

**METRA SPA.**



## ENVIRONMENTAL PRODUCT DECLARATION

Product: name:

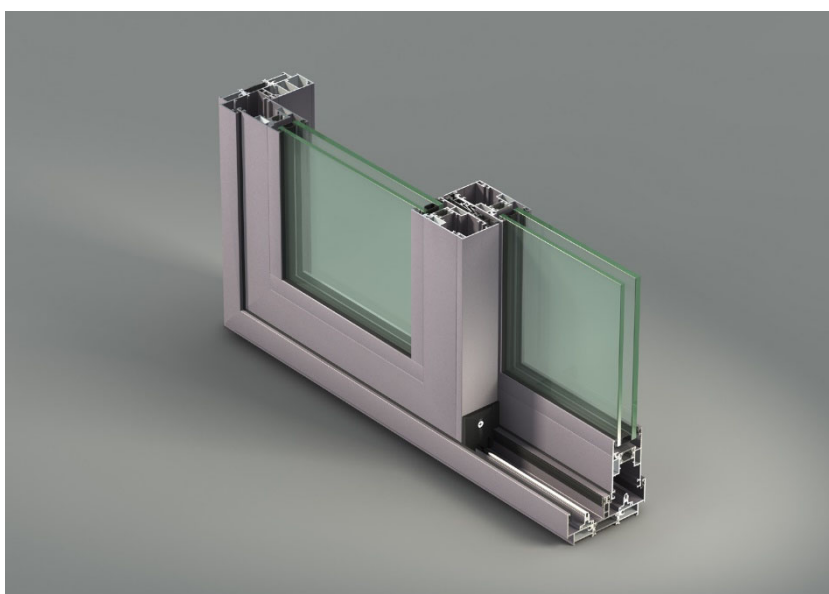
**NC-S120STH Montreal**

Site Plant:

**Rodengo Saiano - Brescia – Italy**

**in compliance with ISO 14025 and EN 15804**

Program Operator	EPDItaly
Publisher	EPDItaly
Declaration Number	00
Registration Number	EPDITALY0040
Issue Date	05/10/2018
Update:	
Valid to	05/10/2023



## GENERAL INFORMATION

<b>Product name</b> NC-S120STH Montreal	<b>Site</b> METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy
<b>Declared unit</b> 1 m <sup>2</sup> of window of the given size (3000*2400 mm)	<b>Scope:</b>  This Environmental Product Declaration (EPD) is valid for NC-S120STH Montreal window. 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.  The owner of the declaration shall be liable for the underlying information and evidence; EPDItaly shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
<b>Declaration based on:</b> PCR ICMQ-001/15 rev. 2	
<b>Type of declaration</b> From Cradle to Gate with options	<b>Database, software, version</b> GaBi database SP36, GaBi v 8.6
<b>Author of the life cycle assessment</b> Thinkstep Italy Via Bovini 41, 48123 Ravenna www.thinkstep.com	<b>Verification</b> Independent verification of the declaration according to /EN ISO 14025:2010/  <input type="checkbox"/> Internally <input checked="" type="checkbox"/> Externally
<b>EPD Owner</b> METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy Contact: Andrea Mafezzoni a.mafezzoni@metra.it	<b>Publisher and Programme Operator</b> EPDITALY, VIA GAETANO DE CASTILLIA 10, MILANO, ITALIA
<b>CPC Code:</b> 42120 “Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium”	

*EPDs from similar product groups from different programmes might not be comparable. In particular EPD on construction products cannot be compared if not complaint with /ISO EN 15804/. Metra Spa makes EPDItaly relieved of any responsibility for not respecting the Environmental regulation the producer itself has made a self-declaration about.*

## Scope and Type of EPD

The type of EPD is “cradle to gate with options” and it’s specific EPD for the product NC-S120STH Montreal (3,0 m x 2,4 m) produced in the METRA plant located in Rodengo Saiano, Brescia (IT) and sold worldwide. All data refer to the 2016 production.

**Database:** GaBi Database SP36 (2018)

**Software:** GaBi 8.6

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 <sup>1</sup>	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X

According to the PCR ICMQ-001/15 rev. 2 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).

The declaration is 1a (specific product from a specific manufacturer).

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

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<sup>1</sup> Module not declared (MND)

## Product description

### 1.1. Declared unit

The declared unit is 1 m<sup>2</sup> of NC-S120STH Montreal window.

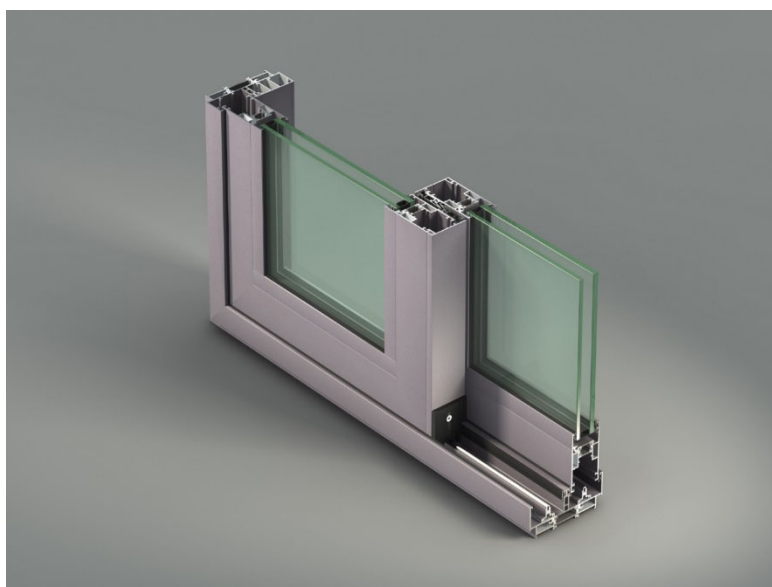
Name	Value	Unit
<b>Declared unit</b>	1	m <sup>2</sup>
<b>Conversion factor to 1 window</b>	7,2	m <sup>2</sup>
<b>Conversion factor to 1 kg</b>	0,0032	m <sup>2</sup> /kg
<b>Transparent area</b>	80	%

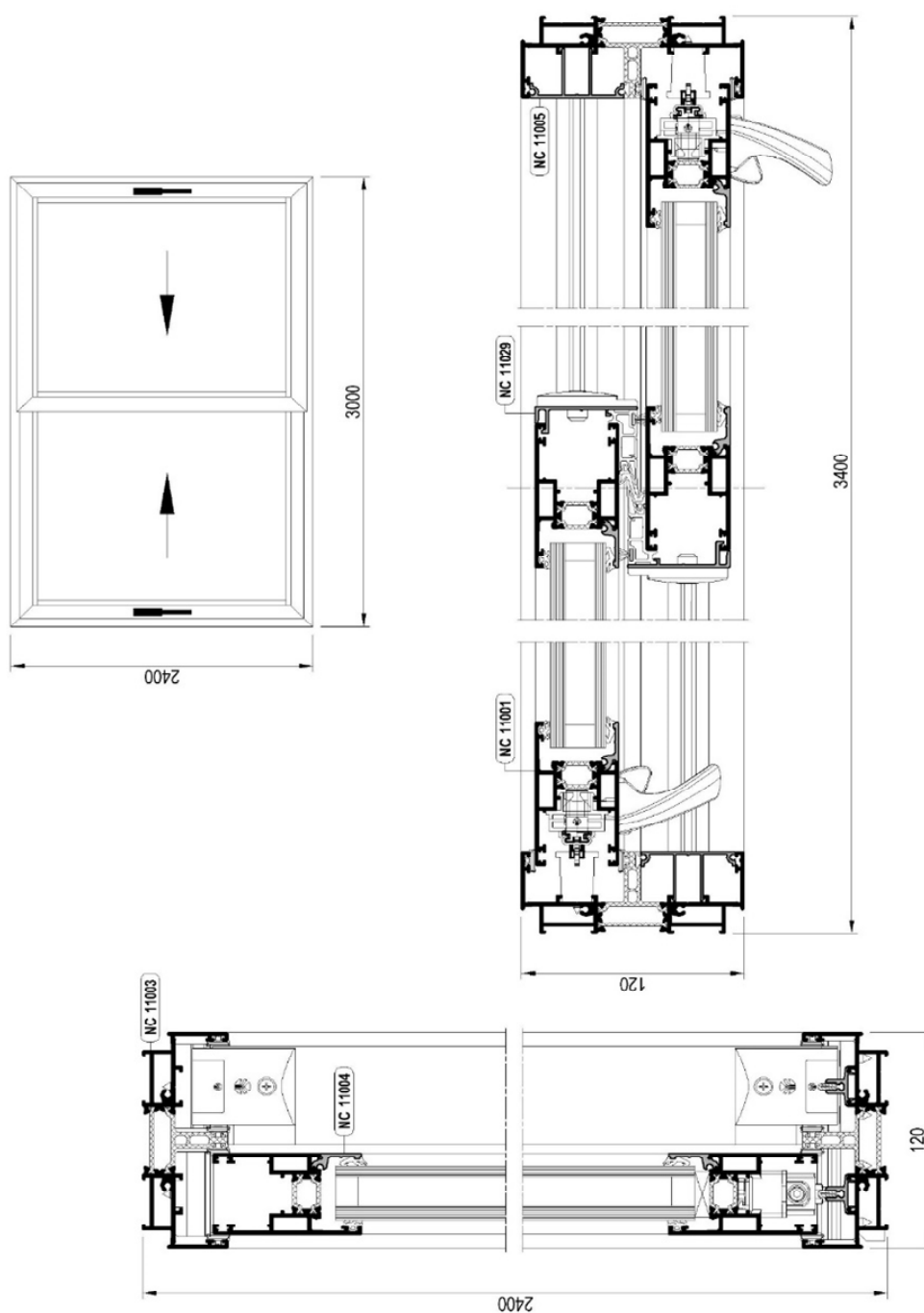
### 1.2. Product

The composition is as following:

Material	%
<b>Glass</b>	76,59%
<b>Aluminium</b>	15,7%
<b>Plastic</b>	3,55%
<b>Other metals</b>	1,80%
<b>EPDM</b>	0,72%
<b>Other</b>	1,65%
	100,00%

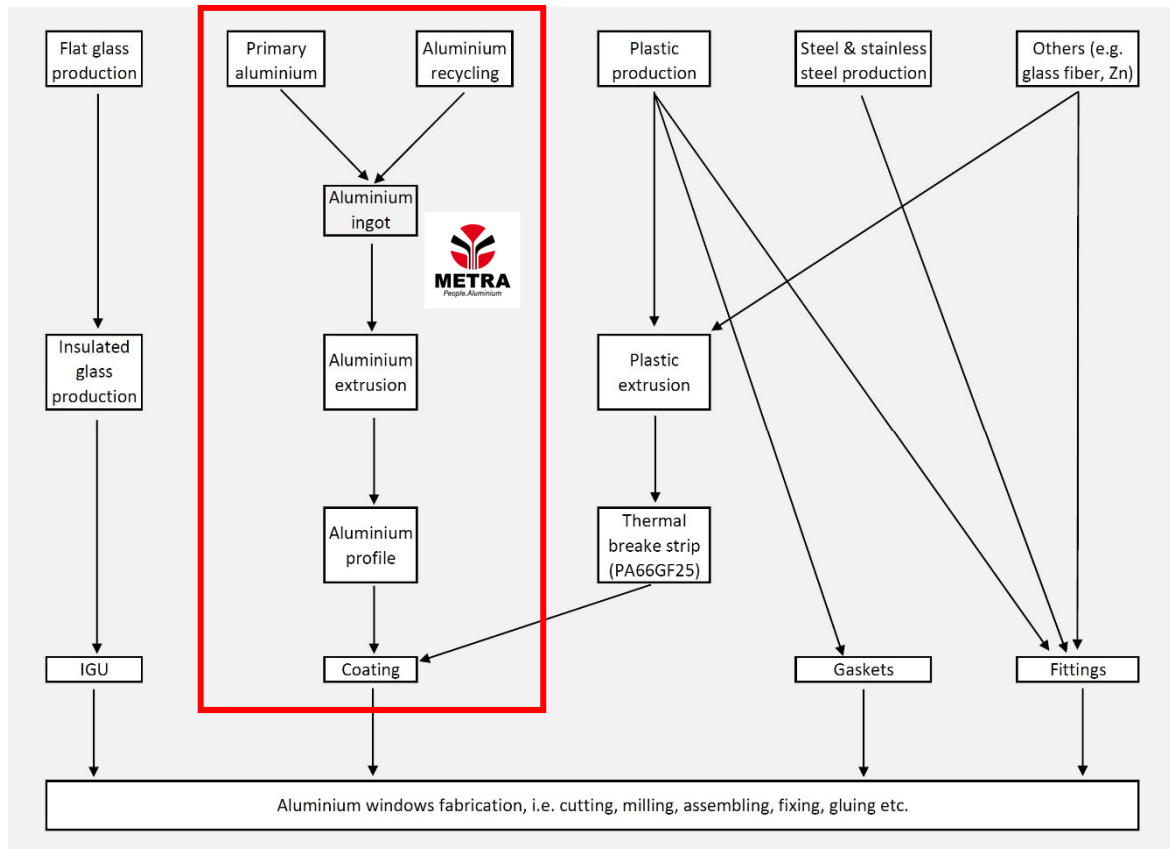
	Material properties
<b>Materials</b>	The product does not contain any substances included in the "Candidate List of Substances of Very High Concern for Authorization" compliant with /REACH/





**Product design**

### 1.3. 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 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, addition 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 windows starts from as assembled product ready for the installation phase.**

### 1.4. Technical data

Category	Description & Value	Standards
<b>Thermal Insulation</b>	Heat transfer coefficient of frame (Uf) down to 3,7 W/m <sup>2</sup> K depending on the frame/sash combination and glass thickness	EN ISO 10077-1 EN ISO 10077-2
<b>Air permeability</b>	Class 4	EN 12207
<b>Watertightness</b>	7A	EN 12208
<b>Wind load resistance</b>	Up to B3	EN 12210

Technical properties	
<b>Size</b>	3000x2400 mm
<b>Frame depth</b>	120mm
<b>Sash depth</b>	45mm
<b>Glazing unit</b>	8/12/8 (double)
<b>Conversion factor to 1 kg</b>	0,0031
<b>Conversion factor to 1 window</b>	7,2 m <sup>2</sup>
<b>Declared unit</b>	1 m <sup>2</sup>

## 1.5. Condition of delivery

The 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 window delivery to the building site is not included in the study. The packaging consists of wooden pallets (41%), aluminium angle brackets (45%), polyethylene film (14%) and 1% of polypropylene wrapper and tape. The total packaging weight for the given product is 12 kg.

## 1.6. Detailed product description

Windows are made applying the METRA NC-S120STH system. The profiles are made of UNI EN AW 6060 aluminium alloy (EN 573-3 and EN 755-2) with T5 temper designation according to UNI EN 515, extruded in accordance with the tolerances specified in UNI EN 12020-2. The system includes thermal-break profiles, made with PA 6.6 insulating strips of glass-fibre-reinforcement (25%). The insulating strips endure oxidation and stove-enamelled treatments under temperatures up to 180° - 200 °C for 15 minutes and these treatments should not alter the quality of the joints. Frame profiles have a double row of strips not less than 38 mm. Sashes have strips not less than 22 mm high. Three-chamber profiles are used in the movable frame so as to allow using 2 corner cleats at corner joints. Maximum thickness allowed for panes is 30 mm.

Corner joints are built with die-cast aluminium corner cleats to be fitted to the internal and external tubular structures of thermal-break profiles. Corner cleats are fastened by means of plugging and/or crimping. Alignment of profiles at corner joints is ensured by using special aligning corner cleats. The movable frame is equipped with internal and external aligning corner cleats.

The contact points between profiles at the joints are sealed and protected in order to prevent any moisture infiltration and the onset of corrosion.

The system has central seal caps to be placed on the lower and upper rails matching the sash intersection. Also at this point, the sashes have finish-cover caps suitable to ensure sealing between the guide and central stop profile. The lower rail guides are made of stainless steel to avoid the deterioration caused by sliding the carriages or by walking on them. If necessary, these guides can be replaced easily at any time.

The lower rail has areas for water drainage. The distribution and dimensions of slots and holes comply with all METRA machining specifications. All the accessories specific for a drainage system are used: drainage valves, which, in certain areas of the rail, prevent water backflow due to external pressure; water drainage caps, which are placed outside to cover the drainage slots on the rail; water discharge

bushings, which collect and carry water without leaking inside the profile so that water is drained in a controlled manner to the outside. The sashes have holes for the perimeter ventilation of glass sheets and the drainage of any water that may have seeped. The polyamide insulating strips are shaped so as to avoid stagnation of any water that may have seeped or condensed and also perfectly aligned with the cross walls of the aluminium profiles. All the drainage slots are protected externally by means of special caps.

All gaskets are made of EPDM rubber.

Under wind pressure, glazing beads guarantee total pressure on the glass sheet / panel without yielding. The glazing bead compensates all the dimensional tolerances, including those caused by added thicknesses such as painting, to ensure proper coupling. Glazing beads are 22 mm high to ensure an adequate bond of the glass sheet and/or panel and to provide adequate coverage of sealants used for insulating glass, protecting them from the sun and preventing their early deterioration. Glass support and dowels provide a ensure supporting surface on double glazing sheets.



## 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), Austria, Poland and Romania (finishing and distribution), 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

### LCA results – Environmental impact per functional or declared unit

Parameter	Unit	TOTAL A1-A3	C3	C4	D
<b>GWP</b>	[kg CO <sub>2</sub> -Eq.]	1,27E+02	3,61E+00	2,81E-01	-3,69E+01
<b>ODP</b>	[kg CFC11-Eq.]	1,58E-10	1,27E-13	6,38E-14	-3,25E-11
<b>AP</b>	[kg SO <sub>2</sub> -Eq.]	5,32E-01	3,33E-03	1,64E-03	-1,77E-01
<b>EP</b>	[kg PO <sub>4</sub> <sup>3-</sup> -Eq.]	6,63E-02	6,80E-04	2,42E-04	-1,42E-02
<b>POCP</b>	[kg Ethen Eq.]	7,80E-03	1,68E-04	1,28E-04	-3,81E-03
<b>ADPE</b>	[kg Sb Eq.]	1,14E-03	3,86E-07	1,07E-07	-6,28E-04
<b>ADPF</b>	[MJ]	1,69E+03	2,39E+00	3,64E+00	-3,87E+02

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

## LCA results – – Resource use per functional or declared unit

### LCA results – Resource use per functional or declared unit

Parameter	Unit	TOTAL A1-A3	C3	C4	D
PERE	[MJ]	3,28E+02	INA	INA	INA
PERM	MJ	0,00E+00	INA	INA	INA
PERT	[MJ]	3,28E+02	4,00E-01	4,62E-01	-1,45E+02
PENRE	[MJ]	1,77E+03	INA	INA	INA
PENRM	[MJ]	5,18E+01	INA	INA	INA
PENRT	[MJ]	1,83E+03	2,64E+00	3,77E+00	-4,47E+02
SM*	[kg]	4,04E+00	0,00E+00	0,00E+00	2,63E+00
RSF*	[MJ]	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
FW	[m³]	9,31E-01	9,78E-03	7,02E-04	-3,73E-01

**Caption:** 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 fuels; NRSF = Use of non-renewable secondary fuels; 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

Parameter	Unit	TOTAL A1-A3	C3	C4	D
HWD	[kg]	9,22E-06	1,23E-08	6,37E-08	-4,81E-07
NHWD	[kg]	2,01E+01	6,00E-01	1,73E+01	-1,02E+01
RWD	[kg]	5,39E-02	9,87E-05	5,46E-05	-2,35E-02
CRU*	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	1,75E+01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	6,18E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	1,04E+01	0,00E+00	0,00E+00

**Caption:** 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

For SM, RSF, NRSF, CRU indicators only the foreground system is considered.

\* Reference to only foreground system.

## Calculation rules

### 1.7. Calculation rules

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#### Declared unit

The declaration refers to the declared unit of 1 m<sup>2</sup> of aluminium window.

#### 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 Lubricant (aqueous emulsion of fatty substances) has been chosen
  - 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 emissions are given as <certain value, as cautelative assumption the maximum value is considered.
3. In the billets production PCDD-PCDF emission is declared as unique emission, then 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 aluminum billet production has been modelled
5. Paint on profiles is considered to follow same trend as the weight of profiles.

#### Cut off rules

/EN 15804/ 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 transport of the glass from the producer to the distributor and the assembly consumption for the assembler itself have not been taken into account.

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.

## **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**

In general, the allocation principles use in standard GaBi datasets are explained within /GABI 8 2018 DOCUMENTATION/.

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](http://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**

Most aluminium scrap along the production chain is sent back to recycling. Most primary data have been allocated based on the worked mass. As for painting data, consumption data have been allocated based on the weight of painted profiles.

## **1.8. Scenarios and additional technical information**

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- 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). Such activities refer both to Metra direct activities primary data have been used for (such as billets production, extrusion, painting, polyamide addition, cutting and packaging to the assembler) and processes not directly carried out by Metra, but included in the study as necessary for the 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 window. METRA Spa provided the distribution

percentage to different types of user, but the transport details used are the ones suggested by the [prEN 17213/2](#) as shown below:

Scenario	GaBi truck	Description	METRA %
<b>Small batches/ direct sales</b>	GLO: Truck-trailer, Euro 6, up to 28t gross weight / payload capacity ts <u-so>	7,5 t truck, 20 % payload, 50 km one way and 50 km return empty. Total 100 km.	<b>0</b>
<b>Small batches through local manufacturers</b>	GLO: Truck-trailer, Euro 6, up to 28t gross weight / 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.	<b>80</b>
<b>Small batches through distributors</b>	GLO: Truck-trailer, Euro 6, 50 - 60t gross weight / payload capacity ts <u-so>	40t truck, full capacity 150 km and 150 km return empty. GLO: Truck-trailer, Euro 6, up to 28t gross weight / payload capacity ts <u-so>	<b>5</b>
<b>Large-scale project</b>	GLO: Truck-trailer, Euro 6, 50 - 60t gross weight / payload capacity ts <u-so>	40t truck, full capacity 150 km and 150 km return empty.	<b>15</b>

	S120STH Montreal [kg/m <sup>2</sup> ]
<b>Wooden pallets</b>	0,688
<b>PP fibers</b>	0,010
<b>PE film</b>	0,228
<b>PVC Tape</b>	0,001
<b>Aluminium spacers</b>	0,747
<b>Total kg/m<sup>2</sup></b>	<b>1,67</b>

- Module A5 has not been included, but the following materials production for the packaging added by Metra have been taken into account for 1 m<sup>2</sup> of 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.
- Module C3 (recycling and incineration with energy recovery) and C4 (landfilling) consider the end of life scenarios of the product, considering all components of the windows. The percentages to the given scenarios has been suggested by the [prEN 17213/](#) for the different materials shown in the table below:

Material	EoL treatment
<b>Glass</b>	50% landfilling and 50% recycling
<b>Non glass- metals</b>	5% landfilling and 95% recycling
<b>Non glass- plastic</b>	5% landfilling and 95% incineration with energy recovery

- Module D consists of the credits deriving from the end of life scenarios.

<sup>2</sup> The [prEN 17213/](#) has been used as a reference for the type of transport means and distances.

## References

### 1.9. References

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

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

EN 15804:2012+A1:2013: Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products. Brussels: European Committee for Standardization.

GaBi LCA Database Documentation. Retrieved from thinkstep AG: <http://www.gabi-software.com/international/databases/gabi-databases/>

Prodotti da costruzione e servizi per costruzioni PCR ICMQ-001/15 – rev.2

GABI ts 2018

PCR ICMQ001/15-rev 2                      Product Category Rules “Prodotti da costruzione e servizi per costruzioni” (Building-Related Products and Services) – ICMQ-001/15- rev.2

GABI 8 2018 DOCUMENTATION                      GaBi 8: Documentation of GaBi8-Datasets for life cycle engineering. LBP University of Stuttgart and PE INTERNATIONAL AG, 2018. <http://www.gabi-software.com/international/index/>

prEN 17213 – Windows and doors – Environmental Product Declarations – Product category rules for pedestrian doorsets

REACH Registration, Evaluation, Authorization and Restriction of Chemical, 2007Bibliographic sources for test descriptions, standards or other documents referenced in the EPD.