Environmental Product Declaration

In accordance with ISO 14025:2006 for:

Billet heater for non ferrous metals

from

Coim Srl

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Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: *Industrial furnaces and ovens, PCR 2022:10, version 1.0.1, UN CPC 43420*
PCR review was conducted by: *Paola Borla. The Chair of the PCR review can be contacted via the PCR review panel: Technical Committee of the International EPD® System, info@environdec.com*
Life Cycle Assessment (LCA)
LCA accountability: *Studio Fieschi & soci s.r.l. - C.so Vittorio Emanuele II, 18 10123 Torino, IT - www.studiofieschi.it*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Chris Foster, EuGeos Srl* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: ☐ Yes ☒ No

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Company information

Owner of the EPD:
Presezzi Extrusion S.p.A.
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Description of the organisation:
COIM is world leader in designing and manufacturing Gas-Fired Billet Heaters for the extrusion of Copper, Brass and Aluminum. Since 1978 COIM means worldwide excellence and expertise for the most important extruders. Our range of products includes Special Furnaces for Annealing and Heat Treatment of extruded products and tailor-made Automatic Storages for billets.
COIM S.r.l. is member of Presezzi Extrusion Group, a group of companies which is able to offer full support to its widespread customer base at all stages in the development and implementation of major projects in the extrusion industry - right from the initial sales meeting, all the way through design and construction of the machines, to installation and start up as well as guaranteeing complete after sales support by offering the highest level of technical specialization and experience available in the industry today - at each and every stage of any project.
Customers can therefore entrust all their technical requirements to a single, consolidated industrial reality - a "one-shop-stop" - in which the management is dedicated to striving for constant technological growth and product development, supported by the consistent, highly qualified activities of its R&D department.

Name and location of production site:
Coim Srl
Via del Donatore 5
25030 Castelcovati (BS)
Italy

Product information

Product name:
PFA1/100M - Billet heater for 10" aluminium billets

Product identification:
Gas-fired billet heaters for aluminium billets and other non-ferrous metals.

Product description:
PFA1 is used for heating billets before they are loaded into the Press to be extruded.
The oven described here is representative of the whole range of Gas-fired billet heaters, based on variation between models when indicators for 1 t of metal thermally treated are considered; these indicators are declared as additional information in this EPD.

Commercial name	PFA1/100M - Billet heater for 10" aluminium billets
Type of metal worked and alloy	Aluminium Alloys: 6063, 6061, 6060, 6082, 6005, 7005, 7075, 7003, 7046, 1xxx, 3xxx, 4xxx.
Billet diameter	10''
Max billet length	1.500 mm
Max. heating temperature	530°C
Max. skin temperature	530°C
Taper	Up to 100 °C/m
Size and dimension	20.000 (length) x 2.500 (width) x 5.000 (height) mm
Weight	21 t
Main power supply	3 phases / 400V / 50Hz 50 kW
Heating sections	10
Energy consumption	170 kWh/t (heat) 6 kWh/t (electricity)
Energy consumption for other processes	Not relevant
Expected lifetime	25 years
Productivity	8 t/h
Foreseen production	25.000 t/year
Installed Power	1.360 kW (heat energy) 50 kW (electricity)
Processing material(s) consumption	Lubricant, 10 kg/y
Refrigerating fluid type and consumption	No consumption. Closed-loop Chiller System with maximum capacity of 15 m^3/h

The physical modules of PFA1 in its standard configuration are:

- Chimney – fan system
- Billet entrance
- Junction tunnel
- Heat exchanger

- Ventilation unit
- Thermocouples
- Combustion system
- Oven exit door
- Diverter valve
- Oven basement and vaults
- Materials recovery group
- Rollers
- Pressurisation system

UN CPC code:
43420 *Industrial or laboratory furnaces and ovens, except non-electric bakery ovens; other industrial or laboratory induction or dielectric heating equipment*

Geographical scope: Global
The product performance has been modelled based on Coim market distribution.

LCA information

Functional unit / declared unit: the thermal treatment of aluminium billets by means of an oven during a Reference Service Life of 20 years at the following operating conditions:

Billet diameter	10''
Max billet length	1 500 mm
Set up	Heating from 20 °C to 530 °C
Energy consumption	170 kWh/t (heat) 6 kWh/t (electricity)
Expected lifetime	25 years
Productivity	8 t/h
Foreseen production	25.000 t/year
Processing material(s) consumption	Lubricant, 10 kg/y
Refrigerating fluid type and consumption	No consumption. Closed-loop Chiller System with maximum capacity of 15 m^3/h

Reference service life: 20 years

Time representativeness: 2021

Database used: Ecoinvent 3.8

Database(s) and LCA software used: Simapro 9.1

Description of system boundaries:
The type of EPD adopted for the products under study is **cradle-to-grave**.
The following information modules are therefore included:

Upstream:

- extraction and production of raw material for all parts of the press/oven;
- recycling processes of secondary materials from other product life cycles;
- production of parts of the oven;
- transportation of raw material and commercial products;
- the manufacturing of primary and secondary packaging;
- generation of electricity and production of fuels; steam and other energy carriers used in the upstream processes.

Core:

- transportation of materials, semi-products and packaging to COIM manufacturing site;
- external transportation from COIM manufacturing site (e.g. wastes to the landfills);
- internal transports within the manufacturing plant;
- production of auxiliary materials;
- manufacturing of the oven (assembly, welding, painting);
- testing of the product including the energy and materials used;
- waste treatment of waste generated during manufacturing of machine;
- preparation and packaging of the final product for shipment;
- generation of electricity and production of fuels, steam and other energy carriers used in core processes.

Downstream:

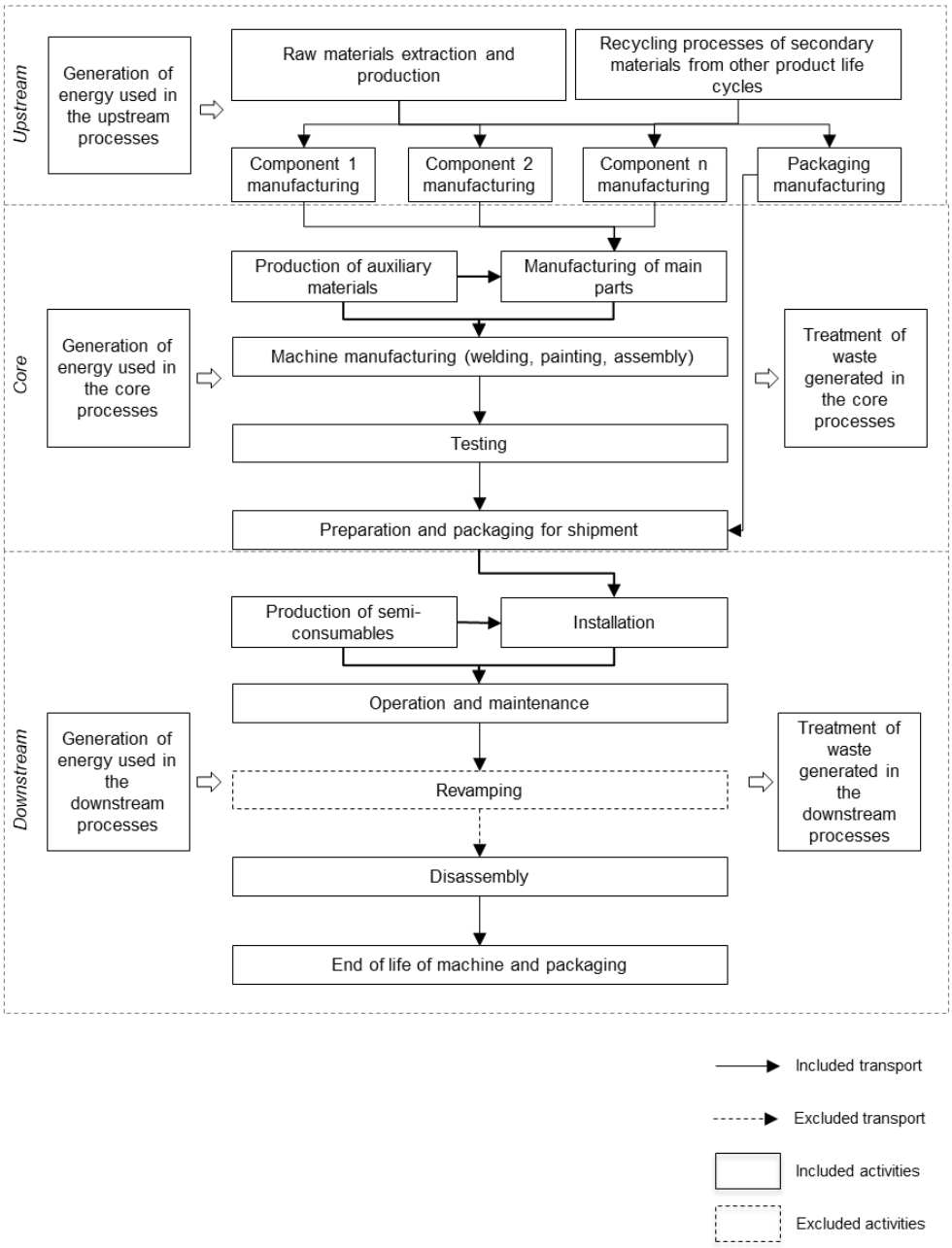
- transportation of the product to user;
- installation of product at site, including used material, energy and waste generated from installation;
- production of semi-consumables installed in the machine at delivery (e.g. hydraulic fluid, etc.),

- operation of the product including energy and material consumptions and emissions;
- ordinary maintenance during RSL;
- disassembling of the product;
- end-of-life treatment of the product after its use stage and final disassembly;
- end-of-life processes of packaging and any wasted part of the press/oven;
- generation of electricity and production of fuels, steam and other energy carriers used in the downstream processes.

The system boundaries do not include:

- Input and output flows related to personnel (e.g. energy used in head offices and sales offices, transports of employees to and from workplace, water use for toilets, etc);
- Input and output flows related to production and maintenance of equipment, other than the machinery under analysis;
- The machine under analysis is not expected to be refurbished within the RSL above declared (see chapter **Errore. L'origine riferimento non è stata trovata.**). Therefore, refurbishment activities (revamping), including substitution of key parts of the press/oven, are not considered in this LCA study.

System diagram:



Upstream

Upstream processes include the production of the components involved in the manufacturing of the PFA1 and the packaging for its distribution. Primary data have been used for the material and the weight of each component and for the amount of packaging employed. Global and European average datasets from Ecoinvent and data from Plastics Europe and have been used to model the production of components and packaging.
More details regarding raw materials and packaging are shown in the tables in the **Content declaration** section.

Core

The Core phase comprises the transport of the components from the suppliers to Coim's plant and the manufacturing process of the PFA1. Primary data about supplier's location has been used for components representing at least the 90% of the total weight. For components representing the remaining 10% of the total weight of the machine, a distance of 100 km by truck was assumed.
Data related to the inputs (energy consumption, water withdrawal, etc.) as well as outputs (air emissions, water emissions etc.) of the plant are primary data provided by Coim's staff.
The electricity used is supplied from the grid. The fuel mix declared by the supplier is the following:

Source	% 2021	% 2020	% 2019
Renewables	33,93%	23,53%	14,05%
Hard coal	9,42%	9,78%	11,63%
Oil	1,00%	0,81%	0,74%
Natural Gas	46,81%	52,31%	63,94%
Nuclear	5,08%	8,00%	5,05%
Others	3,76%	5,57%	4,59%

Waste flows sent to recovery do not carry environmental burdens, whereas their transport from the plant to the recovery facilities is considered. The other waste flows are assumed to be destined to landfill or to incineration. Transports to recovery/disposal facilities were modelled according to actual distances from Coim's plant, travelled by truck.

Downstream

Downstream processes are the distribution of the final product to the market, the use and maintenance stages and the end-of-life. Both the distribution and the use and maintenance scenarios have been modelled using primary data provided by Coim, considering the entire range of machines produced in the reference year. The PFA1 is installed at customers' sites and tested by Coim staff; PFA1 requires the use of electric forklifts and overhead cranes for positioning of bigger components, and natural gas is used for calibration. During installation the chiller closed circuit is filled with coolant.
The oven uses mainly natural gas and a small amount of electricity for its operation. No other processes, such as compressed air production, are relevant for this machine. The electricity mix has been modelled according to the market distribution of the whole production in 2020, 2021 and 2022, considering either national residual mix on the market, for countries where this data is available, or national consumption mix on the market.
So, the electricity mix consists of a share of electricity produced in each country considered and allocated as follows:

- Renewables: 19,6%. Of which:
  - Biomass 1,7%
  - Geothermal 1,0%
  - Hydro 9,1%
  - Solar 2,8%

  - Wind 5,0%
- Coal 33,2%
- Lignite 6,4%
- Natural gas 29,7%
- Nuclear 8,5%
- Oil 1,9%
- Other 0,7%

The furnace is equipped with an energy recovery system. Heat is recovered from the exhaust smokes, before expelling them, to pre-heat the chamber, the material and the combustion air of the burners. The declared energy consumption during the use phase already takes this energy recovery into account.

The use of the machine requires some ordinary maintenance activities during its useful life, i.e. the substitution of: lubricant, ceramic fibre braids and seals.

The end-of-life scenario was modelled according to the most recent Eurostat statistics on generic waste and WEEE treatment in Europe.
Accordingly, the EoL scenario was set up based on the following assumptions:

- dismantling processes require the same energy needed during installation;
- metal components are fully recovered;
- concrete and clays are either recycled or destined to landfill;
- a standard distance of 50 km by truck was assumed for the transport of waste disposed or recovered.

The useful life of PFA1 is 25 years, corresponding to the time the machines could be in use without the need for revamping. Although the core parts of the oven may last longer than the period considered, in absence of reliable information regarding the possible duration of each main component and as a conservative assumption, the above-mentioned useful life is assumed as representative of all components of the machine.

Cut-off:
Auxiliary materials used during manufacturing

Allocation procedures:
Impacts generated by manufacturing processes (assembly, welding) were allocated based on the mass of products and co-products.

Environmental impact indicators

The default environmental performance indicators required by the International EPD System®, Version 2.0, and their methods are used.

The characterization factors applied are derived from the EF 3.0 method (adapted).

The characterization model of each impact indicator is detailed in the following table.

Impact category	Abbreviation	Characterization model	Unit
Global Warming Potential	GWP	GWP100, EN 15804. Version: August 2021 IPCC (2013)	kg CO_2 eq.
Acidification Potential	AP	AP, accumulated exceedance, EN 15804. Version: August 2021. Seppälä et al. 2006, Posch et al. 2008	mol H+ eq.

Impact category	Abbreviation	Characterization model	Unit
Eutrophication Potential, freshwater	EPf	EP, aquatic freshwater, EUTREND model, EN 15804. Version: August 2021. Struijs et al. 2009 as implemented in ReCiPe	kg P eq.
Eutrophication Potential, marine	EPm	EP, aquatic marine, EUTREND model EN 15804. Version: August 2021. Struijs et al. 2009 as implemented in ReCiPe	kg N eq.
Eutrophication Potential, terrestrial	EPt	EP, terrestrial, accumulated, exceedance EN 15804. Version: August 2021. Seppälä et al. 2006, Posch et al. 2008	mol N eq.
Photochemical Oxidant Creation Potential	POCP	POCP, LOTOS-EUROS as applied in ReCiPe, EN 15804. Version: August 2021. Van Zelm et al. 2008, ReCiPe 2008	kg NMVOC eq.
Ozone Depletion Potential	ODP	ODP, EN 15804. Version: August 2021. WMO 2014	kg CFC 11
Abiotic Depletion Potential for minerals and metals (non-fossil resources)	ADPmm	ADP minerals & metals, EN 15804. Version: August 2021. Guinée et al. 2002, van Oers et al. 2002, CML 2001 baseline (Version: January 2016)	kg Sb eq.
Abiotic Depletion Potential for fossil fuels	ADPff	ADP fossil fuels, EN 15804. Version: August 2021. Guinée et al. 2002, van Oers et al. 2002, CML 2001 baseline (Version: January 2016)	MJ
Water deprivation potential	WDP	Available water remaining (AWARE) method Boulay et al (2017)	m^3 world eq. deprived

<u>Indicators describing use of primary and secondary resources</u>

- Primary energy resources – Renewable (PER)
  - PERT: indicator based on CED method version 1.11
  - PERM: a characterization factor of 17 MJ/kg was considered for biomass and paper from wood.
  - PERE: calculated by difference
- Primary energy resources – Non-renewable (PENR)
  - PENRT: indicator based the indicator Resource use, fossils.
  - PENRM: the flows of the above mentioned indicator related to coal, gas and oil feedstocks are considered. For plastics, the following parameters from PlasticsEurope eco-profiles are considered:
    - Nylon 6: Oil 53,02%, Natural Gas 25,90% of the total energy input;
    - Ethylene: Oil 69.44%, Natural Gas 61,09% of the total energy input.
  - PENRE: calculated by difference

Content declaration

Product

Materials	Weight (kg)	%
Steel	12 274	58%
Concrete and clays	5 725	27%
Stainless steel	1 622	8%
Minerals/fibres	890	4%
Electronics and engines	222	1%
Ceramic	105	0%
Other materials	172	1%
TOTAL	**21 009**	**100%**

Environmental/hazardous properties: No substance listed in the Candidate List of Substances of Very High Concern for Authorisation under the REACH Regulations is present in this product, either above the limits for registration with the European Chemicals Agency or in excess of 0,1 weight-% of the product.

Packaging

Type of packaging	Description	Material	Weight for 1 oven (kg)
Distribution packaging	Pallet, boxes, supports 80% EU, 20% Extra EU	Wood	750

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: Not relevant

LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds and safety margins or risks

Results of the environmental performance indicators

Impact category indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	5,68E+04	1,52E+04	2,96E+07	2,97E+07
	Biogenic	kg CO_2 eq.	1,48E+03	5,78E+00	1,40E+04	1,54E+04
	Land use and land transformation	kg CO_2 eq.	5,94E+01	1,87E+00	9,27E+03	9,33E+03
	TOTAL	kg CO_2 eq.	5,84E+04	1,52E+04	2,96E+07	2,97E+07
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	3,67E-03	1,79E-03	2,84E+00	2,85E+00
Acidification potential (AP)		kg mol H^+ eq.	2,81E+02	3,33E+01	4,71E+04	4,74E+04
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	2,65E+00	1,09E-01	2,79E+02	2,82E+02
	Aquatic marine	kg N eq.	5,79E+01	5,02E+00	6,77E+03	6,83E+03
	Aquatic terrestrial	mol N eq.	5,82E+02	5,48E+01	7,45E+04	7,52E+04
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,56E+02	1,63E+01	2,64E+04	2,66E+04
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	1,70E+00	2,48E-02	3,83E+01	4,00E+01
	Fossil resources	MJ, net calorific value	6,57E+05	2,29E+05	4,28E+08	4,29E+08
Water deprivation potential (WDP)		m^3 world eq.	1,29E+04	1,75E+03	9,68E+05	9,82E+05

Resource use indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	8,23E+04	7,67E+03	6,68E+06	6,77E+06
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	8,23E+04	7,67E+03	6,68E+06	6,77E+06
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	6,57E+05	2,29E+05	4,28E+08	4,29E+08
	Used as raw materials	MJ, net calorific value	3,44E+01	0,00E+00	0,00E+00	3,44E+01
	TOTAL	MJ, net calorific value	6,57E+05	2,29E+05	4,28E+08	4,29E+08

Waste categories indicators

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	0,00E+00	3,93E+01	8,22E+01	1,21E+02
Non-hazardous waste disposed	kg	0,00E+00	1,66E+03	1,64E+03	3,30E+03
Radioactive waste disposed	kg	1,97E+00	2,46E-01	1,91E+02	1,93E+02

Additional environmental information: Results per 1 t of aluminium worked

Impact category indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1,14E-01	3,03E-02	5,92E+01	5,93E+01
	Biogenic	kg CO_2 eq.	2,97E-03	1,16E-05	2,79E-02	3,09E-02
	Land use and land transformation	kg CO_2 eq.	1,19E-04	3,75E-06	1,85E-02	1,87E-02
	TOTAL	kg CO_2 eq.	1,17E-01	3,03E-02	5,92E+01	5,94E+01
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	7,35E-09	3,58E-09	5,69E-06	5,70E-06
Acidification potential (AP)		kg mol H^+ eq.	5,63E-04	6,67E-05	9,42E-02	9,48E-02
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	5,30E-06	2,18E-07	5,58E-04	5,63E-04
	Aquatic marine	kg N eq.	1,16E-04	1,00E-05	1,35E-02	1,37E-02
	Aquatic terrestrial	mol N eq.	1,16E-03	1,10E-04	1,49E-01	1,50E-01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	3,12E-04	3,26E-05	5,28E-02	5,31E-02
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	3,39E-06	4,96E-08	7,65E-05	8,00E-05
	Fossil resources	MJ, net calorific value	1,31E+00	4,58E-01	8,56E+02	8,58E+02
Water deprivation potential (WDP)		m^3 world eq.	2,59E-02	3,50E-03	1,94E+00	1,96E+00

Resource use indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,65E-01	1,53E-02	1,34E+01	1,35E+01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	1,65E-01	1,53E-02	1,34E+01	1,35E+01
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1,31E+00	4,58E-01	8,56E+02	8,58E+02
	Used as raw materials	MJ, net calorific value	6,88E-05	0,00E+00	0,00E+00	6,88E-05
	TOTAL	MJ, net calorific value	1,31E+00	4,58E-01	8,56E+02	8,58E+02

Waste categories indicators

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	0,00E+00	7,86E-05	1,64E-04	2,43E-04
Non-hazardous waste disposed	kg	0,00E+00	3,32E-03	3,28E-03	6,60E-03
Radioactive waste disposed	kg	3,95E-06	4,92E-07	3,82E-04	3,86E-04

References

ISO 14025:2010 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*

ISO 14040:2006 *Environmental management – Life cycle assessment – Principles and framework*

ISO 14044:2006 *Environmental management – Life cycle assessment - Requirements and guidelines*

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