Environmental Product Declaration

In accordance with ISO 14025 for:

Extrusion Press ESS (Energy Saving System)

[®]EPD[®]

from

Presezzi Extrusion



Programme:	The International EPD [®] System, <u>www.environdec.com</u>
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Programme information

	The International EPD [®] System
Programme:	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: Presses for working metal, UN CPC 44217 under review

PCR review was conducted by: PCR under development Contact: www.environdec.com - info@environdec.com

Life Cycle Assessment (LCA)

LCA accountability: Life Cycle Assessment (LCA) of Presezzi Extrusion's products, Studio Fieschi & soci

Third-party verification

Independent third-party review and certification of the declaration and data, according to ISO 14040-44 and ISO 14025:2006, via:

EPD pre-certification 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

This is a pre-certified EPD developed in compliance with the requirements outlined in section 6.1.1 of the GPI 4.0.





Company information

<u>Owner of the EPD:</u> Presezzi Extrusion S.p.A. Via Rovereto, 1/d 20871 Vimercate (MB) – Italy

<u>Contacts:</u> Lodovico Taddia EPD Project Coordinator taddia.lugano@presezziextrusion.com

Description of the organisation:

Presezzi Extrusion S.p.A. was founded in 1994 as a company initially specialized in the production of extrusion presses and for revamping activities on pre-existing plants.

The first important corporate evolution took place in 2013 with the acquisition and merger with Profile Automation S.r.I. of Castelbelforte (MN), a company dedicated to the production of extrusion handling systems. This operation thus allowed the Presezzi Extrusion Group with headquarters in Vimercate (Province of Monza and Brianza, Northern Italy) to be set up, together with Coim S.r.I of Castelcovati, specialized in the production of gas furnaces for log and billet heating (an upstream component of the press for complete plants). Through this expansion process, the Group has achieved the ambitious goal of obtaining the complete control of the entire production cycle for extruded aluminum, copper and brass profiles.

Apart from efficiency and technology, the group also pays great attention to the environment and the reduction in energy consumption which has been available since 2009 thanks to the sale of the first extrusion press equipped with the Energy Saving System (with the installation of low energy consumption hydraulic pumps), while in 2015 there was the sale of the first Z.P.E. (Zero Pollution Energy), magnetic heating furnace for billets. The growth of the Group did not stop there, and it is above all in the years between 2019 and 2021 that its greatest milestones were reached thanks to achieving the record of the sale and installation of 200 presses and 200 gas billet heating ovens worldwide. Today, the Presezzi Group is an international leader in the design, production, and marketing of complete plants for the extrusion of non-ferrous metals such as aluminum, copper and brass and looks forward to achieving further important successes in the future as well as being determined to face and overcome any future challenges the market presents.

Product-related or management system-related certifications:

Presezzi has implemented and certified ISO 9001:2015 "Quality Management System" and ISO 45001:2018 "Occupational health and safety management systems".

Name and location of production site: Via Rovereto, 1/d 20871 Vimercate (MB) – Italy





Product information

Product name: Extrusion Press ESS Front loading 40 MN

Product identification:

Extrusion Press with energy saving system for non-ferrous metals

Product description:

The press is used for the production of non-ferrous metals extrusions. These are obtained by exerting pressure on the incoming material through a die having the desired profile cross-section.

Commercial name	Extrusion Press ESS Front loading 40 MN for aluminium, copper, and brass
Type of metal working	Extrusion
Type of metal worked	Aluminium, Copper, Brass
Nominal extrusion force	40 MN
Billet diameter	10"
Max billet length	1 500 mm
Size and dimension	21 980 (length) x 9 230 (width) x 7 445 (height) mm
Weight	292 t
Energy consumption	90 kWh/t (116 kWh/t according to field tests ¹)
Productivity	4 t/h (input material)
Foreseen production	10 000 t/year (input material)
Installed Power	993 kW
Processing material(s) consumption	Grease 50 kg/year Lubricant 400 kg/year
Refrigerating fluid type and consumption	Water (recirculating) 24 m ³ /h

The macro-components of ESS in its standard configuration are:

- Main cylinder with Prefill valve
- Die Platen
- Cases, tie rods and nuts
- Moving crosshead
- Container housing
- Shear
- Die change device (Unistation)
- Billet loader
- Side cylinders
- Container shifting cylinder
- Electrical onboard material
- Hydraulic system (pumps, etc.)

¹ Average value of test results measuring the actual energy consumption of the ESS press according to different operational parameters (type of production, billet length, billet weight)





- Service tooling
- Frame electrical cabinet
- Booster pump
- Butt end chute
- Power and trucks
- Mouth protection
- Billet pusher
- Pneumatic system
- Lubrication system grease
- Container heating
- Cooling system
- Tank, manifolds, filter, booster pump, pipes
- Pneumatic cylinder
- Lubrication system Extrolub
- Die cooling system
- Computer and software

UN CPC code:

44217 Machine-tools for working metal by forging, hammering or die-stamping; machine-tools for working metal by bending, folding, straightening, flattening, shearing, punching or notching; other presses for working metal or metal carbide.

Geographical scope: Global

The product performance has been modelled based on Presezzi market distribution.





LCA information

<u>Functional unit</u>: The extrusion of aluminium billets of 10" diameter and 1500 mm maximum length through an extrusion force of 40 MN at nominal operating conditions.

Reference service life (RSL): 30 years.

Time representativeness: 2021

Database used: Ecoinvent 3.8

LCA software used: Simapro 9.1

LCA practitioner: Studio Fieschi & soci Srl C.so Vittorio Emanuele II, 18 10123 Torino, IT www.studiofieschi.it

Description of system boundaries:

The type of EPD adopted for the products under study is **cradle-to-grave**. This LCA and the associated EPD therefore include the following information modules:

Upstream:

- extraction and production of raw material for all main parts and components;
- recycling processes of secondary materials from other product life cycles;
- secondary processing of material for main parts and components;
- transportation of raw material and components;
- 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 Presezzi manufacturing site;
- external transportation from Presezzi manufacturing site (e.g. wastes to the landfills);
- internal transports within the manufacturing plant;
- production of auxiliary materials;
- manufacturing process for main parts and components (assembly, welding, painting);
- testing of the product including the energy and materials used;
- waste treatment of waste generated during manufacturing of machine;
- preparation of the final product;
- production of fuels, steam and other energy carriers used in core processes.

Downstream:

- transportation of ESS press to user,
- installation of ESS press 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.),
- lifetime operation of the product including energy and material consumptions and emissions;
- ordinary maintenance during RSL;
- disassembling of the product;
- end-of-life of the used product after use phase and final disassembly;
- end-of-life of packaging.

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;

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- The basement on which ESS press is installed;
- The press under analysis is not expected to be refurbished within the RSL above declared. Possible revamping activities occurring after the RSL are not included.





System diagram:





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<u>Upstream</u>

Upstream processes include the production of the components involved in the manufacturing of the Press 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 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.

<u>Core</u>

The Core phase comprises the transport of the components from the suppliers to Presezzi's plant and the manufacturing process of the Press. Primary data about supplier's location has been used for components representing at least the 80% of the total weight. For components representing the remaining 20% of the total weight of the machines, a distance of 200 km by truck was assumed. Data related to the inputs (energy consumption, chemicals etc.) as well as outputs (air emissions, water emissions etc.) of the plant are primary data provided by Presezzi's staff.

The electricity used is supplied from the grid. The fuel mix declared by the supplier is the following:

- Renewables: 23,41%
- Coal: 8,73%
- Natural gas: 59,33%
- Oil: 0,65%
- Nuclear: 4,19%
- Other sources: 3,69%

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 Presezzi'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 Presezzi, considering the entire range of machines produced in the reference year. The press is installed at customers' sites and tested by Presezzi staff; it requires the use of forklifts and overhead cranes for positioning of bigger components. During installation lubricants and release agent are filled in the machine, which are refilled every year. Field tests measuring actual energy consumption for a mixture of aluminium alloys were taken into consideration and the energy mix has been modelled according to the market distribution of the whole production in 2019, 2020 and 2021, considering either national residual mix on the market, for countries where this data is available, or national consumption mix on the market. The productivity considers input materials and does not consider possible loss of materials during operation.

So, the energy mix consists of a share of energy produced in each country considered and allocated as follows:

- Renewables: 23,9%. Of which:
 - o Biomass 1,6%
 - o Geothermal 1,0%
 - o Hydro 12%
 - o Solar 2,9%
 - Wind 6,0%
- Coal 27%
- Lignite 8,8%
- Natural gas 28%





- Nuclear 11%
- Oil 1,5%
- Other 0,6%

The use of the machines requires some ordinary maintenance activities during their useful life, thus the components that need to be replaced have been modelled the same way as in the manufacturing stage.

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;
- a standard distance of 50 km by truck was assumed for the transport of waste disposed or recovered.

Cut-off:

Product

Cut-off: excavation of floor for the preparation of trenches for cable and pipe work during installation.

Allocation procedures:

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

Materials	Weight (t)	% on total weight	% recycled content
Steel	259	89%	0%
Cast iron	19	6,5%	0%
Stainless steel	6,6	2,3%	0%
Plastic	3,9	1,3%	0%
Bronze	1,3	0,4%	0%
Copper	0,8	0,3%	0%
Aluminium	0,7	0,2%	0%
Other materials	1,1	<0,5%	0%
Total	292	100%	0%

Content declaration

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 press (t)
Distribution packaging	Pallet, beams, wedges, supports 80% EU - 20% Extra EU	Wood	3,6

Environmental performance

Potential environmental impact

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL	
	Fossi	I	kg CO ₂ eq.	3,99E+00	1,42E-01	8,21E+01	8,63E+01
Global warming	Bioge	enic	kg CO ₂ eq.	1,17E-01	9,11E-04	2,58E-01	3,77E-01
potential (GWP)	Land transf	use and land formation	kg CO ₂ eq.	4,52E-03	2,18E-05	2,28E-01	2,33E-01
	TOTA	AL.	kg CO ₂ eq.	4,11E+00	1,43E-01	8,26E+01	8,69E+01
Depletion potential of the stratospheric ozone layer (ODP)		al of the ne layer	kg CFC 11 eq.	2,94E-07	2,40E-08	3,57E-06	3,88E-06
Acidification potential (AP)		ntial (AP)	kg mol H ⁺ eq.	2,48E-02	6,60E-04	4,44E-01	4,69E-01
Aquatic freshwa		Aquatic freshwater	kg P eq.	2,12E-04	2,10E-06	5,99E-03	6,20E-03
Eutrophicati potential (El	on P)	Aquatic marine	kg N eq.	4,12E-03	1,54E-04	7,18E-02	7,61E-02
		Aquatic terrestrial	mol N eq.	4,35E-02	1,69E-03	8,02E-01	8,47E-01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,20E-02	4,30E-04	2,06E-01	2,19E-01	
Abiotic depletio potential (ADP)	etion	Metals and minerals	kg Sb eq.	2,31E-04	2,70E-07	1,91E-04	4,22E-04
	DP)	Fossil resources	MJ, net calorific value	4,59E+01	2,09E+00	1,08E+03	1,13E+03
Water deprivation potential (WDP)		m ³ world eq.	9,52E-01	5,06E-02	2,16E+01	2,26E+01	

Use of resources

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,56E+01	2,56E-01	1,36E+02	1,52E+02
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00



PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
	TOTAL	MJ, net calorific value	1,56E+01	2,56E-01	1,36E+02	1,52E+02
Primary energy resources – Non- renewable	Use as energy carrier	MJ, net calorific value	4,55E+01	2,09E+00	1,08E+03	1,13E+03
	Used as raw materials	MJ, net calorific value	3,30E-01	0,00E+00	0,00E+00	3,30E-01
	TOTAL	MJ, net calorific value	4,59E+01	2,09E+00	1,08E+03	1,13E+03

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References

General Programme Instructions of the International EPD® System. Version 4.0

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

Draft PCR 44217 Presses for working metal

Studio Fieschi & soci Srl, Life Cycle Assessment (LCA) of of Presezzi Extrusion's products: Extrusion Press (with Energy Saving System), ZPE (Zero Pollution Energy) Permanent Magnet Heater

Ecoinvent 3.8

Eurostat database on waste

International Energy Agency, electricity generation by source

Plastics Europe - Eco-profiles for determining environmental impacts of plastics

