METRA SPA

ENVIRONMENTAL PRODUCT DECLARATION

Product: name:

METRA SLIDING WINDOWS SYSTEMS

[NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES and NC-S175HES LUX]

Site Plant:

Rodengo Saiano - Brescia – Italy

in compliance with ISO 14025 and EN 15804:2012+A2:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	SLIDINGWINDOWS
Registration Number	EPDITALY0040

Issue Date	05/10/2018
Update:	19/01/2022
Valid to	19/01/2027

GENERAL INFORMATION

EPD OWNER:	METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy
PLANTS INVOLVED in the declaration:	METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy
SCOPE OF APPLICATION:	This Environmental Product Declaration (EPD) is valid for NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES and NC-S175HES LUX sliding windows. The production facility is located in Rodengo Saiano, Brescia (IT). The life cycle assessment is representative for the product introduced in the declaration for the given system boundaries.
PROGRAM OPERATOR:	EPDITALY, via Gaetano De Castillia 10, 20124 Milano, Italia.
INDIPENDENT CHECK:	This declaration has been developed referring to EPDItaly, following the General Program Instruction; further information and the document are available at: www.epditaly.it. This EPD document is valid within the following geographical area: worlwide according to sales market conditions. CEN standard EN 15804:2012+A2:2019 served as the core PCR (PCR ICMQ-001/15 rev 3.0). PCR review was conducted by Daniele Pace. Contact via info@epditaly.it Independent verification of the declaration and data, according to EN ISO 14025:2010. Third party verifier: ICMQ SpA, via De Castillia, 10 20124 Milano (www.icmq.it) ☐EPD process certification (Internal)☑ EPD verification (External) ***Accredited by: Accredia***
CPC CODE:	**42120** "Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium"
CORPORATE CONTACT:	Andrea Mafezzoni a.mafezzoni@metrabuilding.com
TECHNICAL SUPPORT:	Sphera https://www.sphera.com
COMPARABILITY:	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019.
ACCOUNTABILITY:	METRA SpA relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence; EPDItaly declines all responsibility for

	the manufacturer's information, data and results of the life cycle assessment.
REFERENCE DOCUMENT:	This declaration has been developed following the General Program Instruction document of EPDItaly, available at www.epditaly.it.
PRODUCT CATEGORY RULES (PCR):	PCR ICMQ-001/15 rev 3.0 EN 15804:2012+A2:2019 is the framework reference for PCRs.

Scope and Type of EPD

The type of EPD is “cradle to gate with options” and it’s specific EPD for the products NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES and NC-S175HES LUX (3.00 m x 2.40 m) produced in the METRA plant located in Rodengo Saiano, Brescia (IT) and sold worldwide. All data refer to the 2020 production.

Database: GaBi Database 2021.2 (2021)

Software: GaBi 10

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

According to the PCR ICMQ-001/15 rev. 3 the LCA study it’s “cradle to gate with options”. Modules included are A1, A2, A3, C and D. All manufacturing activities and packaging/auxiliary’s production are in module A3, while energy production and input materials are in A1. Distribution to distributors/installers (A3) is included together with end of life scenarios (credits included). “MND” indicates “Module not declared”.

The declaration is 1a (specific product from a specific manufacturer) according to /REGOLAMENTO EPDITALY V.5/.

The production facility is located in Rodengo Saiano, Brescia (IT). The market range is worldwide.

Product description

Declared unit

The declared unit is 1 m² of sliding windows (NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES and NC-S175HES LUX).

Name	Declared unit [m²]	Conversion factor to 1 kg [m²/kg]	Transparent area [%]
NC-S120STH MONTREAL	1	0.0232	80
NC-S120STH EUROPA	1	0.0233	80
NC-S120STH SLIM	1	0.0208	88
NC-S150HES	1	0.0213	77
NC-S170HES	1	0.0211	77
NC-S175HES LUX	1	0.0199	96

Product

The composition is as following:

Name	Glass [%]	Aluminium [%]	Plastic [%]	Other metals [%]	EPDM [%]	Other [%]	Total [%]
NC-S120STH MONTREAL	76.18	15.34	3.64	2.35	1.22	1.27	**100**
NC-S120STH EUROPA	76.45	16.40	3.38	1.46	1.13	1.17	**100**
NC-S120STH SLIM	74.72	15.81	2.17	2.11	4.06	1.14	**100**
NC-S150HES	68.14	21.31	1.42	4.94	3.22	0.97	**100**
NC-S170HES	67.40	21.43	2.09	4.89	2.92	1.27	**100**
NC-S175HES LUX	71.38	21.72	3.16	1.33	0.85	1.56	**100**

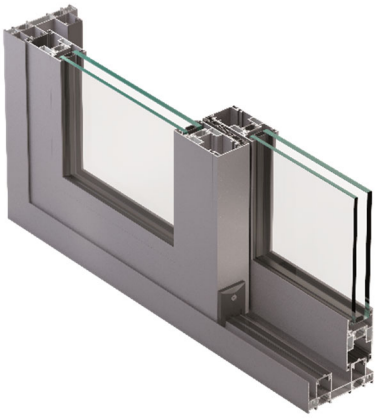
The product does not contain any substances included in the “Candidate List of Substances of Very High Concern for Authorization" compliant with /REACH/.

NC-S120STH Slim

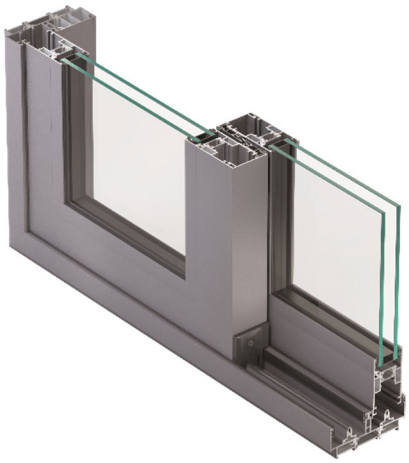
NC-S150 HES

NC-S175HES LUX

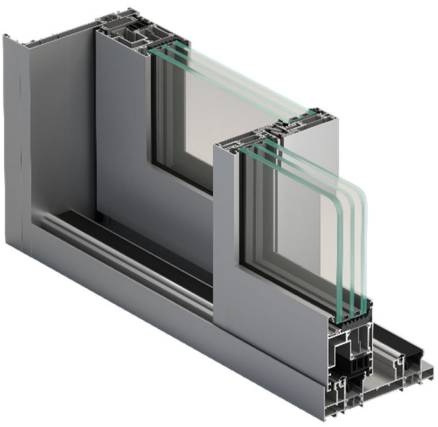
NC-S120STH Europa



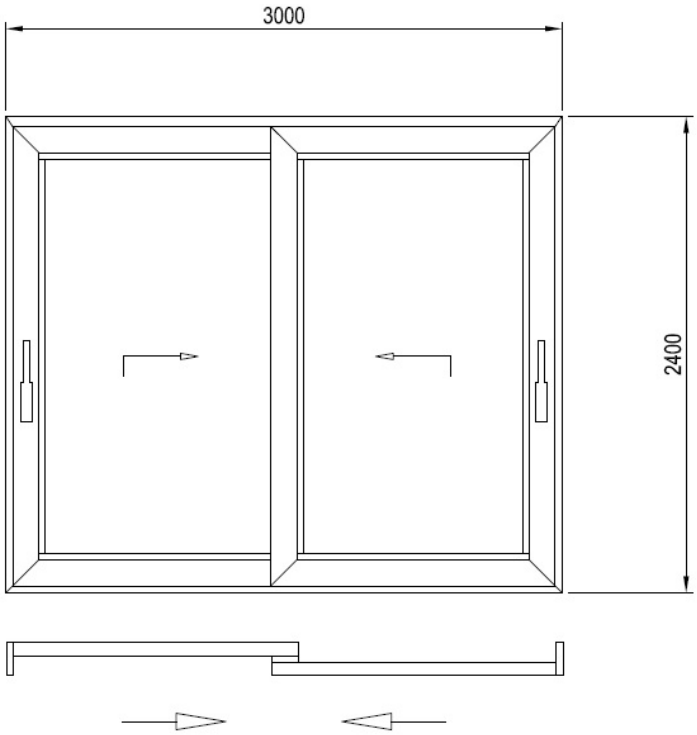
NC-S120STH Montreal



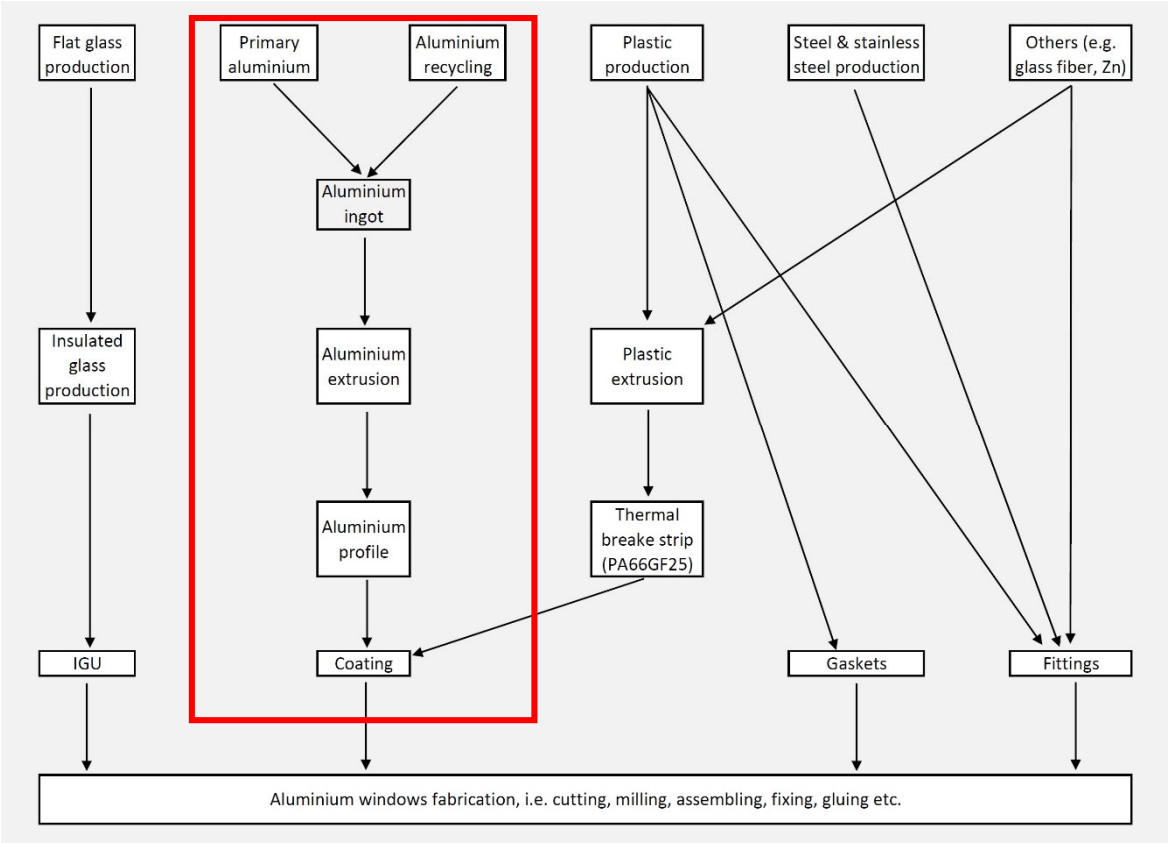
NC-S170 HES



Product design



Production processes



Processes within the red box are the ones within Metra gate primary data were then available for. All processes outside that boundary have been taken into account as necessary for the complete sliding window's production, but secondary data have been used to estimate the impact production. Processes included in the study by using primary data (as directly connected to Metra activities) are then: aluminum

billet production (using both primary and secondary aluminum), billets extrusion, painting, addiction of polyamide to the profile, cutting of the profile and finally packaging for the delivery to the assembler/distributor. All other components are provided by Metra to the assembler while the glass is delivered directly from the glass producer to the assembler. The gate the EPD refers to is not the Metra gate, but the gate of the final assembler where the sliding windows starts from as assembled product ready for the installation phase.

Technical data

Category	Description & Value	Standards
Thermal Insulation (Heat transfer coefficient of frame (Uf) depending on the frame/vent combination)	down to: 1.2 W/m²K for NC-S120STH MONTREAL, 2.7 W/m²K for NC-S120STH EUROPA, 1.2 W/m²K for NC-S120STH SLIM, 2.0 W/m²K for NC-S150HES, 1.6 W/m²K for NC-S170HES and 2.0 W/m²K for NC-S175HES LUX	EN ISO 10077-2
Thermal insulation – sliding window	Uw 1,2 W/m2K: NC-S175HES LUX Uw 1,3 W/m²K: NC-S170HES Uw 1,4 W/m²K: NC-S120STH SLIM Uw 1,5 W/m2K: NC-S120STH Europa, NC-S120STH Montreal	EN ISO 10077-1
Air permeability	Class 4	EN 12207
Watertightness	Class 9A: NC-S120STH MONTREAL Class 8A: NC-S120STH EUROPA, NC-S120STH SLIM Class E900: NC-S150HES, NC-S170HES, NC-S175HES LUX	EN 12208
Wind load resistance	Up to A3: NC-S120STH EUROPA Up to B3: NC-S120STH MONTREAL, NC-S150HES, NC-S170HES, NC-S175HES LUX Up to class C5: NC-S120STH SLIM	EN 12210
Operating forces	Class 1: NC-S120STH SLIM, NC-S175HES LUX	EN 13115
Mechanical properties	Class 4: NC-S120STH SLIM	EN 13115
Sound insulation	Up to 39dB: NC-S120STH EUROPA Up to 42dB: NC-S120STH MONTREAL Up to 44dB: NC-S150HES, NC-S170HES Up to 47dB: NC-S120STH SLIM	EN ISO 140-3

	Technical properties
Size	3000x2400 mm
Frame depth	NC-S120STH Europa - 115mm NC-S120STH Montreal, NC-S120STH Montreal - 120mm NC-S150HES - 150mm NC-S170HES - 170mm NC-S175HES LUX -175mm
Sash depth	NC-S120STH Montreal, NC-S120STH Europa, NC-S120STH SLIM – 45mm NC-S150HES, NC-S170HES- 60mm NC-S175HES LUX - 68mm
Glazing unit	8/12/8: NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES 8/18/8: NC-S175HES LUX

Technical properties	
Fitting	MA6471: NC-S120STH MONTREAL MA6348: NC-S120STH EUROPA, NC-S120STH SLIM MGU: NC-S150HES, NC-S170HES Ma0127: NC-S175HES LUX
Conversion factor to 1 sliding window	7.2 m^2
Declared unit	1 m^2

Condition of delivery

The sliding windows are supplied in customised dimensions with appropriate protection and transport equipment. Such packaging only refers to the distribution to the installer, any other packaging the distributor uses for the whole sliding window delivery to the building site is not included in the study. The packaging consists of wooden pallets (41.11%), aluminium angle brackets (44.65%), polyethylene film (13.60%) and 0.58% of polypropylene wrapper and tape. The total packaging weight for the given product is 12.04 kg.

Detailed product description

The sliding windows are manufactured with METRA NC-S120STH Montreal /Europa/Slim, NC-S150HES, NC170HES and NC-S175HES LUX systems. The profiles are made of aluminium alloy EN AW 6060 (EN 573-3 and EN 755-2) with temper designation T5 according to EN 515, extruded in compliance with the tolerances according to EN 12020-2. The systems include thermal break profiles, made with insulating strips of polyamide PA 6.6 reinforced with 25% glass fibre. Thermal insulation of the profiles is achieved by inserting special reinforced polyamide bars between the two separately extruded profile elements. The profiles are assembled by mechanical rolling after knurling the extruded aluminium. The insulating strips can be oven painted at temperatures of up to 180 - 200° for 15 minutes without affecting the quality of the connection. The frame profiles have a double row of strips with a width of at least 16 mm. The sash profiles have bars with a minimum width of 18 mm. The sash profiles are of the three-chambered type to enable the use of 2 corner cleats in the corner joints.

The corner joints are made by means of aluminium alloy corner cleats to be inserted into the inner and outer tubes of the thermal break profiles and simple screws depending on the type. The corner cleats are fixed in place by plugging or crimping. The coplanarity and alignment of the profiles in the corner joints are ensured by special alignment corner cleats. The sash is equipped with internal and external alignment corner cleats. The contact points between the profiles in the joints are sealed and protected to avoid possible seepage and corrosion. The systems are provided with central sealing plugs to be placed on the lower rail and on the upper rail in correspondence with the crossing of the sashes. At the intersection of the sashes, they are also provided with cover caps to guarantee the seal between the rail and the central bearing profile. The lower rail guides are made of stainless steel or aluminium, depending on the model, to prevent deterioration caused by sliding carriages and treading.

The lower rail has water drainage machining. The sashes have perimeter ventilation for the glass panes and drainage of any infiltration water. The polyamide insulating strips are shaped in such a way as to avoid any stagnation of water infiltration or condensation and are perfectly coplanar with the transversal walls of the aluminium profiles.

All profiles are coated with polyester powder paint. The trolleys have nylon wheels rotating on bearings. The carriages allow a load capacity of 300-400 kg (per sash). In the case of lifting sliding windows, the sashes are moved by means of a lever handle that allows them to be lifted and slid easily. The sashes are closed at several points by special devices. The glazing beads ensure optimum pressure on the glass pane/panel under wind pressure without failure. The glazing beads compensate for all dimensional

tolerances, also caused by added thicknesses such as painting, to ensure a proper fit. The sealing around the glass panes is carried out with suitable preformed ethylene-propylene elastomer (EPDM) gaskets properly jointed at the corners.

Company

Since 1962 Made in Metra has been the philosophy that brings solutions to Italian and International companies that start from the supply of aluminum and turn into a flexible partnership that is always focused on innovation.

Dynamism and continual research, experience and approach to the relationship are the bearing points of a path that led Metra to qualify as a point of reference for the textile industry, with an annual production of over 90,000 tons of aluminum bars.

Thanks to a structure that is organized and efficient, but at the same time streamlined and flexible, Metra responds precisely to the most complete design needs with the versatility of a service designed to measure the needs of the client.

Today the Metra Group has extensive coverage of Italy and a strong presence in Europe and the world.

Under the guidance of the Brescia office, are 3 production establishments in Italy, 2 logistical centers and a lot of points of sale, among dealers and retailers. In Europe and the world Metra is currently present across a commercial and distributive network to be able to supply the international market through the sites located in Canada (production and finishing) high standard of quality and service. The expansion continues, with internationalization both at a production level and distribution level and a consistent search for growth in the network of partners, dealers and distributors outside Europe.

LCA results – Environmental impact per functional or declared unit

Additional environmental impact indicators have been calculated and included in the project report, but are not declared according to EN 15804:2012+A2:2019 chapter 7.2.3.2.

LCA results – Environmental impact per functional or declared unit

NC-S120STH Montreal

Environmental Impact for 1 m2

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	9.67E01	4.78E-01	2.62E01	7.40E-01	1.28E00	4.36E00	3.68E-01	-2.91E01
GWP - fossil	[kg CO2 eq.]	9.63E01	4.73E-01	2.54E01	7.39E-01	1.27E00	4.36E00	3.65E-01	-2.91E01
GWP - biogenic	[kg CO2 eq.]	3.56E-01	1.42E-03	8.13E-01	9.56E-04	3.81E-03	6.34E-04	1.10E-03	-7.78E-02
GWP - luluc	[kg CO2 eq.]	4.77E-02	3.87E-03	2.95E-02	1.38E-04	1.04E-02	2.57E-04	1.06E-03	-1.26E-02
ODP	[kg CFC-11 eq.]	3.75E-11	9.35E-17	1.18E-12	1.26E-14	2.51E-16	1.93E-15	1.41E-15	-8.95E-13
AP	[Mole of H+ eq.]	5.10E-01	1.42E-03	6.61E-02	7.01E-04	1.28E-03	3.76E-03	2.57E-03	-1.51E-01
EP - freshwater	[kg P eq.]	1.01E-04	1.41E-06	4.50E-05	3.01E-07	3.78E-06	4.42E-07	2.00E-06	-2.15E-05
EP - marine	[kg N eq.]	1.25E-01	6.41E-04	1.75E-02	2.30E-04	3.88E-04	1.84E-03	6.67E-04	-2.45E-02
EP - terrestrial	[Mole of N eq.]	1.44E00	7.17E-03	1.89E-01	2.50E-03	4.72E-03	2.08E-02	7.32E-03	-2.83E-01
POCP	[kg NMVOC eq.]	3.18E-01	1.28E-03	4.96E-02	6.88E-04	1.09E-03	4.72E-03	2.02E-03	-6.64E-02
ADPE	[kg Sb eq.]	1.27E-03	4.20E-08	3.36E-06	1.31E-07	1.13E-07	3.03E-08	3.43E-08	-1.02E-03
ADPF	[MJ]	1.42E03	6.31E00	3.15E02	1.12E01	1.69E01	2.84E00	4.86E00	-3.56E02
WDP	[m³ world equiv.]	1.15E01	4.40E-03	2.55E00	7.80E-02	1.18E-02	4.69E-01	3.83E-02	-3.83E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

NC-S120STH Europa

Environmental Impact for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	9.54E01	4.63E-01	2.60E01	7.37E-01	1.28E00	4.13E00	3.66E-01	-2.93E01
GWP - fossil	[kg CO2 eq.]	9.50E01	4.58E-01	2.52E01	7.36E-01	1.26E00	4.13E00	3.64E-01	-2.92E01
GWP - biogenic	[kg CO2 eq.]	3.58E-01	1.37E-03	8.09E-01	9.52E-04	3.79E-03	6.05E-04	1.11E-03	-7.96E-02
GWP - luluc	[kg CO2 eq.]	4.40E-02	3.75E-03	2.94E-02	1.37E-04	1.04E-02	2.51E-04	1.05E-03	-1.28E-02
ODP	[kg CFC-11 eq.]	3.73E-11	9.06E-17	1.16E-12	1.25E-14	2.50E-16	1.89E-15	1.40E-15	-8.69E-13
AP	[Mole of H+ eq.]	5.03E-01	1.37E-03	6.58E-02	6.98E-04	1.28E-03	3.53E-03	2.56E-03	-1.53E-01
EP - freshwater	[kg P eq.]	9.52E-05	1.36E-06	4.46E-05	2.99E-07	3.76E-06	4.26E-07	1.92E-06	-2.15E-05
EP - marine	[kg N eq.]	1.24E-01	6.21E-04	1.74E-02	2.29E-04	3.87E-04	1.72E-03	6.64E-04	-2.47E-02
EP - terrestrial	[Mole of N eq.]	1.42E00	6.95E-03	1.88E-01	2.49E-03	4.70E-03	1.95E-02	7.30E-03	-2.85E-01
POCP	[kg NMVOC eq.]	3.15E-01	1.24E-03	4.93E-02	6.85E-04	1.08E-03	4.42E-03	2.01E-03	-6.68E-02
ADPE	[kg Sb eq.]	1.20E-03	4.07E-08	3.32E-06	1.30E-07	1.12E-07	2.94E-08	3.42E-08	-1.02E-03
ADPF	[MJ]	1.40E03	6.11E00	3.11E02	1.11E01	1.69E01	2.74E00	4.84E00	-3.60E02
WDP	[m³ world equiv.]	1.06E01	4.26E-03	2.87E00	7.77E-02	1.18E-02	4.43E-01	3.82E-02	-3.93E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

NC-S120STH SLIM

Environmental Impact for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	1.06E02	5.08E-01	2.69E01	8.22E-01	1.42E00	6.92E00	4.04E-01	-3.25E01
GWP - fossil	[kg CO2 eq.]	1.05E02	5.02E-01	2.60E01	8.21E-01	1.41E00	6.92E00	4.02E-01	-3.24E01
GWP - biogenic	[kg CO2 eq.]	4.09E-01	1.51E-03	8.18E-01	1.06E-03	4.23E-03	5.94E-04	1.22E-03	-9.72E-02
GWP - luluc	[kg CO2 eq.]	5.18E-02	4.11E-03	3.18E-02	1.53E-04	1.15E-02	1.81E-04	1.16E-03	-1.47E-02
ODP	[kg CFC-11 eq.]	1.32E-11	9.94E-17	1.16E-12	1.40E-14	2.79E-16	1.47E-15	1.55E-15	-1.84E-12
AP	[Mole of H+ eq.]	5.52E-01	1.51E-03	6.71E-02	7.79E-04	1.43E-03	2.90E-03	2.82E-03	-1.65E-01
EP - freshwater	[kg P eq.]	1.13E-04	1.50E-06	4.64E-05	3.34E-07	4.20E-06	3.73E-07	2.65E-06	-2.79E-05
EP - marine	[kg N eq.]	1.36E-01	6.82E-04	1.79E-02	2.55E-04	4.31E-04	1.33E-03	7.31E-04	-2.70E-02
EP - terrestrial	[Mole of N eq.]	1.56E00	7.62E-03	1.93E-01	2.77E-03	5.24E-03	1.58E-02	8.03E-03	-3.12E-01
POCP	[kg NMVOC eq.]	3.43E-01	1.36E-03	5.07E-02	7.64E-04	1.21E-03	3.44E-03	2.22E-03	-7.31E-02
ADPE	[kg Sb eq.]	2.01E-03	4.46E-08	3.40E-06	1.45E-07	1.25E-07	2.30E-08	3.77E-08	-1.69E-03
ADPF	[MJ]	1.60E03	6.70E00	3.17E02	1.24E01	1.88E01	2.24E00	5.35E00	-4.04E02
WDP	[m³ world equiv.]	1.15E01	4.67E-03	3.26E00	8.66E-02	1.31E-02	6.69E-01	4.18E-02	-4.39E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

NC-S150HES

Environmental Impact for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	1.10E02	4.75E-01	2.89E01	8.02E-01	1.39E00	5.18E00	3.60E-01	-3.84E01
GWP - fossil	[kg CO2 eq.]	1.09E02	4.70E-01	2.80E01	8.01E-01	1.37E00	5.18E00	3.58E-01	-3.83E01
GWP - biogenic	[kg CO2 eq.]	3.65E-01	1.41E-03	8.52E-01	1.04E-03	4.13E-03	4.62E-04	1.06E-03	-8.35E-02
GWP - luluc	[kg CO2 eq.]	5.22E-02	3.85E-03	3.27E-02	1.49E-04	1.13E-02	1.63E-04	1.04E-03	-1.48E-02
ODP	[kg CFC-11 eq.]	7.15E-11	9.30E-17	1.19E-12	1.36E-14	2.72E-16	1.27E-15	1.38E-15	3.05E-13
AP	[Mole of H+ eq.]	5.58E-01	1.41E-03	7.08E-02	7.60E-04	1.39E-03	1.93E-03	2.52E-03	-1.92E-01
EP - freshwater	[kg P eq.]	9.34E-05	1.40E-06	5.01E-05	3.26E-07	4.10E-06	3.12E-07	2.04E-06	-2.08E-05
EP - marine	[kg N eq.]	1.30E-01	6.37E-04	1.94E-02	2.49E-04	4.21E-04	8.66E-04	6.53E-04	-3.03E-02
EP - terrestrial	[Mole of N eq.]	1.49E00	7.13E-03	2.10E-01	2.71E-03	5.11E-03	1.04E-02	7.18E-03	-3.46E-01
POCP	[kg NMVOC eq.]	3.35E-01	1.27E-03	5.47E-02	7.46E-04	1.18E-03	2.25E-03	1.98E-03	-8.49E-02
ADPE	[kg Sb eq.]	5.26E-04	4.17E-08	3.61E-06	1.42E-07	1.22E-07	1.96E-08	3.36E-08	-3.81E-04
ADPF	[MJ]	1.62E03	6.27E00	3.29E02	1.21E01	1.84E01	1.85E00	4.76E00	-4.60E02
WDP	[m³ world equiv.]	1.21E01	4.37E-03	4.65E00	8.45E-02	1.28E-02	4.98E-01	3.75E-02	-4.73E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

NC-S170HES

Environmental Impact for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	1.13E02	4.80E-01	3.14E01	8.10E-01	1.40E00	5.35E00	3.62E-01	-3.90E01
GWP - fossil	[kg CO2 eq.]	1.13E02	4.75E-01	3.04E01	8.09E-01	1.39E00	5.35E00	3.60E-01	-3.89E01
GWP - biogenic	[kg CO2 eq.]	3.82E-01	1.43E-03	9.02E-01	1.05E-03	4.17E-03	5.43E-04	1.05E-03	-8.51E-02
GWP - luluc	[kg CO2 eq.]	5.36E-02	3.89E-03	3.41E-02	1.51E-04	1.14E-02	1.79E-04	1.04E-03	-1.50E-02
ODP	[kg CFC-11 eq.]	7.22E-11	9.39E-17	1.37E-12	1.38E-14	2.75E-16	1.39E-15	1.39E-15	3.20E-13
AP	[Mole of H+ eq.]	5.68E-01	1.42E-03	7.56E-02	7.67E-04	1.41E-03	2.67E-03	2.53E-03	-1.95E-01
EP - freshwater	[kg P eq.]	1.05E-04	1.41E-06	5.53E-05	3.29E-07	4.13E-06	3.56E-07	2.14E-06	-2.11E-05
EP - marine	[kg N eq.]	1.33E-01	6.43E-04	2.12E-02	2.51E-04	4.25E-04	1.25E-03	6.56E-04	-3.06E-02
EP - terrestrial	[Mole of N eq.]	1.51E00	7.19E-03	2.29E-01	2.73E-03	5.16E-03	1.46E-02	7.21E-03	-3.49E-01
POCP	[kg NMVOC eq.]	3.42E-01	1.28E-03	5.97E-02	7.53E-04	1.19E-03	3.23E-03	1.99E-03	-8.60E-02
ADPE	[kg Sb eq.]	5.28E-04	4.22E-08	4.02E-06	1.43E-07	1.23E-07	2.18E-08	3.38E-08	-3.81E-04
ADPF	[MJ]	1.68E03	6.34E00	3.63E02	1.22E01	1.85E01	2.11E00	4.79E00	-4.67E02
WDP	[m³ world equiv.]	1.38E01	4.41E-03	4.21E00	8.53E-02	1.29E-02	5.33E-01	3.77E-02	-4.81E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

NC-S175HES LUX

Environmental Impact for 1 m2									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP - total	[kg CO2 eq.]	1.18E02	5.27E-01	3.36E01	8.57E-01	1.48E00	4.07E00	4.04E-01	-3.76E01
GWP - fossil	[kg CO2 eq.]	1.18E02	5.21E-01	3.26E01	8.56E-01	1.47E00	4.07E00	4.01E-01	-3.75E01
GWP - biogenic	[kg CO2 eq.]	4.07E-01	1.56E-03	9.44E-01	1.11E-03	4.41E-03	6.26E-04	1.20E-03	-9.07E-02
GWP - luluc	[kg CO2 eq.]	5.43E-02	4.27E-03	3.63E-02	1.60E-04	1.20E-02	1.91E-04	1.16E-03	-1.54E-02
ODP	[kg CFC-11 eq.]	1.71E-11	1.03E-16	1.49E-12	1.46E-14	2.91E-16	1.46E-15	1.55E-15	2.13E-13
AP	[Mole of H+ eq.]	6.08E-01	1.56E-03	7.98E-02	8.12E-04	1.49E-03	4.03E-03	2.83E-03	-1.96E-01
EP - freshwater	[kg P eq.]	1.19E-04	1.55E-06	6.01E-05	3.48E-07	4.38E-06	3.91E-07	1.99E-06	-2.16E-05
EP - marine	[kg N eq.]	1.44E-01	7.05E-04	2.28E-02	2.66E-04	4.50E-04	1.99E-03	7.34E-04	-3.07E-02
EP - terrestrial	[Mole of N eq.]	1.65E00	7.89E-03	2.46E-01	2.89E-03	5.46E-03	2.25E-02	8.06E-03	-3.52E-01
POCP	[kg NMVOC eq.]	3.70E-01	1.40E-03	6.42E-02	7.97E-04	1.26E-03	5.10E-03	2.22E-03	-8.47E-02
ADPE	[kg Sb eq.]	5.89E-04	4.63E-08	4.35E-06	1.52E-07	1.31E-07	2.38E-08	3.77E-08	-4.59E-04
ADPF	[MJ]	1.74E03	6.95E00	3.90E02	1.29E01	1.96E01	2.34E00	5.33E00	-4.59E02
WDP	[m³ world equiv.]	1.56E01	4.85E-03	4.28E00	9.03E-02	1.37E-02	4.63E-01	4.22E-02	-4.98E00

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element), ADPF = abiotic depletion potential (fossil) WDP = water scarcity.

LCA results – Resource use per functional or declared unit

NC-S120STH Montreal

Resource use for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	2.40E02	3.63E-01	6.15E01	1.83E00	9.75E-01	5.24E-01	6.47E-01	-1.27E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	2.40E02	3.63E-01	7.32E01	1.83E00	9.75E-01	5.24E-01	6.47E-01	-1.27E02
PENRE	[MJ]	1.36E03	6.33E00	3.05E02	1.12E01	1.70E01	2.84E00	4.86E00	-3.57E02
PENRM	[MJ]	6.53E01	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.42E03	6.33E00	3.16E02	1.12E01	1.70E01	2.84E00	4.86E00	-3.57E02
SM	[kg]	3.93E00	0	1.01E-01	0	0	0	0	0
RSF	[MJ]	3.56E-14	0	3.13E-22	0	0	0	0	-2.80E-14
NRSF	[MJ]	4.18E-13	0	3.68E-21	0	0	0	0	-3.28E-13
FW	[m³]	7.11E-01	4.16E-04	1.39E-01	2.07E-03	1.12E-03	1.12E-02	1.17E-03	-3.17E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

NC-S120STH Europa

Resource use for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	2.41E02	3.52E-01	6.15E01	1.82E00	9.71E-01	5.10E-01	6.45E-01	-1.31E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	2.41E02	3.52E-01	7.32E01	1.82E00	9.71E-01	5.10E-01	6.45E-01	-1.31E02
PENRE	[MJ]	1.34E03	6.13E00	3.01E02	1.11E01	1.69E01	2.74E00	4.84E00	-3.60E02
PENRM	[MJ]	6.17E01	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.41E03	6.13E00	3.11E02	1.11E01	1.69E01	2.74E00	4.84E00	-3.60E02
SM	[kg]	4.08E00	0	9.91E-02	0	0	0	0	0
RSF	[MJ]	3.52E-14	0	3.00E-22	0	0	0	0	-2.79E-14
NRSF	[MJ]	4.13E-13	0	3.53E-21	0	0	0	0	-3.28E-13
FW	[m³]	6.90E-01	4.03E-04	1.46E-01	2.06E-03	1.11E-03	1.06E-02	1.17E-03	-3.27E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

NC-S120STH SLIM

Resource use for 1 m2									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	2.67E02	3.86E-01	6.26E01	2.03E00	1.08E00	4.19E-01	7.10E-01	-1.43E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	2.67E02	3.86E-01	7.43E01	2.03E00	1.08E00	4.19E-01	7.10E-01	-1.43E02
PENRE	[MJ]	1.48E03	6.73E00	3.07E02	1.24E01	1.89E01	2.24E00	5.35E00	-4.05E02
PENRM	[MJ]	1.14E02	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.60E03	6.73E00	3.18E02	1.24E01	1.89E01	2.24E00	5.35E00	-4.05E02
SM	[kg]	4.51E00	0	1.01E-01	0	0	0	0	0
RSF	[MJ]	5.71E-14	0	3.02E-22	0	0	0	0	-4.62E-14
NRSF	[MJ]	6.71E-13	0	3.55E-21	0	0	0	0	-5.43E-13
FW	[m^3]	7.55E-01	4.42E-04	1.56E-01	2.29E-03	1.24E-03	1.58E-02	1.28E-03	-3.51E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

NC-S150HES

Resource use for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	3.07E02	3.61E-01	6.62E01	1.98E00	1.06E00	3.59E-01	6.34E-01	-1.66E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	3.07E02	3.61E-01	7.79E01	1.98E00	1.06E00	3.59E-01	6.34E-01	-1.66E02
PENRE	[MJ]	1.53E03	6.29E00	3.19E02	1.21E01	1.84E01	1.85E00	4.77E00	-4.60E02
PENRM	[MJ]	8.47E01	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.62E03	6.29E00	3.30E02	1.21E01	1.84E01	1.85E00	4.77E00	-4.60E02
SM	[kg]	6.30E00	0	1.09E-01	0	0	0	0	0
RSF	[MJ]	1.38E-14	0	3.09E-22	0	0	0	0	-1.04E-14
NRSF	[MJ]	1.62E-13	0	3.63E-21	0	0	0	0	-1.22E-13
FW	[m³]	8.49E-01	4.13E-04	1.88E-01	2.24E-03	1.21E-03	1.18E-02	1.15E-03	-4.27E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

NC-S170HES

Resource use for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	3.14E02	3.65E-01	6.94E01	2.00E00	1.07E00	3.92E-01	6.37E-01	-1.69E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	3.14E02	3.65E-01	8.10E01	2.00E00	1.07E00	3.92E-01	6.37E-01	-1.69E02
PENRE	[MJ]	1.59E03	6.36E00	3.53E02	1.22E01	1.86E01	2.11E00	4.79E00	-4.68E02
PENRM	[MJ]	8.59E01	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.68E03	6.36E00	3.63E02	1.22E01	1.86E01	2.11E00	4.79E00	-4.68E02
SM	[kg]	6.38E00	0	1.28E-01	0	0	0	0	0
RSF	[MJ]	1.47E-14	0	3.77E-22	0	0	0	0	-1.04E-14
NRSF	[MJ]	1.73E-13	0	4.42E-21	0	0	0	0	-1.22E-13
FW	[m³]	9.01E-01	4.18E-04	1.79E-01	2.26E-03	1.22E-03	1.26E-02	1.15E-03	-4.35E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

NC-S175HES LUX

Resource use for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	[MJ]	3.21E02	4.00E-01	7.25E01	2.12E00	1.13E00	4.03E-01	7.12E-01	-1.74E02
PERM	[MJ]	0	0	1.17E01	0	0	0	0	0
PERT	[MJ]	3.21E02	4.00E-01	8.41E01	2.12E00	1.13E00	4.03E-01	7.12E-01	-1.74E02
PENRE	[MJ]	1.68E03	6.98E00	3.80E02	1.29E01	1.97E01	2.34E00	5.34E00	-4.59E02
PENRM	[MJ]	6.09E01	0	1.02E01	0	0	0	0	0
PENRT	[MJ]	1.74E03	6.98E00	3.91E02	1.29E01	1.97E01	2.34E00	5.34E00	-4.59E02
SM	[kg]	6.50E00	0	1.42E-01	0	0	0	0	0
RSF	[MJ]	1.88E-14	0	4.22E-22	0	0	0	0	-1.25E-14
NRSF	[MJ]	2.21E-13	0	4.96E-21	0	0	0	0	-1.47E-13
FW	[m³]	9.56E-01	4.58E-04	1.82E-01	2.39E-03	1.29E-03	1.10E-02	1.29E-03	-4.41E-01

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 resources; SM= Use of secondary material; RSF=Use of renewable secondary fuel; RNSF=Use of non renewable secondary fuel s; FW= Use of net fresh water

LCA results – Output flows and waste categories per declared unit

LCA results – Output flows and waste categories per functional or declared unit

NC-S120STH Montreal

Wastes input/output flows for 1 m2									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	6.56E-07	3.34E-10	1.08E-07	2.96E-09	8.96E-10	5.91E-10	5.24E-10	-2.10E-07
NHWD	[kg]	1.18E01	9.93E-04	7.37E00	2.87E-03	2.67E-03	6.42E-01	2.38E01	-7.74E00
RWD	[kg]	3.69E-02	1.15E-05	8.37E-03	4.58E-04	3.08E-05	8.44E-05	5.10E-05	-1.88E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.11E01	0	0
EEE	[MJ]	0	0	0	0	0	7.37E00	0	0
EET	[MJ]	0	0	0	0	0	1.30E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

NC-S120STH Europa

Wastes input/output flows for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	6.38E-07	3.23E-10	1.06E-07	2.94E-09	8.92E-10	5.68E-10	5.21E-10	-2.09E-07
NHWD	[kg]	1.19E01	9.62E-04	7.32E00	2.85E-03	2.66E-03	6.27E-01	2.37E01	-7.93E00
RWD	[kg]	3.75E-02	1.11E-05	8.37E-03	4.57E-04	3.07E-05	8.13E-05	5.08E-05	-1.92E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.07E01	0	0
EEE	[MJ]	0	0	0	0	0	6.96E00	0	0
EET	[MJ]	0	0	0	0	0	1.22E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

NC-S120STH SLIM

Wastes input/output flows for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	7.37E-07	3.54E-10	1.07E-07	3.28E-09	9.95E-10	4.60E-10	5.79E-10	-2.37E-07
NHWD	[kg]	1.27E01	1.06E-03	7.49E00	3.18E-03	2.96E-03	4.25E-01	2.60E01	-8.41E00
RWD	[kg]	4.10E-02	1.22E-05	8.50E-03	5.09E-04	3.43E-05	8.20E-05	5.62E-05	-2.22E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.19E01	0	0
EEE	[MJ]	0	0	0	0	0	1.14E01	0	0
EET	[MJ]	0	0	0	0	0	2.02E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

NC-S150HES

Wastes input/output flows for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	1.09E-06	3.32E-10	1.11E-07	3.20E-09	9.71E-10	3.69E-10	5.14E-10	-2.00E-07
NHWD	[kg]	1.49E01	9.88E-04	8.11E00	3.11E-03	2.89E-03	3.92E-01	2.33E01	-9.90E00
RWD	[kg]	4.52E-02	1.14E-05	8.95E-03	4.97E-04	3.34E-05	6.66E-05	5.01E-05	-2.34E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.21E01	0	0
EEE	[MJ]	0	0	0	0	0	8.39E00	0	0
EET	[MJ]	0	0	0	0	0	1.46E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

NC-S170HES

Wastes input/output flows for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	1.10E-06	3.35E-10	1.24E-07	3.23E-09	9.80E-10	4.32E-10	5.18E-10	-2.00E-07
NHWD	[kg]	1.52E01	9.98E-04	8.89E00	3.14E-03	2.92E-03	4.28E-01	2.34E01	-1.00E01
RWD	[kg]	4.64E-02	1.15E-05	9.36E-03	5.02E-04	3.37E-05	7.18E-05	5.03E-05	-2.39E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.21E01	0	0
EEE	[MJ]	0	0	0	0	0	8.83E00	0	0
EET	[MJ]	0	0	0	0	0	1.52E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

NC-S175HES LUX

Wastes input/output flows for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	[kg]	5.61E-07	3.68E-10	1.33E-07	3.42E-09	1.04E-09	5.12E-10	5.74E-10	-2.24E-07
NHWD	[kg]	1.58E01	1.10E-03	9.57E00	3.32E-03	3.09E-03	4.45E-01	2.62E01	-1.04E01
RWD	[kg]	4.82E-02	1.27E-05	9.74E-03	5.31E-04	3.57E-05	6.78E-05	5.60E-05	-2.42E-02
CRU	[kg]	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	4.89E-01	0	0	1.16E01	0	0
EEE	[MJ]	0	0	0	0	0	7.24E00	0	0
EET	[MJ]	0	0	0	0	0	1.25E01	0	0

HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; ; EEE = Exported electrical energy; EET = Exported Thermal Energy

LCA results – Biogenic carbon content of product and packaging for 1m2

LCA results - Biogenic carbon content of product and packaging for 1 m²

NC-S120STH Montreal

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

NC-S120STH Europa

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

NC-S120STH SLIM

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

NC-S150HES

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

NC-S170HES

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

NC-S175HES LUX

Biogenic carbon content of product and packaging for 1 m²									
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Biog. C in product	[kg]	0	0	0	0	0	0	0	0
Biog. C in packaging	[kg]	0	0	0.24	0	0	0	0	0

Caption: Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product

Calculation rules

Declared unit

The calculation refers to the declared unit is 1 m^2 of sliding windows (NC-S120STH MONTREAL, NC-S120STH EUROPA, NC-S120STH SLIM, NC-S150HES, NC-S170HES and NC-S175HES LUX).

Assumptions

Where possible, a conservative approach has been adopted, overestimating burdens to prove irrelevance. In other cases, proxy data were selected based on scientific experience, in order to improve the accuracy of the model. Where it was not possible to know the precise composition of materials in the supply chain (due to commercial or industrial confidential suppliers' reasons or due to missing datasets), these have been approximated with LCIs of similar materials, estimated by the combination of available dataset or reconstructed with literature data.

1. In particular for a few components a detailed technical sheet was not available and then assumption have been made:

- STAG10 (detaching oil in the extrusion process): a fatty acid-based lubricant has been chosen as a proxy.
- BONDERITE G34/A and BONDERITE 1095 used in the painting plant: the composition of similar Bonderite additives has been used (BONDERITE C-AK 415 ALKALINE and BONDERITE C-IC W-1 AERO ACID DEOXIDIZER known as TURCO WO #1).

2. In general, where not a defined value of emissions, but a range of values is provided as conservative assumption the maximum value is considered.

3. In the billets production PCDD-PCDF emission is declared as a unique emission. This has been modelled as an equal division between polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-p-furans.

4. As no specific data were available for the production of the 6060 alloy, a general aluminium billet production has been modelled.

5. Paint on profiles is considered to follow same trend as the weight of profiles

6. In case of PA with glass fibre with no available proportion, a 75(PA)/25 (GF) ratio is used

7. In case of components mixtures with no available proportion between components, an equal distribution is considered

8. In NC-S175HES LUX product, the metal processing is assumed to be stamping

9. For double glass manufacturing, as in GaBi database only one size is available (4-16-4), in order to model the missing weight of thicker layers a float glass dataset is used and it is summed up to the given double glass so to reach the real double glass weight

10. For glass suppliers, a conservative distance of 200 km is considered

11. The PCR /EN 17213:2020/ (used as useful reference for the declared unit, type of transport means and distances for distribution to retailers and end of life scenarios) is related to windows and doors. As we assume that other products (facades, doors, shutters) may be similar with relation to such aspects, scenarios from the given PCR are the also used for the other products impacts calculations.

Cut off rules

EN 15804:2012+A2:2019 requires that where there are data gaps or insufficient input data for a unit process the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass of this unit process. The total neglected flows from a product stage must be no more than 5% of product inputs by mass or 5% of primary energy contribution.

The only flows that have been omitted in the study are the flows related to glass spacers. The mass of these inputs are far below 1% of the total inputs to the production process. Moreover the transport from the glass producer to the final assembler and the assembly consumption at the assembler place have been neglected as widely <1%.

Data quality

The data quality can be considered as good. The LCA models have been checked and most relevant flows are considered. Technological, geographical and temporal representativeness is appropriate.

Allocation – upstream data

For all refinery products, allocation by mass and net calorific value has been applied. The specific manufacturing route of every refinery product is modelled and so the impacts associated with the production of these products are calculated individually. Two allocation rules are applied: 1. the raw material (crude oil) consumption of the respective stages, which is necessary for the production of a product or an intermediate product, is allocated by energy (mass of the product * calorific value of the product); and 2. the energy consumption (thermal energy, steam, electricity) of a process, e.g. atmospheric distillation, being required by a product or an intermediate product, are charged on the product according to the share of the throughput of the stage (mass allocation).

Materials and chemicals needed used in the manufacturing process are modelled using the allocation rule most suitable for the respective product. For further information on a specific product, see documentation gabi-software.com.

In addition to the above mentioned allocation methods for refinery products and materials, inventories for electricity and thermal energy generation also include allocation by economic value for some by-products (e.g. gypsum, boiler ash and fly ash). In case of plants for the co-generation of heat and power, allocation by exergy is applied.

Allocation – foreground data

The overall production of METRA comprises further products beside the product considered in this study. Data for thermal and electrical energy as well as auxiliary material refer to the declared product. During data collection the allocation is done via mass, area, pieces or time spent in the machine.

Scenarios and additional technical information

METRA SpA's environmental management system is in compliance with the standard ISO 14001:2015 for activities related to manufacture of aluminium alloy extruded sections by means of extrusion, mechanical processing, and heat treatment phases (Certificate n. EMS- 8598/S).

- Module A1 refers to all raw materials' impacts production with packaging included and all types of energy inputs
- Module A2 includes the raw materials (also auxiliary's and packaging) transports to factory gate
- Module A3 comprises all production activities and wastes treatment and process emissions (both to air and to water).
- Module C1-C2 comprise dismantling activities and transport to end of life treatments
- Module C3-C4 comprise all production activities and wastes treatment and process emissions (both to air and to water). Such activities refer both to Metra direct activities primary data have been used for (such as billets production, extrusion, painting, polyamide addiction, cutting and packaging to the assembler) and processes not directly carried out by Metra, but included in the study as necessary for the sliding window's production (secondary data used in that case). It also includes the impacts linked to transport from the factory gate to the distributor/ manufacturer that is also assembling the sliding window.

- Module D comprises all the declared benefits and loads from net flows leaving the product system that have not been allocated as co-products (which is the case for flows from A1-A3) and that have passed the end-of waste state (processing up to the end-of waste state or disposal of final residues during the product stage) it's been included in module D. The arising recycling potential for the generated power and thermal energy from incineration at EoL and for the material credits due to recycling process are considered in module D. The benefits and loads beyond the product boundary are covered in module D, relating to the benefits from reuse, recovery and/or recycling potentials of the product, and are included in the analysis of the study as well.

METRA Spa provided the distribution percentage to different types of user, but the transport details used are the ones suggested by the /EN 17213:2020/ (used as useful reference for the declared unit, type of transport means and distances for distribution to retailers and end of life scenarios)

Scenario	GaBi truck	Description	METRA %
Small batches/ direct sales	GLO: Truck-trailer, Euro 6, up to 28t gross weight / 12,4t payload capacity ts <u-so>	7,5 t truck, 20 % payload, 50 km one way and 50 km return empty. Total 100 km.	**13.26**
Small batches through local manufacturers	GLO: Truck-trailer, Euro 6, up to 28t gross weight / 12,4t payload capacity ts <u-so>	7,5 t truck, full capacity 50 km and 7,5 t 20% payload, 50 km one way and 100 km return empty. Total 200 km.	**26.51**
Small batches through distributors	GLO: Truck-trailer, Euro 6, 50 - 60t gross weight / 40,6t payload capacity ts <u-so>	40t truck, full capacity 150 km and 150 km return empty.	**58.92**
	GLO: Truck-trailer, Euro 6, up to 28t gross weight / 12,4t payload capacity ts <u-so>	7,5 t 20% payload, 50 km one way and 50 km return empty. Total 400 km.	
Large-scale project	GLO: Truck-trailer, Euro 6, 50 - 60t gross weight / 40,6t payload capacity ts <u-so>	40t truck, full capacity 150 km and 150 km return empty.	**1.47**

	Average composition of the packaging [kg/m²]
Wooden pallets	0.688
PP fibers	0.010
PE film	0.228
PVC Tape	0.001
Aluminium spacers	0.747
Total kg/m²	**1.672**

Module A5 has not been included, but the following materials production for the packaging added by Metra have been taken into account for 1 m² of sliding window (only the production materials' impact has been considered). The packaging added by the local manufacturer/distributor has not been included.

- Module B is not considered: for B1 only energy-related emissions would be relevant but such impact shall be calculated at the building level as there are no power operated devices in the product under study. From B2 to B6 module no standard scenarios are available.
- Modules C1 (dismantling) and C2 (transport to end of life treatment) are considered. 100 km has been assumed as transport distance
- Modules C3 (recycling and incineration with energy recovery) and C4 (landfilling) consider the end of life scenarios of the product, considering all components of the sliding windows. The percentages to the given scenarios has been suggested by the /EN 17213:2020/ (used as useful reference for the declared unit, type of transport means and distances for distribution to retailers and end of life scenarios) for the different materials shown in the table below:

Material	EoL treatment
Glass	70% landfilling and 30% recycling
Non glass-metals	5% landfilling and 95% recycling
Non glass-plastic	5% landfilling and 95% incineration with energy recovery

- Module D deriving from the end of life scenarios.

References

EN ISO 14044:2006 Environmental Management – Life Cycle Assessment – Requirements and Guidelines.

EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

EN 15804:2012+A2:2019: Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products

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