

## ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Hydro Aluminium AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1841-768-EN
Registration number:	NEPD-1841-768-EN
ECO Platform reference number:	-
Issue date:	05.08.2019
Valid to:	05.08.2024

### Hydro 75R Aluminium Extrusion Ingot

Hydro Aluminium AS



[www.epd-norge.no](http://www.epd-norge.no)



## General information

**Product:**

Hydro 75R Aluminium Extrusion Ingot

**Program operator:**

 The Norwegian EPD Foundation  
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**Declaration number:**

NEPD-1841-768-EN

**ECO Platform reference number:**
**This declaration is based on Product Category Rules:**

 CEN Standard EN 15804 serves as core PCR.  
 PCR NPCR 013 version 3.0 Part B for steel and aluminium construction products.

**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.

**Declared unit:**

1 kg of aluminium extrusion ingot produced according to the 75R certification.

**Declared unit with option:**

1 kg of aluminium extrusion ingot produced according to the 75R certification with 80% post consumer scrap or more, including waste handling and potential environmental benefits beyond the system boundaries.

**Functional unit:**

The product is an input to several different building products and no use scenarios are defined, hence no functional unit.

**Verification:**

The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

 internal  external

Third party verifier:



 Jane Anderson, ConstructionLCA Limited  
 (Independent verifier approved by EPD Norway)

**Owner of the declaration:**

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**Place of production:**

Hydro Clervaux, Luxembourg

**Management system:**

ISO 14001, ISO 50001

**Organisation no:**

917,537,534

**Issue date:**

05.08.2019

**Valid to:**

05.08.2024

**Year of study:**

 2019  
 Data from Clervaux resmelter: 2017.  
 Material composition 75R: 2018.

**Comparability:**

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

**The EPD has been worked out by:**

Kari-Anne Lyng, Irmeline de Sadeleer, and Andreas Brekke



 PhD Kari-Anne Lyng  Østfoldforskning

Approved



 Håkon Hauan  
 Managing Director of EPD-Norway

## Product

### Product description:

This EPD covers the Aluminium under the brand of 75R. 75R contains a minimum of 75% post-consumer scrap, but in practice the share of post-consumer scrap is more than 80%, and this EPD is valid for extrusion ingots containing more than 80% post-consumer scrap. When guaranteeing more than 75% recycled content, we exclusively refer to aluminium that has reached its end of life as a product in use and brought back into the loop. The products are produced in a certified value chain. The production process is fully traceable and the product is certified by an independent third party.

### Technical data:

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/)

### Market:

Europe.  
Building and Construction, Automotive and Transport,  
Consumer Goods, General Engineering and Solar.

### Product specification\*:

Materials	kg	%
Post-consumer scrap	0.821	82.1
External Coldmetal	0.179	17.9%

\*average composition in 2018.

Name	Typical Values 6xxx alloys	Unit
Density	2.66-2.71	(kg/m <sup>3</sup> ) x 10 <sup>3</sup>
Melting point (Typical)	575-655	°C
Electrical conductivity (Typical) at 20°C/at 68°F	Equal Volume: 22-36	MS/m (0.58%ACS)
Thermal conductivity (Typical) at 25°C/at 77°F	130-220	W/(m.K)
Average Coefficient of thermal expansion (Typical) 20° to 100°c /68° to 212°F	19.4-24.1	per °C
Modulus of elasticity (Typical)	69-72	MPa * 10 <sup>3</sup>
Chemical composition	Varying alloy by alloy, most case Al > 98	% by mass

### Reference service life, product:

Dependent on product application, but the material itself has an infinite life time.

### Reference service life, building:

Dependent on product application, but the material itself has an infinite life time.

## LCA: Calculation rules

### Declared unit with option:

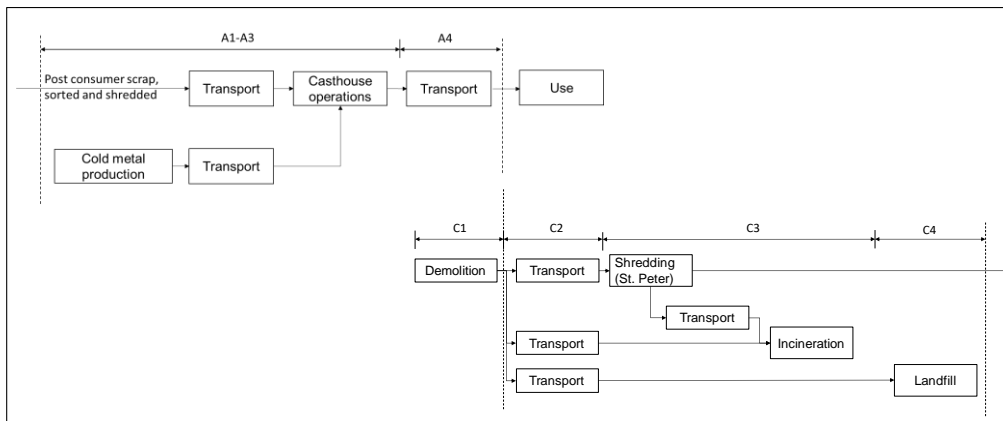
1 kg of aluminium extrusion ingot produced according to the 75R certification with 80% post consumer scrap or more. The EPD also covers A4, C2-C4 and module D.

75R is produced at Clervaux remelter.

### System boundary:

Cradle to gate with options. The value chain includes transport of shredded, post consumer scrap to Clervaux, production and transport of cold metal (Iceland and Mozambique) and melting. In addition modules A4, C2-C4, and D are reported.

Figure 1 Flow chart of A1-A4 and C1-C4.



### Data quality:

Specific data are used for all of Hydro's processes based on the production year 2017. As Hydro have ownership in a total value chain from mining of bauxite to production of aluminium extrusion ingots, and also on post consumer scrap handling and remelting, all stages from A1 to A4 are covered by specific data. Background data on for instance transport and electricity production are from ecoinvent 3.4 (April 2018).

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. 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 allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

## LCA: Scenarios and additional technical information

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

The transport from production sites to market is assumed to be the distance from the Clervaux smelter to a location in central Europe. Stuttgart is chosen as a proxy for central Europe.

### Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Truck	50	Lorry, >32 metric tons, Euro V	400	2.46E-02   l/tkm

Most of the aluminium used for construction purposes is collected (approximately 96%) and recycled (approximately 97% of the collected aluminium), meaning that 93% of the initial material is recycled. The aluminium is transported to a material processing site where different materials, including metals are sorted. Aluminium is sent to remelting.

### End of Life (C2, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	-
Collected as mixed construction waste	kg	0.96
Reuse	kg	-
Recycling	kg	0.93
Energy recovery	kg	0.027*
To landfill	kg	0.04**

\* 27 grams of the original material is lost in the recycling process and sent to incineration. No loads or benefits are included for this material flow

\*\* There will be a small portion of extruded aluminium ending as aggregate at the construction site. This is included under "energy recovery" where no loads or benefits are included.

### Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Truck	50	Lorry, 16-32 metric tons, Euro IV	50	2.46E-02   l/tkm

Aluminium from construction site to waste handling site is assumed to be transported in an older medium-sized lorry with smaller capacity utilization than in the production system.

**Benefits and loads beyond the system boundaries (D)**

	Unit	Value
Aluminium extrusion ingot to material recycling	g	112

Aluminium collected and recycled is assumed to replace an average extrusion ingot in Europe consisting of 40% recycled and 60% primary aluminium. This is a conservative approach. The original content of recycled aluminium in the 75R extrusion ingot have been subtracted before the calculation to avoid double counting of benefits.

**LCA: Results**

All results are calculated with the use of SimaPro v.9 (2019) and impact methods according to ISO 15804.

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

Product stage			Assembly stage		Use stage								End of life stage			Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Retubishment	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X

**Environmental impact**

Parameter	Unit	A1-A3	A4	C2	C3	C4	D
GWP	kg CO <sub>2</sub> -eqv	2.33E+00	3.60E-02	7.85E-03	2.50E-01	0.00E+00	-5.90E-01
ODP	kg CFC11-eqv	1.25E-07	6.90E-09	1.46E-09	9.72E-09	0.00E+00	-3.61E-08
POCP	kg C <sub>2</sub> H <sub>4</sub> -eqv	1.15E-03	5.88E-06	1.30E-06	3.07E-05	0.00E+00	-3.17E-04
AP	kg SO <sub>2</sub> -eqv	1.89E-02	1.19E-04	3.08E-05	7.04E-04	0.00E+00	-3.76E-03
EP	kg PO <sub>4</sub> <sup>3-</sup> -eqv	1.28E-03	1.97E-05	5.52E-06	1.61E-04	0.00E+00	-1.96E-04
ADPM	kg Sb-eqv	8.40E-06	6.73E-08	2.37E-08	1.66E-06	0.00E+00	-1.47E-06
ADPE	MJ	4.87E+01	5.66E-01	1.20E-01	1.34E+00	0.00E+00	-5.71E+00

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Resource use							
Parameter	Unit	A1-A3	A4	C2	C3	C4	D
RPEE	MJ	7.76E+00	5.75E-03	1.20E-03	1.73E-01	0.00E+00	-2.78E+00
RPEM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	7.76E+00	5.75E-03	1.20E-03	1.73E-01	0.00E+00	-2.78E+00
NRPE	MJ	2.55E+01	5.75E-01	1.22E-01	1.54E+00	0.00E+00	-6.94E+00
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	2.55E+01	5.75E-01	1.22E-01	1.54E+00	0.00E+00	-6.94E+00
SM	kg	8.21E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m <sup>3</sup>	8.78E-03	1.34E-04	2.28E-05	7.44E-04	0.00E+00	-5.28E-03

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE 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; W Use of net fresh water

End of life - Waste							
Parameter	Unit	A1-A3	A4	C2	C3	C4	D
HW	kg	9.12E-04	3.33E-07	7.68E-08	6.17E-03	0.00E+00	5.95E-04
NHW	kg	1.11E+00	5.20E-02	6.42E-03	1.17E+00	4.00E-02	-3.01E-01
RW	kg	4.82E-05	3.89E-06	8.19E-07	4.85E-06	0.00E+00	-2.74E-05

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow							
Parameter	Unit	A1-A3	A4	C2	C3	C4	D
CR	kg	-	-	-	-	-	-
MR	kg	-	-	9.60E-01	9.33E-01	-	1.12E-01
MER	kg	-	-	-	2.70E-02	-	-
EEE	MJ	-	-	-	-	-	-
ETE	MJ	-	-	-	-	-	-

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009

## Additional Norwegian requirements

### Greenhouse gas emission 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) for Luxembourg is applied for electricity use for the manufacturing process - Clervaux remelter (A3).

Data source	Amount	Unit
ecoinvent v3.4 (April 2018)	0.6	kg CO <sub>2</sub> -eq/kWh

### Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiten, Annex III), see table.

Name	CAS no.	Amount

**Indoor environment**

Not relevant





**Carbon footprint**

Carbon footprint has not been worked out for the product.

**Bibliography**

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
NPCR 013	<i>NPCR 013 version 3.0 Part B for steel and aluminium construction products.</i>
Sadeleer, I., Brekke, A. and Lyng, Kari-Anne (2019)	<i>Background report for the Environmental Product Declarations for: Hydro Extrusion Ingot 4.0, Hydro Extrusion Ingot Europe and Hydro Extrusion Ingot 75R.</i>

&lt;Other references&gt;

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