EPD™

Environmental Product Declaration

Global GreenTag^CertTM EPD Program

Compliant to EN 15804:2012+A1 2013

Polyflor Ltd

Heterogeneous Acoustic Flooring

Acoustix Forest 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 A1 2021EP
Issue Date	10th August 2021
Valid Until	10th 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.

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

EPD Program Operator	LCA and EPD Producer	Declaration Owner
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Product Information

Product name	Polyflor Heterogeneous Acoustic flooring
Product codes	Acoustix Forest fx PUR
Declared Unit	The declared product per kilogram
Product Specifications	Heterogeneous 3.7mm gauge acoustic flooring
Standards	EN 651: 2011 - Resilient floor coverings - Polyvinyl chloride floor coverings with foam layer - Specification.
Manufacture 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.

Functional & Technical Performance

Property	Conformance to Standard	Acoustix Forest fx PUR
Performance	EN 651	Conforms
Reaction to Fire	EN 13501-1 Class	Bfl-S1
Use Area	EN 685/ISO 10874	23, 34 & 42
Acoustic Impact Sound Reduction	EN ISO 140-8	≥19dB
	EN ISO 10140-3	≥19dB
Slip Resistance	DIN51130	R10
VOC Emissions	Indoor Air Comfort	Eurofins Gold certified
	AgBB/ABG	Very Low

Data quality, range & variability	Cut-off criteria and data quality complies with EN 15804+1 2013 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	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. 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

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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Product 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	Acoustix Forest fx PUR
Binder	Polyvinylchloride	UK, EU	>56<59
Plasticiser	Dioctyl terephthalate	S Korea	22<25
Filler	Dolomite	UK	>16<19
Carrier	Fibreglass	EU	>2<4
Flame retardant	Ethylhexyldiphenyl phosphate	UK	>2<4
Plasticiser	Epoxidized soybean oil	UK	>1<3
Stabiliser	Calcium Zinc Soap	Italy	>1<2
Viscosity depressant	Fatty acid esters	UK	>1<2
Coating	Polyurethane	UK, EU	>0.5<1.5
Foam agent	Azodicarbonamide	UK	>0.5<1.0
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.

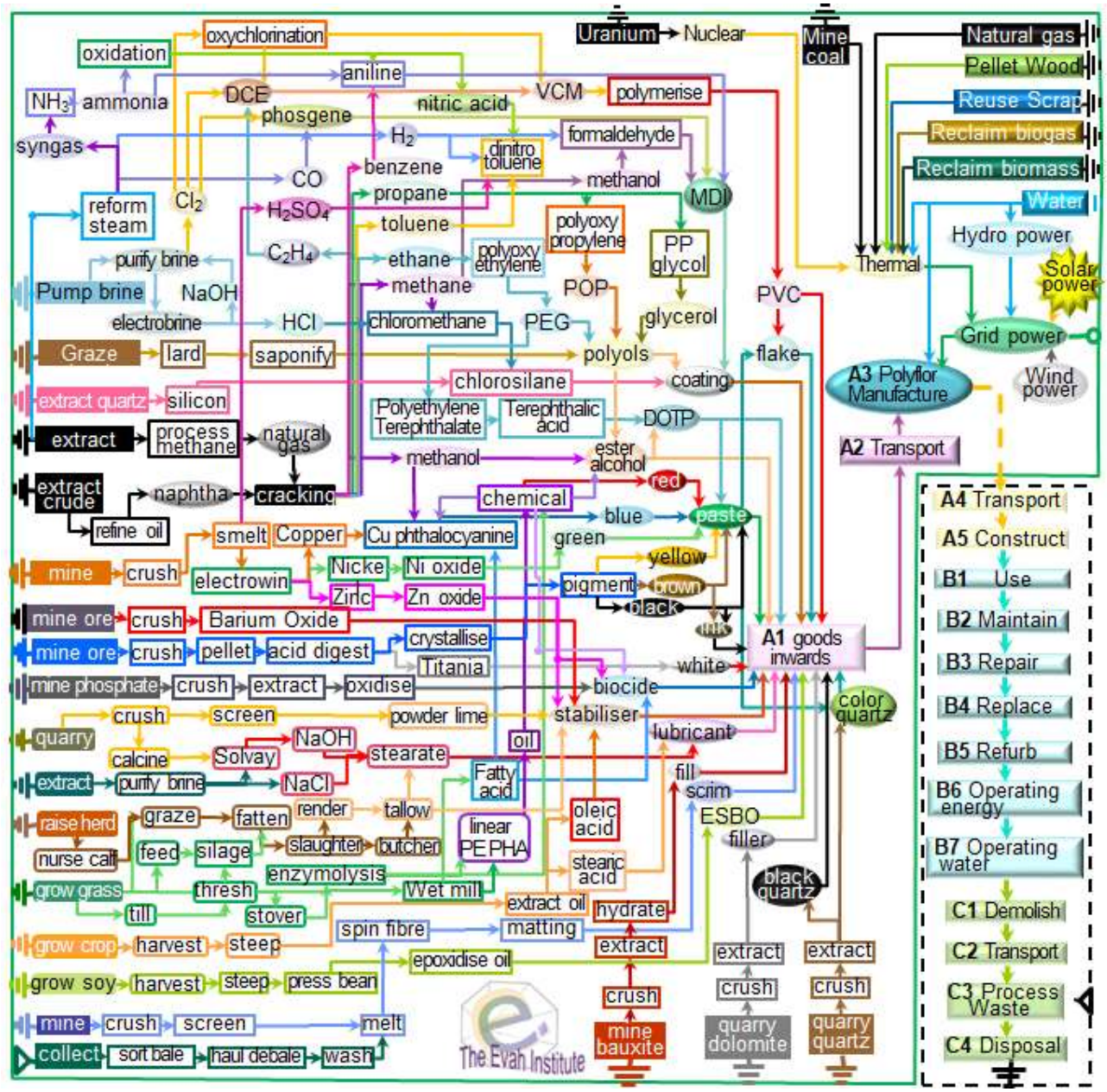

Figure 2 Process Flow Chart Cradle to Gate scope inside Cradle to Grave System Boundary

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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.

Global warming potential	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, wild-fire, cyclone, 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".***
Ozone depletion potential	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 refrigerants, aerosols and solvents is essential to avoid further its depletion and enable accumulation of naturally-formed ozone
Acidification potential of land and water	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 fossil fuels polluting rain and snow precipitation world-wide.
Eutrophication potential	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, NH_4) and phosphorus (P, PO_4^{3-}) in rain run-off across over-fertilised land catchments.
Photochemical ozone creation potential	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.
Abiotic depletion potential elemental	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 ore reserves, biodiversity and climate for current youth and future generations.
Abiotic depletion potential fossil fuel	Abiotic depletion of resources by consuming finite oil, natural gas, coal and yellowcake 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.

Cradle to Gate Inventory and Potential Impact Results

Table 2 shows inputs, outputs and potential impacts per declared unit.

Table 2 Flow and Impacts Results Amounts A1-A3 /kg

Inventory Input Categories	Unit	Acoustix Forest fx PUR
Net Fresh Water	m^3	0.89
Secondary Material	kg	3.5E-03
Secondary Renewable Fuels	MJ $_{ncv}$	0.E+00
Secondary Non-Renewable Fuels	MJ $_{ncv}$	0.38
Primary Renewable Energy Not Feedstock	MJ $_{ncv}$[1]	16
Primary Energy Renewable Feedstock Material	MJ $_{ncv}$	1.5
Total Primary Renewable Energy Resources	MJ $_{ncv}$	17
Primary Energy Non-renewable Not Feedstock	MJ $_{ncv}$	64
Non-renewable Primary Energy Feedstock	MJ $_{ncv}$	26
Total Non-renewable Primary Energy Resources	MJ $_{ncv}$	89
Inventory Output Categories		
Hazardous Waste Disposed	kg	8.9E-03
Non-hazardous Waste Disposed	kg	0.74
Radioactive Waste Disposed	kg	2.0E-09
Components for Reuse	kg	0.67
Material for Recycling	kg	0
Material for Energy Recovery	kg	4.7E-02
Exported Electrical Energy	MJ $_{ncv}$	0.E+00
Exported Thermal Energy	MJ $_{ncv}$	0.E+00
Impact Potential Results		
Global Warming	kg CO_{2e}	3.8
Stratospheric Ozone Depletion	kg $R11_e$	2.3E-09
Photochemical Ozone Creation	kg C_2H_{4e}	1.3E-02
Acidification of Land and Water	kg SO_{2e}	1.3E-02
Eutrophication	kg PO_{4e}[3]	2.9E-03
Abiotic Depletion Fossil Fuel	MJ $_{ncv}$	4.3
Abiotic Depletion Mineral (Elemental)	kg Sb $_{eq}$	5.0E-03

[1] Ncv stands for net calorific value

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.

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

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

GreenTag™ 2021 Product Category Rules http://www.globalgreentag.com/greentag-epd-program

International Energy Agency, Energy Statistics 2020 http://www.iea.org

ISO 14015:2001 EMS: Environmental assessment of sites & organizations (EASO)

ISO 14020:2000 Environmental labels & declarations — General principles

ISO 14025:2006 Environmental labelling & declarations Type III EPDs Principles & procedures

ISO 14031:1999 EM: Environmental performance evaluation: Guidelines

ISO 14040:2006 EM: Life cycle assessment (LCA): Principles & framework, London, BSI, 2006.

ISO 14044:2006 EM: LCA: Requirement & guideline LCI; LCIA Interpretation, London, BSI, 2006.

ISO 15392:2008 Sustainability in building construction General principles

ISO 15686-1:2011 Buildings & constructed assets - Service life planning - Part 1: General principles and framework

ISO 15686-2:2012 Buildings and 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