epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

JACKODUR® LIGNIN

The Norwegian EPD Foundation

Owner of the declaration:
BEWI ASA, Insulation and Construction

Product:
JACKODUR® LIGNIN

Declared unit:
1 m3

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2022 Part B for Thermal insulation products

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-9802-9742

Registration number:
NEPD-9802-9742

Issue date:
22.04.2025

Valid to:
22.04.2030

EPD software:
LCAno EPD generator ID: 172376

General information

Product

JACKODUR® LIGNIN

Owner of the declaration:

BEWI ASA, Insulation and Construction
Contact person: Marc Storm Andersen
Phone: +45 72157902
e-mail: marc.andersen@bewi.com

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Manufacturer:

BEWI Insulation Germany and Belgium

, Europe

Declaration number:

NEPD-9802-9742

Place of production:

JACKON Insulation GmbH
Ritzlebener Str.1
39619 Arendsee, Germany

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2022 Part B for Thermal insulation products

Management system:

ISO 14001 og 9001 for all production sites

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

925437948

Declared unit:

1 m3 JACKODUR® LIGNIN

Issue date:

22.04.2025

Declared unit with option:

A1, A2, A3, A4, A5, C1, C2, C3, C4, D

Valid to:

22.04.2030

Year of study:

2024

Functional unit:

1 m^2 of JACKODUR® LIGNIN insulation material with a thickness (34 mm) provide a thermal resistance (R-value)=1 m^2K/W within an expected service life for insulation materials. Therefore the conversion factor for R=1 m^2K/W is f=0,029.

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804:2012+A2:2019 and seen in a building context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. NEPDT97

Developer of EPD: Mark Plate

Reviewer of company-specific input data and EPD: Martin Bendix

Verification of EPD tool:

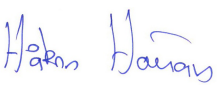
Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

JACKODUR® LIGNIN is an extruded polymer foam (with lignin and rPS) produced on the basis EN 13164 and available in board shape with a density 36 kg/m3 in average (measured). Lignin is a biopolymer and is abundantly produced as a byproduct of the paper industry during the breakdown of cellulose. rPS is made from post-consumer waste.

Product specification

JACKODUR® LIGNIN has specifically low values of thermal conductivity. To meet the need of various applications the boards are produced with different surfaces: with the extrusion skin, planed, grooved or with thermal embossing. JACKODUR® LIGNIN boards are supplied with different edge treatments such as butt edge, ship-lap and tongue and groove. The EPD is related to an unlaminated product only; lamination and additional product treatment are not considered.

Materials	kg	%
Emissions and waste streams	25,20	66,098
Expansion gas	1,29	3,39
Fuels, fossil	0,61	1,60
Organic Polymer	10,80	28,32
Packaging - EPS	0,21	0,56
Total	38,12	100,00

Packaging	kg	%
Packaging - Plastic	0,43	100,00
Total incl. packaging	38,56	100,00

Technical data:

Name	Value	Unit	Norm
Gross density	> 30	kg / m3	EN 1602
Compressive strength (thickness > 30 mm)	0.3	N/mm2	EN 826
Tensile strength	0,1 - 0,4	N/mm2	EN 1607
Dimensional stability at 70°C and 90% relative humidity	< 5	%	EN 1605
Deformation under 40 kPa load and 70°C	< 5	%	EN 1605
Thermal conductivity	0,034	W/(m·K)	EN 13164
Water vapour diffusion resistance factor	250-80		EN 12086

Market:

Europe

Reference service life, product

A reference service life (RSL) according to ISO 15686 cannot be declared. The durability of JACKODUR® LIGNIN is normally at least as long as the lifetime of the building in which it is used (more than 80 years).

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 m3 JACKODUR® LIGNIN

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

< 0,5%

Allocation:

The allocation is made in accordance with the provisions of EN 15804+A2. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

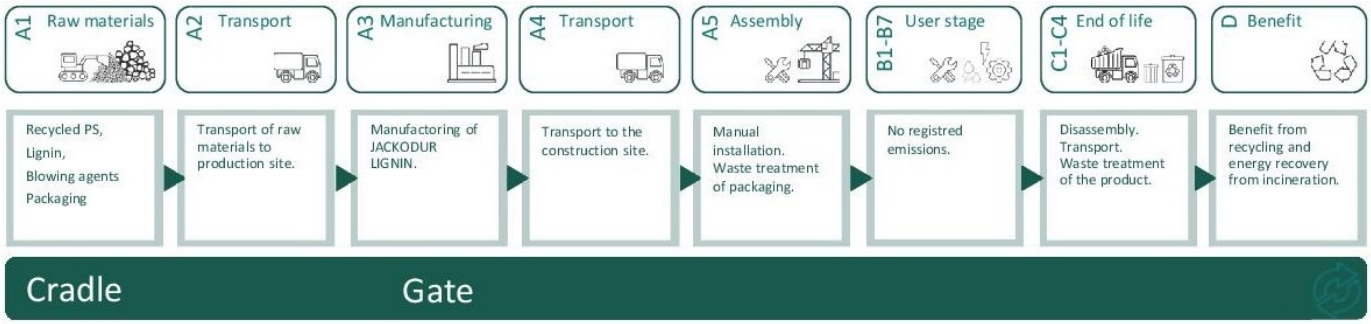
Materials	Source	Data quality	Year
Emissions and waste streams	LCA.no	Database	2024
Expansion gas	ecoinvent 3.6	Database	2019
Expansion gas	ecoinvent 3.6	Database	2020
Fuels, fossil	ecoinvent 3.6	Database	2019
Organic Polymer	Supplier	Supplier specific	2022
Packaging - EPS	Plastics Europe + ecoinvent 3.6	European average.	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:

Type of EPD: cradle-to-gate (A1 - A3) – with options
The following modules are considered in the Life Cycle Assessment:
- Raw material supply (A1),
- Transport to manufacturer (A2),
- Manufacturing (A3),
- Transport to construction site (A4)
- Deconstruction (C1) andTransport to EoL (C2),
- Wasteprocessing (C3) and Disposal (C4) with one scenarios (thermal treatment)
- Reuse, recovery or recycling potential (D)



Additional technical information:

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (kgkm)	36,7 %	500	0,043	l/tkm	21,50

Assembly (A5)	Unit	Value			
Waste, packaging, plastic to average treatment - A5 (inkl transport) (kg)	kg	0,65			

De-construction demolition (C1)	Unit	Value			
Waste treatment, PS, Insulation, Germany (kg)	kg/DU	36,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (kgkm)	53,3 %	50	0,023	l/tkm	1,15

Waste processing (C3)	Unit	Value			
Waste, Polystyrene, incineration	kg	32,40			
Recycling of PS	kg	3,60			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of PS	kg	0,097			
Waste, inert waste, to landfill (kg)	kg	0,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
substitution of electricity (MJ)	MJ	18,79			
Substitution of thermal energy (MJ)	MJ	1034,59			
Substitution of expandable polystyrene, EPS, granulate (kg)	kg	3,60			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact												
	Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	-6,95E+00	2,45E+00	1,58E+00	3,15E+00	5,16E-02	0,00E+00	1,68E-01	1,03E+02	5,04E-03	-1,94E+01
	GWP-fossil	kg CO_2 -eq	6,07E+00	2,45E+00	1,57E+00	3,15E+00	5,16E-02	0,00E+00	1,68E-01	1,03E+02	5,03E-03	-1,91E+01
	GWP-biogenic	kg CO_2 -eq	-1,30E+01	1,01E-03	4,64E-03	1,30E-03	7,12E-06	0,00E+00	7,19E-05	7,12E-04	2,67E-06	-9,23E-02
	GWP-luluc	kg CO_2 -eq	2,67E-02	8,70E-04	1,70E-03	1,12E-03	3,95E-06	0,00E+00	5,12E-05	1,13E-04	7,72E-07	-2,05E-01
	ODP	kg CFC11 -eq	1,01E-06	5,54E-07	1,20E-07	7,13E-07	3,10E-09	0,00E+00	4,05E-08	7,41E-08	5,40E-10	-4,37E-01
	AP	mol H+ -eq	7,06E-02	7,03E-03	1,05E-02	9,05E-03	6,36E-05	0,00E+00	5,41E-04	1,23E-02	1,77E-05	-9,32E-02
	EP-FreshWater	kg P -eq	2,65E-04	1,95E-05	9,23E-05	2,52E-05	1,06E-07	0,00E+00	1,34E-06	7,31E-06	6,80E-08	-7,45E-04
	EP-Marine	kg N -eq	1,19E-02	1,39E-03	1,68E-03	1,79E-03	5,81E-05	0,00E+00	1,18E-04	5,91E-03	5,53E-06	-2,29E-02
	EP-Terrestial	mol N -eq	1,31E-01	1,56E-02	1,83E-02	2,00E-02	2,28E-04	0,00E+00	1,32E-03	6,32E-02	6,29E-05	-2,46E-01
	POCP	kg NMVOC -eq	4,51E-02	5,96E-03	6,37E-03	7,67E-03	7,49E-05	0,00E+00	5,19E-04	1,52E-02	1,74E-05	-8,76E-02
	ADP-minerals&metals[1]	kg Sb-eq	8,54E-05	6,75E-05	1,80E-04	8,70E-05	2,74E-07	0,00E+00	2,99E-06	3,19E-06	2,82E-08	-3,80E-05
	ADP-fossil[1]	MJ	1,55E+02	3,70E+01	1,72E+01	4,76E+01	2,13E-01	0,00E+00	2,73E+00	6,33E+00	4,58E-02	-3,80E+02
	WDP[1]	m^3	6,72E+02	3,58E+01	4,27E+01	4,61E+01	7,52E-01	0,00E+00	2,09E+00	1,40E+01	4,74E-01	-3,07E+02

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

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

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	3,30E-07	1,50E-07	1,03E-07	1,93E-07	1,14E-09	0,00E+00	1,54E-08	5,17E-08	2,20E-10	-3,41E-06
	IRP[2]	kgBq U235 -eq	4,24E-01	1,62E-01	4,99E-02	2,08E-01	9,61E-04	0,00E+00	1,19E-02	1,06E-02	2,17E-04	-4,69E-01
	ETP-fw[1]	CTUe	1,64E+02	2,74E+01	7,15E+01	3,53E+01	2,03E-01	0,00E+00	1,99E+00	1,53E+01	8,42E-02	-4,99E+02
	HTP-c[1]	CTUh	2,44E-09	0,00E+00	5,01E-09	0,00E+00	5,00E-12	0,00E+00	0,00E+00	4,34E-09	4,00E-12	-1,03E-08
	HTP-nc[1]	CTUh	8,10E-08	2,99E-08	9,52E-08	3,86E-08	1,92E-10	0,00E+00	1,93E-09	1,72E-07	1,55E-10	-4,50E-07
	SQP[1]	dimensionless	5,14E+02	2,59E+01	3,70E+01	3,33E+01	3,71E-01	0,00E+00	3,13E+00	7,54E-01	1,26E-01	-5,72E+02

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

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
2. 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 use												
Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	4,36E+01	5,29E-01	1,90E+02	6,82E-01	5,37E-03	0,00E+00	3,43E-02	1,82E-01	2,67E-03	-4,74E+02
	PERM	MJ	1,42E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,42E+02	0,00E+00	0,00E+00
	PERT	MJ	1,85E+02	5,29E-01	1,90E+02	6,82E-01	5,37E-03	0,00E+00	3,43E-02	-1,41E+02	2,67E-03	-4,74E+02
	PENRE	MJ	1,30E+02	3,70E+01	1,72E+01	4,76E+01	2,13E-01	0,00E+00	2,73E+00	6,33E+00	4,58E-02	-3,80E+02
	PENRM	MJ	2,54E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,56E+02	3,70E+01	1,72E+01	4,76E+01	2,13E-01	0,00E+00	2,73E+00	6,33E+00	4,58E-02	-3,80E+02
	SM	kg	2,52E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	1,73E-01	1,89E-02	3,30E-02	2,44E-02	1,41E-04	0,00E+00	1,20E-03	5,08E-03	6,63E-05	-4,77E-02
	NRSF	MJ	7,69E-02	6,77E-02	1,75E-03	8,72E-02	3,69E-04	0,00E+00	4,02E-03	0,00E+00	1,06E-02	-3,13E+01
	FW	m^3	7,28E-02	3,95E-03	4,59E-02	5,09E-03	1,12E-04	0,00E+00	3,10E-04	1,79E-02	4,21E-05	-4,42E-01

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	3,90E-02	1,91E-03	1,99E-02	2,46E-03	0,00E+00	0,00E+00	1,49E-04	0,00E+00	8,35E-02	-6,51E-03
	NHWD	kg	8,75E-01	1,80E+00	1,60E+00	2,32E+00	6,51E-01	0,00E+00	2,37E-01	0,00E+00	4,14E-02	-1,83E+00
	RWD	kg	3,71E-04	2,52E-04	4,98E-05	3,24E-04	0,00E+00	0,00E+00	1,86E-05	0,00E+00	2,76E-07	-4,11E-04

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	3,20E-03	0,00E+00	3,89E-01	0,00E+00	3,32E-01	0,00E+00	0,00E+00	3,60E+00	0,00E+00	0,00E+00
	MER	kg	3,16E-04	0,00E+00	9,07E-02	0,00E+00	3,26E-05	0,00E+00	0,00E+00	3,24E+01	0,00E+00	0,00E+00
	EEE	MJ	8,25E-04	0,00E+00	1,35E-01	0,00E+00	5,00E-05	0,00E+00	0,00E+00	5,71E+01	0,00E+00	0,00E+00
	EET	MJ	1,25E-02	0,00E+00	2,05E+00	0,00E+00	7,57E-04	0,00E+00	0,00E+00	8,64E+02	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	3,56E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
Electricity, with Guarantee of origin, 01.01.2025 - 31.12.2025 - BEWI Arendsee, Germany (kWh)	ecoinvent 3.6	29,24	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

JACKODUR® LIGNIN can be used indoor however they are generally not exposed to the indoor air but covered by a finishing element or system.
The VOC emission testing meets the requirements of the AgBB/DIBt method.
The tested products all comply with the requirements of DIBt and AgBB for the use in the indoor environment.
The tested products also all achieved the A+ rating of the French VOC labelling scheme.

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	6,12E+00	2,45E+00	1,58E+00	3,15E+00	5,16E-02	0,00E+00	1,68E-01	1,03E+02	5,22E-03	-1,93E+01

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

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NPCR 012 Part B for Part B for Thermal insulation products, Ver. 2.0, 31.03.2022, EPD Norway.

epd-norge Global program operatør	**Program operator and publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: e-mail: web:	+47 977 22 020 post@epd-norge.no www.epd-norge.no
BEWI	**Owner of the declaration:** BEWI ASA, Insulation and Construction Hammarvikringen 64, HAMAR 7263, Norway	Phone: e-mail: web:	+45 72157902 marc.andersen@bewi.com https://bewi.com
LCA.no	**Author of the Life Cycle Assessment** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: e-mail: web:	+47 916 50 916 post@lca.no www.lca.no
LCA.no	**Developer of EPD generator** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: e-mail: web:	+47 916 50 916 post@lca.no www.lca.no
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: web:	www.eco-platform.org ECO Portal