

## ENVIRONMENTAL PRODUCT DECLARATION (EPD) FOR THE ALUMINIUM EXTRUSION BILLET PRODUCED BY HYDRO BUILDING SYSTEMS ATESSA SRL



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*EPD in accordance with ISO 14025 and EN 15804:2012+A1:2013*

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## 1 PROGRAMME RELATED INFORMATION

This EPD is developed under the program The International EPD ® System, in compliance with the General Program Instruction version 3 for the EPD development and the Product Category Rules PCR CPC 54 “Construction products and Construction services” 2012:01 version 2.31.

More information about the International EPD ® System is available on the website:

<https://www.environdec.com/>

## 2 PRODUCT RELATED INFORMATION

### 2.1 THE COMPANY

Hydro Building Systems Atessa Srl manufactures aluminium profiles and includes also a remelting unit. The manufacturing site is located in a 57.660 mq area. The production processes occurring in the site include the production of billets in aluminium alloys and the production of profiles through the extrusion of billets, including eventual additional manufacturing steps and treatment such as the such the profile aging processes and the thermal break.

### 2.2 THE PRODUCT

The studied aluminium billets are intermediate products which feed other processing steps for the production of other products, mainly profiles for the building sector. Aluminium scrap and primary ingots are melt, with the eventual addition of alloying elements, and billets produced through a casting process.

The studied aluminium billets are intermediate products which feed other processing steps for the production of other products, mainly profiles for the building sector. The production process, represented in Figure 1, includes the remelting of aluminium scrap and primary ingots and the following casting process. During the process, impurities are removed and alloys are added, if needed, to adjust the chemical composition and to reach the quality standard. Casted billets are binded together by means of plastic straps and wood bars and are stored to be sold externally or to be used internally as input in the extrusion process (profiles production).

The reference CPC code is 415 “Semi-finished products of copper, nickel, aluminium, lead, zinc and tin or their alloys”.

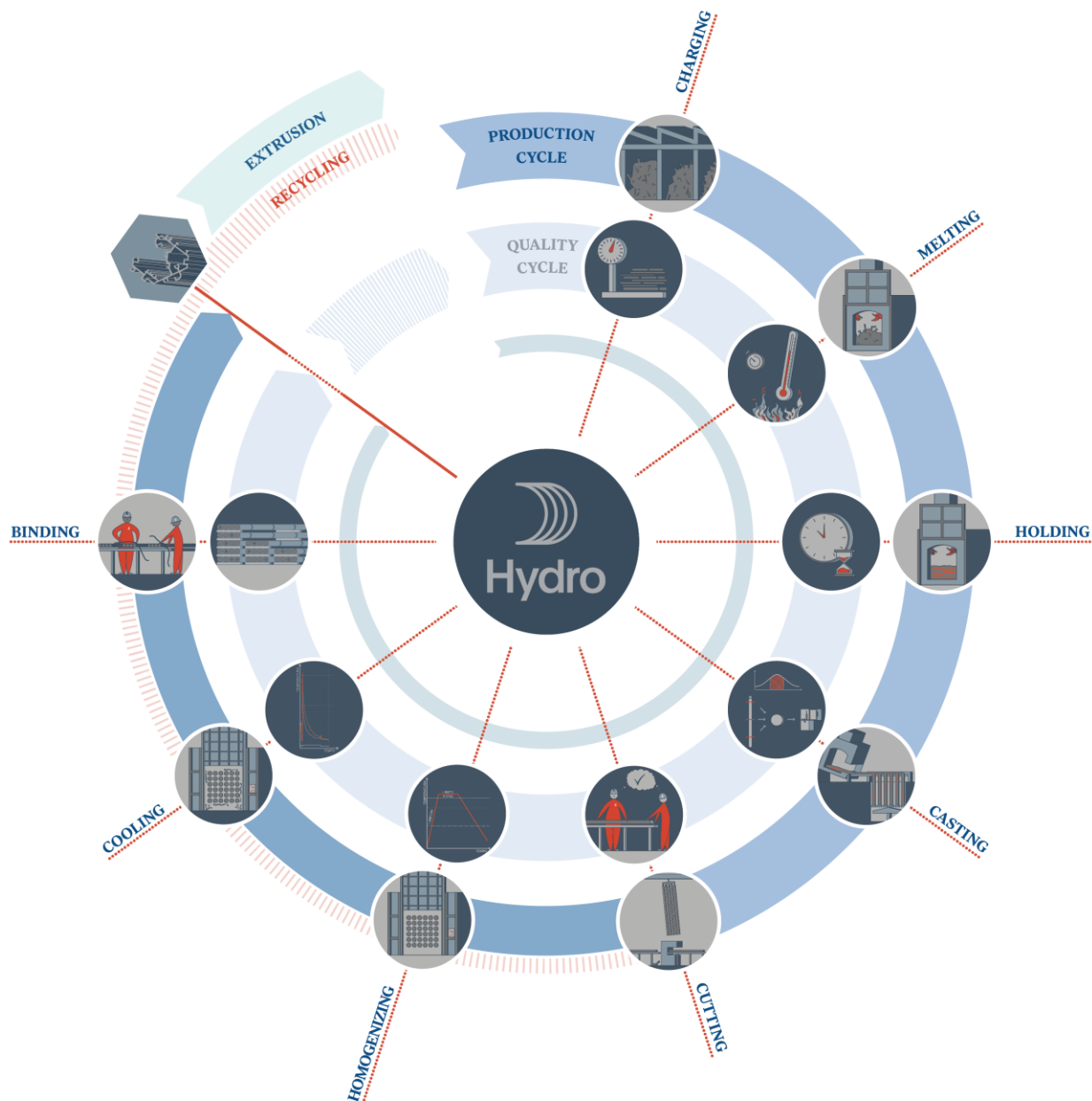


Figure 1: Production process of the aluminium billet occurring in Atesa's site.

### 2.2.1 TECHNICAL CHARACTERISTICS OF THE PRODUCT

All products are produced according to European standards specific for each casthouse products. The products are variants within the 6000 alloys. For more detailed information about shapes, dimensions and tolerances: [www.hydro.com/en/products/casthouse-products/](http://www.hydro.com/en/products/casthouse-products/).

### 2.2.2 PRODUCT COMPOSITION

The composition of the product is reported in Table 1. The content of SVHC does not exceed 0.1 % of the total weight.

Table 1: BoM of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl

BoM of the aluminium billet	
Material contribution (% in weight) to 1 kg of aluminium billet	
<b>Aluminium scrap, of which</b>	<b>84,93</b>
<i>Process scrap</i>	<i>98,30</i>
<i>Post-consumer (treated)</i>	<i>1,29</i>
<i>Post-consumer</i>	<i>0,42</i>
<b>Primary aluminium ingot</b>	<b>14,85</b>
<b>Alloys, of which</b>	<b>0,22</b>
<i>Silicon</i>	<i>20</i>
<i>Manganese</i>	<i>5</i>
<i>Magnesium</i>	<i>20</i>
<i>Boron-titanium</i>	<i>55</i>
Packaging per kg of aluminium billet	
<b>Plastic strap</b>	<b>0,0002</b>
<b>Wood</b>	<b>0,0058</b>

### 2.2.3 PRODUCT REFERENCE SERVICE LIFE

Product Reference Service Life is dependent on product application. Aluminium itself has an infinite lifetime.

### 2.2.4 MARKET

The reference market is Europe. Application sector is mainly Building and Construction, but also Automotive and Transport, Consumer Goods, General Engineering.

## 3 ENVIRONMENTAL PRODUCT DECLARATION

### 3.1 METHODOLOGY

The study behind the present EPD has been performed according to the state of art of the LCA methodology, with specific reference to the construction sector, in accordance to the following standard and guidelines:

- EN ISO 14040: 2006 Environmental management -- Life cycle assessment -- Principles and framework
- EN ISO 14044: 2006/Amd 1:2017 Environmental management -- Life cycle assessment -- Requirements and guidelines
- EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- General Programme Instructions (GPI) for the International EPD® VERSION 3
- The International EPD® System Product Category Rules (PCRs) for construction products and construction services version 2012:01 2.31

The goal of the study is the evaluation of the potential environmental impacts of the aluminium billet.

The EPD is mainly addressed to the business-to-business communication. The data elaboration has been performed with the Gabi software, version 9.2.1.68. The database used are the most updated ones implemented in Gabi software. More in detail, main database used is ts, European Aluminium and IAI. The LCIA method used is CML 2001 version 4.2 (April 2013).

### 3.2 DECLARED UNIT

The declared unit is 1 kg of aluminium billet, plus its packaging.

### 3.3 SYSTEM BOUNDARY

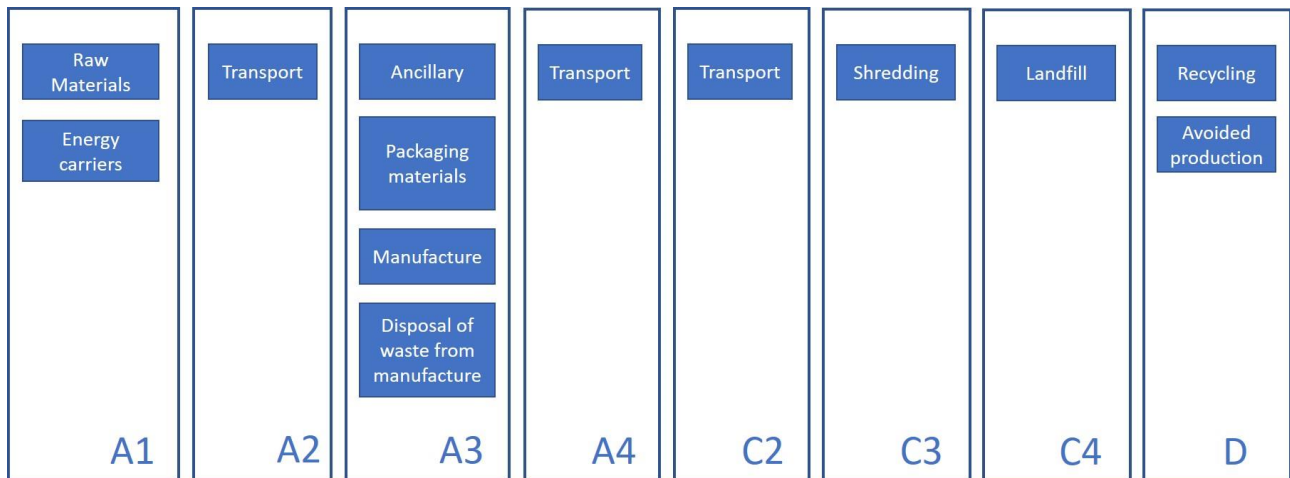
The EPD is a Cradle to Gate with option (as represented in Table 2 and in showed in Figure 2). Modules A5, B1 to B7 and C1 are excluded as they are strongly dependent on the specific application within the reference market.

**Table 2: Life cycle stages included in the study for the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl**

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE	END-OF-LIFE STAGE				BENEFITS and LOADS BEYOND SYSTEM BOUNDARY
A1	A2	A3	A4	A5	B1 to B7	C1	C2	C3	C4	D
Raw Material Supply	Transport	Manufacturing	Transport	Construction/Installation	Use, Maintenance, Repair, Replacement, Refurbishment, Operational energy use, Operational water use	Deconstruction/Demolition	Transport	Waste processing	Disposal	Reuse, Recycling potential
X	X	X	X	Mnd*	Mnd*	Mnd*	X	X	X	X

\* Module Not Declared

**Figure 2: System boundaries for the study of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl**



The following stages are included in the study:

**Raw Materials supply (A1).** Production of raw materials used in the products, of as well as the production of energy carriers used in the production process.

**Transport of raw materials to the factory (A2)**

**Manufacturing of the Hydro aluminium billet (A3).** *It includes the following production phases:*

- Remelting, alloying and casting
- Cutting and homogenization
- Cooling and binding (packaging) for final storage

Moreover, in module A3, the production of primary packaging and of the ancillary materials and the treatment of waste generated from the manufacturing processes are accounted for.

**Transport to the user (A4)**

**Transport from collection to waste processing and disposal site (C2)**

**Waste processing (C3):** shredding

**Disposal (C4):** landfill of material fractions not entering the recycling treatment

**Module D:** transport to recycling treatment site (remelter), remelting process and benefit due to the avoided production of primary aluminium.

The reference year of the study is 2019.

### 3.4 MAIN ASSUMPTIONS, CUT-OFFS, BACKGROUND DATA INFORMATION AND SCENARIOS

#### 3.4.1 DATA QUALITY

Specific data are used for all of Hydro's processes based on the production year 2019. All background data used in the study are from LCI database and are not older than 5 years. Background data on for instance transport and energy production are from thinkstep. In addition, with specific reference to the electricity used in the manufacturing processes, the electricity mix of the specific electricity supplier is used.

#### 3.4.2 ALLOCATION

The allocation is made in accordance with the provisions of EN 15804. Energy and resources (water and ancillary) in input and waste and emissions in output from the foundry are allocated to the billet production based on the mass. The production of primary aluminium included in process scrap is allocated to the main product in which the material is used. The recycling process and transportation of the material is allocated to this analysis.

#### 3.4.3 CUT-OFFS CRITERIA

Raw and packaging materials are fully included as well as the energy for manufacturing. In the same way, all manufacturing waste (including hazardous waste) and air emissions are accounted for.

The construction of the manufacturing site (capital goods) is not included. The modules A5, from B1 to B7, and C1 are excluded as they are dependent of the specific product application.

#### 3.4.4 BACKGROUND DATA INFORMATION

For the majority of the raw materials as well as for the packaging for the finished products a European production is considered. Process scrap is given the impact of primary aluminium ingot consumed in Europe.

Raw materials road transport is assumed on a truck Euro 4 (> 32 t) with an utilisation ratio of 0,61.

#### 3.4.4 SCENARIOS FOR OPTIONAL MODULES

For the transport towards clients an average distance, based on Hydro's clients location, is considered (Table 3).

Table 3: Distance and transport mean considered for module A4

End-of-life – transport information for modules C and D		
Transport mean	Utilisation ratio - %	Distance travelled - km
Diesel truck, Euro IV, > 32 t	61	50

Building sector, as the main reference market, is the economic sector considered for the End-of-life modules. After collection, aluminium is shredded and sorted aluminium is sent to remelting. Materials lost at the collection and waste treatment sites is sent to landfill. Collection and waste processing efficiency are reported in Table 4, whereas Table 5 reports transport information.



Table 4: Applied collection and waste processing efficiency for the End-of-life.

End-of-life - collection and processing efficiency	
Collection efficiency - %	
Aluminium collected	96
Aluminium lost at the collection site	4
Processing efficiency (shredding) - %	
Aluminium sent to recycling after shredding	95
Aluminium lost in the shredding	5

Table 5: Distance and transport means applied for the End-of-life

End-of-life – transport information for modules C and D		
Transport mean	Utilisation ratio - %	Distance travelled - km
<b>Materials not collected and sent to landfill (module C2)</b>		
Diesel truck, Euro IV, > 32 t	0,61	50
<b>Material collected and sent to waste processing (module C2)</b>		
Diesel truck, Euro IV, > 32 t	0,61	200*
<b>Materials from waste processing to remelter (module D)</b>		
Diesel truck, Euro IV, > 32 t	0,61	200

\*no additional transport is assumed for material which is landfilled after waste processing.

Module D environmental impacts address burden and benefit from net output flows leaving the product system, i.e. from flows leaving the product system, lowered of the recycled content % initially included in the product. The primary aluminium ingot consumed in Europe is considered for the accounting of benefits from remelted aluminium.

### 3.5 PARAMETERS DESCRIBING THE ENVIRONMENTAL IMPACT

Table 6: Environmental profile of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl

Impact category	A1-A3	A4	C2	C3	C4	D
<b>Abiotic Depletion (ADP fossil) [MJ]</b>	9,06E+01	3,68E-01	1,74E-01	2,20E-01	1,83E-02	-7,51E+01
<b>Abiotic Depletion (ADP elements) [kg Sb-Equiv.]</b>	2,18E-06	1,93E-09	9,10E-10	6,09E-09	1,30E-10	-8,00E-07
<b>Acidification Potential (AP) [kg SO2-Equiv.]</b>	4,27E-02	1,14E-04	5,37E-05	5,25E-05	7,78E-06	-3,42E-02
<b>Eutrophication Potential (EP) [kg Phosphate-Equiv.]</b>	2,80E-03	2,86E-05	1,35E-05	5,27E-06	8,80E-07	-1,86E-03
<b>Global Warming Potential (GWP 100 years) [kg CO2-Equiv.]*</b>	8,41E+00	2,69E-02	1,27E-02	2,05E-02	1,31E-03	-7,01E+00
<b>Ozone Layer Depletion Potential (ODP, steady state) [kg R11-Equiv.]</b>	2,96E-10	4,49E-18	2,11E-18	5,77E-16	7,62E-18	3,10E-12
<b>Photochem. Ozone Creation Potential (POCP) [kg Ethene-Equiv.]</b>	2,29E-03	-4,25E-05	-2,00E-05	3,67E-06	6,02E-07	-1,90E-03

\* In compliance to the applied LCIA method, the Global Warming Potential also includes biogenic emissions.

### 3.6 INDICATORS OF RESOURCES USE

Table 7: Indicators of resources of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl

Indicator of resources	A1-A3	A4	C2	C3	C4	D
<i>Use of non renewable secondary fuels (NRSF) [MJ]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Use of renewable secondary fuels (RSF) [MJ]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Use of net fresh water (FW) [m3]</i>	1,38E-01	4,48E-04	2,11E-04	4,06E-04	1,48E-05	-1,15E-01
<i>Non-renewable primary energy resources used as raw materials (PENRM) [MJ]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials [MJ]</i>	1,04E+02	3,70E-01	1,74E-01	3,70E-01	1,90E-02	-8,98E+01
<i>Total use of non-renewable primary energy resources (PENRT) [MJ]</i>	1,04E+02	3,70E-01	1,74E-01	3,70E-01	1,90E-02	-8,98E+01
<i>Renewable primary energy resources used as raw materials [MJ]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Use of renewable primary energy resources excluding renewable primary energy resources used as raw materials [MJ]</i>	4,92E+01	2,14E-02	1,01E-02	1,49E-01	1,49E-01	-4,09E+01
<i>Total use of renewable primary energy resources (PERT) [MJ]</i>	4,92E+01	2,14E-02	1,01E-02	1,49E-01	1,49E-01	-4,09E+01
<i>Use of secondary materials [kg]</i>	8,49E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

### 3.7 INDICATORS OF WASTE AND OUTPUT FLOWS

Table 8: Indicators of waste of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl

Indicator of waste	A1-A3	A4	C2	C3	C4	D
<i>Hazardous waste disposed (HWD) [kg]</i>	9,50E-08	2,07E-08	9,73E-09	1,78E-10	3,23E-10	-6,05E-08
<i>Non-hazardous waste disposed (NHWD) [kg]</i>	2,52E+00	3,01E-05	1,42E-05	0,000271	0,088123	-2,12258
<i>Radioactive waste disposed (RWD) [kg]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Table 9: Indicators of output flows of the aluminium billet produced in Atessa by Hydro Building Systems Atessa srl

Indicator of output flows	A1-A3	A4	C2	C3	C4	D
<i>Exported electrical energy (EEE) [M]</i>	8,67E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Exported thermal energy (EET) [M]</i>	1,57E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Materials for Recycling (MFR) [kg]</i>	1,72E-04	0,00E+00	0,00E+00	9,12E-01	0,00E+00	8,94E-01
<i>Components for reuse [kg]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Materials for Energy Recovery [kg]</i>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## 4 REFERENCE

EC-JRC, 2010. International reference Life Cycle data System Handbook. General Guidance for life cycle assessment. Detailed Guidance

Ecoinnovazione, 2020. Technical report: LCA study of aluminium billets produced by Hydro Building System Atessa srl

EN 15804:2012+A1:2013 “Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”

International EPD® System, 2018. General Programme Instructions for the International EPD System, vers. 3

International EPD® System, 2012. PCR 2012:01 Construction products and construction services, version 2.31

International Organisation for Standardization (ISO), 2006a Environmental management – Life Cycle assessment – Principles and framework. ISO 14040:2006, Geneva

International Organisation for Standardization (ISO), 2017 Environmental management – Life Cycle assessment – Requirements and guidelines. ISO 14040:2006/Amd 1:2017 Geneva

International Organisation for Standardization (ISO), 2006c Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures. ISO 14025:2006, Geneva

## 5 GLOSSARY

**ENVIRONMENTAL IMPACT:** Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects [ISO 14001:2015].

**ENVIRONMENTAL DECLARATION:** Claim which indicates the environmental aspects of a product or service. An environmental label or declaration may take the form of a statement, symbol or graphic on a product or package label, in product literature, in technical bulletins, in advertising or in publicity, amongst other things. [ISO 14020:2000].

**IMPACT CATEGORY:** Class representing environmental issues of concern to which life cycle inventory analysis results may be assigned [ISO 14040:2006]

**LIFE CYCLE ASSESSMENT (LCA):** Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle [ISO 14040:2006]

**PRODUCT CATEGORY RULES (PCR):** Set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more product categories [ISO 14025:2006].

**RAW MATERIAL:** Primary or secondary material that is used to produce a product. Secondary material includes recycled material. [ISO 14040:2006]

**RECOVERED (RECLAIMED) MATERIAL:** Material that would have otherwise been disposed of as waste or used for energy recovery, but has instead been collected and recovered (reclaimed) as a material input, in lieu of new primary material, for a recycling or a manufacturing process. [ISO 14021:2016].

**SYSTEM BOUNDARY:** Set of criteria specifying which unit processes are part of a product system [ISO 14040:2006].

**SVHC:** Substances that may have serious and often irreversible effects on human health and the environment can be identified as substances of very high concern (SVHCs). If a substance is identified as an SVHC, it will be added to the Candidate List for eventual inclusion in the Authorization List of the REACH Regulation). The inclusion in this list implicates legal duties for manufacturers, importers o companies, which use those substances as such, in formulation or in their products.

## 6 ADDITIONAL INFORMATION

### 6.1 ADDITIONAL INFORMATION CONCERNING THE PROGRAMME AND THE EPD

EPDs within the same product category but from different programme may not be comparable.

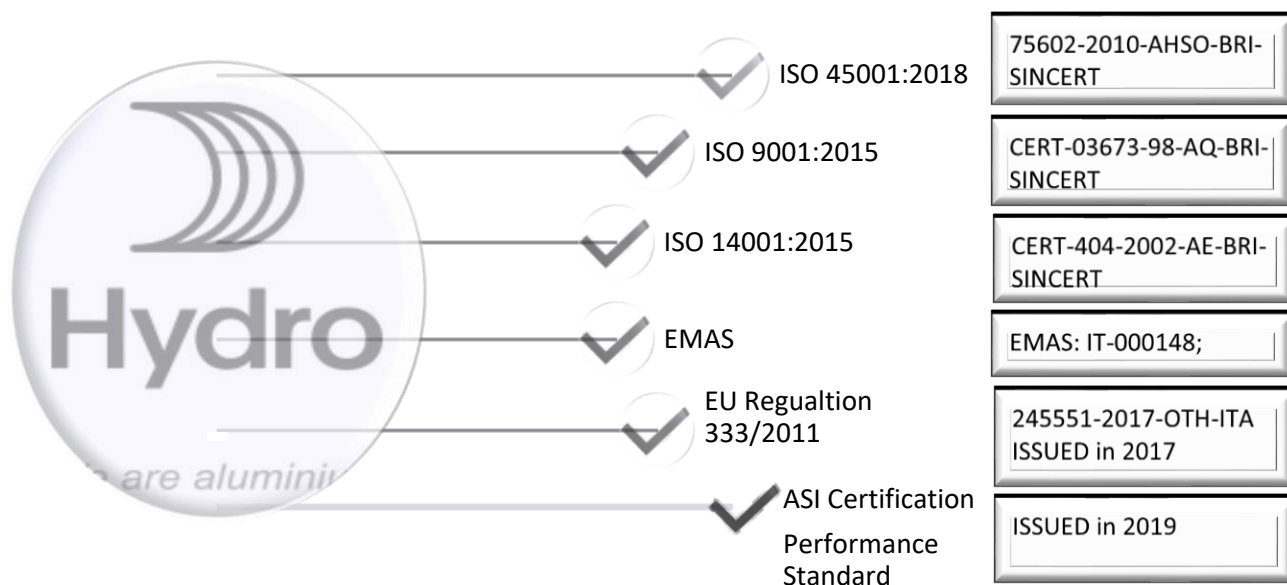
EPDs of construction products may not be comparable if they do not comply with EN 15804. Environmental product declarations within the same product category from different programs may not be comparable. This EPD and the PCR CPC 54 “Construction products and Construction services” are available on the website of The International EPD® System ([www.environdec.com](http://www.environdec.com)).

The verifier and the Programme Operator do not make any claim nor have any responsibility of the legality of the products included in the present EPD.

The LCA study and the present EPD have been issued with the technical scientific support of Ecoinnovazione S.r.l., spin-off ENEA (<http://ecoinnovazione.it/?lang=en>).

### 6.2 ADDITIONAL INFORMATION ON THE PRODUCT AND ON THE COMPANY

Aluminium billet covered by the present EPD are produced in Atesa. The management and production system of the plant is certified in compliance to:



For further information on product characteristics, typical applications, technical datasheet and case histories, please visit our website [www.hydro.com](http://www.hydro.com) or contact us to [hydro.atessa@pechydrosystems.it](mailto:hydro.atessa@pechydrosystems.it)

## 7 VERIFICATION AND REGISTRATION

CEN standard EN 15804 served as core PCR	
<b>EPD Programme:</b>	The International EPD® System For more information – <a href="http://www.environdec.it">www.environdec.it</a>
<b>PCR:</b>	PCR 2012:01 Construction products and construction services version 2.31
<b>PCR review was conducted by:</b>	The Technical Committee of the International EPD® System. Chair of the TC: Massimo Marino Contact: <a href="mailto:info@environdec.com">info@environdec.com</a>
<b>EPD Registration n°:</b>	S-P-02089
<b>EPD validity:</b>	5 years
<b>EPD valid within the following geographical area:</b>	Global
<b>Technical support:</b>	Ecoinnovazione S.r.l. – spin-off ENEA Via d'Azeglio 51, 40123 Bologna  ecoinnovazione spin off ENEA <a href="http://www.ecoinnovazione.it">www.ecoinnovazione.it</a>
<b>Independent verification of the declaration and data according to ISO 14025:</b>	EPD verification (external)
<b>Third party verifier:</b>	DNV GL Business Assurance Italia S.r.l. Via Energy Park, 14, 20871 Vimercate (MB), Italy. Tel: 039 68 99 905.  <a href="http://www.dnvgl.it/businessassurance">www.dnvgl.it/businessassurance</a>
<b>Accredited by:</b>	ACCREDIA (Registration number 008H rev.01)