Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Steel Structural circular, square and rectangular hollow sections

from

Arvedi Tubi Acciai Spa

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

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

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.11* *CPC code: 41287 Other tubes and pipes, of circular cross-section, welded, of steel* *41288 Tubes and pipes, of non-circular cross-section, welded, of steel*
PCR review was conducted by: *PCR moderator: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se* *PCR Committee: IVL Swedish Environmental Research Institute* *Secretariat of the International EPD® System*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: *RINA Services S.p.A* *In case of accredited certification bodies:* Accredited by: *Accredia, n. N.001H*
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Arvedi Tubi Acciaio S.p.A.
Contact: sales@ata.arvedi.it

Description of the organisation

Advanced technology, experience consolidated over the years, the constant search for quality, flexibility and customer service, are the strong points of Arvedi Tubi Acciaio S.p.A, a leader in welded tube for special applications.
With a production capacity of over 600,000 tpy, the Cremona-based company holds a considerable share of the market in the automotive, mechanical applications, heat transfer and pressure equipment, piping, industrial and civil constructions.
Its stretch-reducing mill and HFI welding lines, fitted with the most advanced automation technology, allow customer to be offered a vast range of products that can meet the strictest requirements and standards.
ATA's production range meets the requirements of three basic areas of application, namely special, energy and civil engineering and includes round tube and pipe in diameters from 17.2 to 355.6 mm. Square hollow section from 90x90 to 300x300 mm and rectangular hollow section from 100x80 to 400x200 mm in a range of wall thicknesses from 1,2 to 16 mm.

Product-related or management system-related certifications:

Arvedi Tubi Acciaio has a management system certified according to ISO 14001 (environment), ISO 50001 (energy), ISO 9001 & IATF 16949:2016 (quality) and ISO 45001 (health and safety).

Name and location of production site.

The production sites are in Cremona, Italy, Via Acquaviva, 3 & 6 (Zona Porto Canale).

Vista aerea dello stabilimento – Arvedi Tubi Acciaio (ATA)

Product information

Product name

- Steel structural circular hollow sections
- Steel structural square and rectangular hollow sections~~, cold finished and hot finished~~

Product identification and description

Product	Description	Sales markets
Steel structural circular hollow sections	Circular hollow section for structural uses in accordance with EN standards: EN10219-1; EN 10219-2; EN 10210-1; EN 10210-2	Europe, USA
Steel structural square and rectangular hollow sections	Square and rectangular hollow section in accordance with EN standards: EN10219-1; EN 10219-2; EN 10210-1; EN 10210-2	Europe, USA

ARVEDI Hollow sections are also produced according to other international standards and steel grades EN / ASTM / CSA.

ARVEDI hollow sections produced on the base of EN10219-1 & EN10210-1 are covered by CE mark in accordance with Regulation (EU) No. 305/2011; the material certificate and the declaration of performance accompany each supply.
ARVEDI structural circular hollow sections produced on EN10210-1 are DNV GL approved according DNV GL rules for classification – ships & offshore standards.

UN CPC code

• 41287 Other tubes and pipes, of circular cross-section, welded, of steel
• 41288 Tubes and pipes, of non-circular cross-section, welded, of steel

LCA information

Functional unit:

The functional unit is 1 ton of product (structural tubes)

Time representativeness

The reference year of the LCA study is 2020

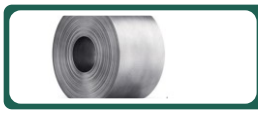
Database and LCA software used

Ecoinvent 3.8 allocation, cut-off by classification, November 2021; Sima Pro 9.3

Description of system boundaries

The system boundaries are: Cradle to gate with options: modules A1-A3 + module A4 + C + D

System diagram



A1 - Production of raw materials and energy
- production of raw materials (steel coils from blast furnace and EAF)
- energy production (electricity, natural gas extraction)

A2 - Transport
- transport of the coils to the plant
- transport of the other raw materials to the plant

A3 - Production
- tube production process; emissions to air, emissions to water, waste generation;
- consumption of auxiliary materials (welding wire, welding plates, technical gases) and maintenance
- production of used packaging

A4 - Transport to the customer
- transport of packaged products to the customer

C1 - Dismantling and demolition

C2 - Transport
- transport of the demolished material to the treatment plants

C3 - Treatment of waste for recycling

C4 - Disposal

D - Potential for recycling, recovery and reuse

This module evaluates the benefits and / or impacts related to the potential recycling of materials at the end of the product's life, according to the requirements of EN 15804

More information

The specific mix of supply coils was also considered for each product (BOF or EAF).
Energy consumption and emissions are specific to each production line and for each product the percentage of production on the various lines has been considered.
For the electricity used in the plant it's used the residual mix according to "Results of the calculation of Residual Mixes for the calendar year 2020".
With regard to transport to the customer, the information required by EN 15804 is explained:

Parameter	Unit	Value
Means used	n.a.	articulated lorry, euro 5 + ship
Distance to customer *(It is the weighted average distance, considering all the sales markets)*	km	**Product** / **lorry** / **ship** tubes / 815 / 22 square and rectangular hollow sections / 991 / 183
Percentage of use	%	In 2020, 97% of transport was optimized for weight
Density of the transported product	g/ml	Variable according to the section

End of life scenario

The end of life was modelled on the basis of the end-of-life data of the construction products of the states that contribute at least 5% to the sales of the two products. They have all been located within the EU.
Module C1: the consumption of diesel for demolition operations was assumed from “Waste bulk iron process, excluding reinforcement {RER} | treatment of “sorting plant”
Module C2: a transport distance to a treatment centre of 50 km was assumed
Module C3: a recycling rate of 92% was used, deriving from the average recycling percentage weighed on the sales of the various countries - Eurostat data for demolition waste in Europe in 2018.
Module C4: a landfill rate of 8% was assumed, a percentage indicated by Eurostat for demolition waste in Europe, calculated as in the previous point.
Module D: the advantage is considered as the difference between the impacts of a blast furnace, in which virgin minerals are used, and a second smelting steel plant.
In the calculation of the environmental advantage, the melting yield is considered and the content of recycled material already present in the purchased coils is separated, as per module D of EN 15804.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	RoW	EU	IT	RoW									EU	EU	EU	EU	
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	n.a.					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Steel structural circular hollow sections

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Carbon steel	1000	53% *	0%
TOTAL	1000		
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Straps, seals and steel wire rods	2,8	0,3%	
Polyester bands	0,3	0,03%	
TOTAL	3,1		

* the data derives from the recycled content in the used process of Ecoinvent 3.8 database. Only for steel from Acciaierie Arvedi the data in the relative EMAS declaration were used.

Steel structural square and rectangular hollow sections

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Carbon steel	1000	47%*	0%
TOTAL	1000		
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Straps, seals and steel wire rods	2,3	0,2%	
Polyester bands	0,2	0,02%	
TOTAL	2,5		

* the data derives from the recycled content in the used process of Ecoinvent 3.8 database. Only for steel from Acciaierie Arvedi the data in the relative EMAS declaration were used.

The products don’t contain dangerous substances from the candidate list of SVHC for Authorisation in quantity greater than 0,1%.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Steel structural circular hollow sections

Results per functional or declared unit (1 t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1599	14	18	1631	74	4	5	23	0	-407
GWP-biogenic	kg CO_2 eq.	7	0	0	7	0	0	0	0	0	4
GWP-luluc	kg CO_2 eq.	1	0	0	1	0	0	0	0	0	0
GWP-total	kg CO_2 eq.	1607	14	18	1639	74	4	5	23	0	-404
ODP	kg CFC 11 eq.	1,18E-04	2,73E-06	5,65E-06	1,26E-04	1,78E-05	7,2E-07	1,08E-06	3,05E-06	1,7E-07	-1,4E-05
AP	mol H^+ eq.	6,17	0,17	0,06	6,40	0,32	0,02	0,02	0,27	0,00	-1,22
EP-freshwater	kg PO_4^{3-} eq.	1,84	0,01	0,02	1,87	0,01	0,00	0,00	0,04	0,00	-0,55
EP-freshwater	kg P eq.	0,600	0,002	0,006	0,608	0,005	0,001	0,000	0,015	0,000	-0,178
EP-marine	kg N eq.	1,35	0,05	0,03	1,43	0,10	0,01	0,01	0,06	0,00	-0,32
EP-terrestrial	mol N eq.	14,4	0,5	0,1	15,0	1,1	0,1	0,1	0,7	0,0	-3,5
POCP	kg NMVOC eq.	6,64	0,14	0,05	6,83	0,34	0,02	0,02	0,19	0,00	-2,25
ADP-minerals&metals*	kg Sb eq.	4,23E-03	3,60E-05	1,87E-04	4,45E-03	1,70E-04	2,02E-05	1,04E-05	2,72E-03	9,61E-07	8,69E-04
ADP-fossil*	MJ	17992	198	161	18351	1159	66	71	317	12	-3217
WDP	m^3	372	1	9	382	4	0	0	4	1	-31
Acronyms	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										

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Steel structural square and rectangular hollow sections

Results per functional or declared unit (1 t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1742	25	30	1797	92	4	5	23	0	-470
GWP-biogenic	kg CO_2 eq.	4	0	0	4	0	0	0	0	0	4
GWP-luluc	kg CO_2 eq.	1	0	0	1	0	0	0	0	0	0
GWP-total	kg CO_2 eq.	1747	25	30	1802	92	4	5	23	0	-466
ODP	kg CFC 11 eq.	1,13E-04	4,86E-06	4,58E-06	1,22E-04	2,19E-05	7,2E-07	1,08E-06	3,05E-06	1,7E-07	-1,6E-05
AP	mol H^+ eq.	6,76	0,31	0,05	7,12	0,43	0,02	0,02	0,27	0,00	-1,41
EP-freshwater	kg PO_4^{3-} eq.	2,22	0,01	0,01	2,24	0,02	0,00	0,00	0,04	0,00	-0,63
EP-freshwater	kg P eq.	0,724	0,004	0,004	0,732	0,006	0,001	0,000	0,015	0,000	-0,206
EP-marine	kg N eq.	1,51	0,09	0,03	1,63	0,13	0,01	0,01	0,06	0,00	-0,37
EP-terrestrial	mol N eq.	15,9	0,9	0,1	16,9	1,4	0,1	0,1	0,7	0,0	-4,0
POCP	kg NMVOC eq.	7,53	0,26	0,04	7,83	0,44	0,02	0,02	0,19	0,00	-2,59
ADP-minerals&metals*	kg Sb eq.	4,02E-03	7,05E-05	1,29E-04	4,22E-03	2,09E-04	2,02E-05	1,04E-05	2,72E-03	9,61E-07	1,00E-03
ADP-fossil*	MJ	19158	364	136	19658	1428	66	71	317	12	-3712
WDP	m^3	537	2	8	547	5	0	0	4	1	-36
Acronyms	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										

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Potential environmental impact – additional mandatory and voluntary indicators

Steel structural circular hollow sections

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	1546	13	18	1578	74	4	5	23	0	-385
PM	Disease incidence	9,72E-05	1,17E-06	8,13E-07	9,92E-05	8,73E-06	3,62E-07	5,34E-07	3,67E-06	7,98E-08	-2,15E-05
IRP	kBq U235 eq.	93,9	1,4	0,8	96,1	5,9	0,8	0,4	3,3	0,1	30,5
ETP-fw	CTUe	36732	157	720	37609	905	52	55	1164	7	-12641
HTP-c	CTUh	2,61E-05	7,96E-09	6,73E-08	2,62E-05	2,51E-08	2,64E-09	1,53E-09	3,93E-08	1,89E-10	5,78E-06
HTP-nc	CTUh	3,40E-05	1,50E-07	4,04E-07	3,46E-05	9,92E-07	5,58E-08	6,06E-08	1,72E-06	4,92E-09	-7,48E-06
SQP	dimensionless	4300	157	47	4504	1323	57	81	586	25	-424

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[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Steel structural square and rectangular hollow sections

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	1682	25	30	1737	91	4	5	23	0	-444
PM	Disease incidence	1,15E-04	2,14E-06	6,40E-07	1,18E-04	1,07E-05	3,62E-07	5,34E-07	3,67E-06	7,98E-08	-2,48E-05
IRP	kBq U235 eq.	89,5	2,7	0,7	92,8	7,2	0,8	0,4	3,3	0,1	35,2
ETP-fw	CTUe	42036	295	613	42945	1112	52	55	1164	7	-14586
HTP-c	CTUh	2,25E-05	1,56E-08	5,18E-08	2,25E-05	3,14E-08	2,64E-09	1,53E-09	3,93E-08	1,89E-10	6,67E-06
HTP-nc	CTUh	3,62E-05	2,81E-07	3,25E-07	3,68E-05	1,21E-06	5,58E-08	6,06E-08	1,72E-06	4,92E-09	-8,63E-06
SQP	dimensionless	4590	286	39	4915	1612	57	81	586	25	-490

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Use of resources

Steel structural circular hollow sections

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	919	6	10	935	15	5	1	49	0	166
PERM	MJ	0	0	0	0	0	0	0	0	0	0
PERT	MJ	919	6	10	935	15	5	1	49	0	166
PENRE	MJ	17985	198	161	18344	1159	66	71	317	12	-3218
PENRM	MJ.	0	0	8	8	0	0	0	0	0	0
PENRT	MJ	17993	198	161	18352	1159	66	71	317	12	-3218
SM	kg	629	0	0	629	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m^3	54,7	0,3	1,3	56,2	0,9	0,2	0,1	1,0	0,0	7,5
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water										

Steel structural square and rectangular hollow sections

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	955	14	8	977	18	5	1	49	0	192
PERM	MJ	0	0	0	0	0	0	0	0	0	0
PERT	MJ	955	14	8	977	18	5	1	49	0	192
PENRE	MJ	19153	364	136	19653	1428	66	71	317	12	-3713
PENRM	MJ.	0	0	6	6	0	0	0	0	0	0
PENRT	MJ	19159	364	136	19659	1428	66	71	317	12	-3713
SM	kg	629	0	0	629	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m^3	56,5	0,6	1,2	58,3	1,1	0,2	0,1	1,0	0,0	8,7
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water										

Waste production and output flows

Steel structural circular hollow sections

Waste production

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0,106	0,000	0,006	0,112	0,003	0,000	0,000	0,001	0,000	-0,054
Non-hazardous waste disposed	kg	490	11	5	506	108	3	7	10	80	57
Radioactive waste disposed	kg	0,0395	0,0013	0,0006	0,0414	0,0078	0,0005	0,0005	0,0019	0,0001	0,0060

Output flows

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	5	5	0	0	0	916	0	0
Materials for energy recovery	kg	0	0	0,6	0,6	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0

Steel structural square and rectangular hollow sections

Waste production

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0,121	0,001	0,003	0,125	0,003	0,000	0,000	0,001	0,000	-0,062
Non-hazardous waste disposed	kg	474	18	4	496	132	3	7	10	80	65
Radioactive waste disposed	kg	0,0391	0,0024	0,0006	0,0421	0,0097	0,0005	0,0005	0,0019	0,0001	0,0070

Output flows

Results per functional or declared unit (1t)											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	5	5	0	0	0	917	0	0
Materials for energy recovery	kg	0	0	0,6	0,6	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Steel structural circular hollow sections and Steel structural square and rectangular hollow sections

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional information

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References

- General Program Instructions of the International EPD® System. Version 3.01.
- PCR CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.1 of the EPD® System
- EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- e3 studio associato di consulenza www.ecubo.it - Studio LCA di tubi di acciaio elettrosaldati per il settore costruzioni: Tubi quadri rettangoli lavorati sia a freddo che a caldo, Tubi tondi lavorati sia a freddo che a caldo - Rev.1 10/05/2022

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