gate Inventory and Potential Impact Results

Table 2 shows inputs, outputs and potential impacts per declared unit. LCIA results are relative expressions that do not predict impacts on category endpoints, exceeding of thresholds, safety margins or risks.

Table 2 Resource Amounts A1-A3 /kg

Inventory Input Categories	Unit	Polysafe Wood fx PUR
Net Fresh Water	m ³	691
Secondary Material	kg	0.027
Renewable Secondary Fuels	MJ _{ncv}	11.4
Primary Renewable Energy Not Feedstock	MJ _{ncv} ¹	12.6
Primary Energy Renewable Feedstock Material	MJ _{ncv}	3.0
Total Primary Renewable Energy Resources	MJ _{ncv}	18.1
Non-Renewable Secondary Fuels	MJ _{ncv}	0.34
Primary Energy Non-renewable Not Feedstock	MJ _{ncv}	54.9
Non-renewable Primary Energy Feedstock	MJ _{ncv}	22.5
Total Non-renewable Primary Energy Resources	MJ _{ncv}	77.3
Inventory Output Categories		
Hazardous Waste Disposed	kg	8.6E-03
Non-hazardous Waste Disposed	kg	0.39
Radioactive Waste Disposed	kg	1.2E-09
Components for Reuse	kg	23.21
Material for Recycling	kg	0.00
Material for Energy Recovery	kg	4.7E-02
Exported Electrical Energy	MJ _{ncv}	0.0E+00
Exported Thermal Energy	MJ _{ncv}	0.0E+00
Potential Impact Categories		
Global Warming	kg CO _{2e}	3.76
Stratospheric Ozone Depletion	kg R11 _e	1.4E-09
Photochemical Ozone Creation	kg C ₂ H _{4e}	1.3E-02
Acidification of Land and Water	kg SO _{2e}	1.9E-06
Eutrophication	kg PO _{4e} ³	4.2E-07
Abiotic Depletion Fossil Fuel	MJ _{ncv}	3.83
Abiotic Depletion Mineral (Elemental)	kg Sb _{eq}	4.7E-03

¹ Ncv stands for net calorific value



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4.4. Interpretation

The majority of impacts derive from the binder. Typically, of the gross energy embodied in these products, a quarter is used at the Teesside factory half is in making PVC, 20% in plasticisers and 5% in all remaining operations.

Figure 3 shows product Global Warming Potential (GWP) correlated with ADP Fossil Fuel Depletion which is typical of mineral filled polymer floorcovering.

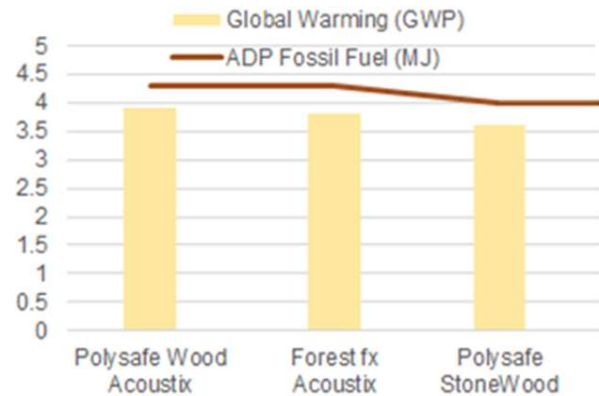


Figure 3 Product GWP Vs ADP Fossil Fuel/kg

References for this EPD

CML LCA methodology, Institute of Environmental Sciences (CML), Faculty of Science, University of Leiden, Netherlands
 GreenTag™ 2021 <http://www.globalgreentag.com/get-certified>
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 ISO 15686-1:2011 Buildings & constructed assets - Service life planning - Part 1: General principles & framework
 ISO 15686-2:2012 Buildings & constructed assets - Service life planning - Part 2: Service life prediction procedures
 ISO 15686-8:2008 Buildings and constructed assets — Service-life planning — Part 8: Reference service life and service-life estimation
 EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
 ISO 21929-1:2011 Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators and a core set of indicators for buildings
 ISO 21930:2007 Sustainability in building construction — Environmental declaration of building products
 ISO 21931-1:2010 Sustainability in building construction — Framework for methods of assessment of the environmental performance of construction works — Part 1: Buildings
 ISO/TR 21932:2013 Sustainability in buildings and civil engineering works — A review of terminology