METRA SPA.

ENVIRONMENTAL PRODUCT DECLARATION

Product: name:

NC 65STH HES WS

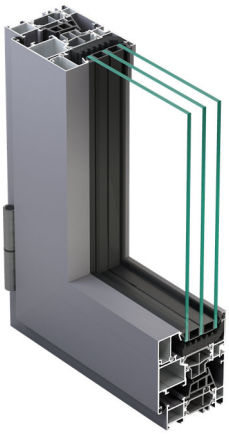
NC 75STH HES WS

Site Plant:

Rodengo Saiano - Brescia – Italy

in compliance with ISO 14025 and EN 15804

Program Operator	EPDItaly
Publisher	EPDItaly
Declaration Number	00
Registration Number	EPDITALY0254
Issue Date	05/10/2018
Update:	
Valid to	05/10/2023



NC 65STH HES WS

NC 75STH HES WS

GENERAL INFORMATION

Product name NC 65STH HES WS **NC 75STH HES WS**	**Site** METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy
Declared unit 1 m^2 of window of the given size (1230*1480 mm)	**Scope:** This Environmental Product Declaration (EPD) is valid for NC 65STH HES WS and NC 75STH HES WS 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. 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.
Declaration based on: PCR ICMQ-001/15 rev. 2	
Type of declaration From Cradle to Gate with options	**Database, software, version** GaBi database SP36, GaBi v 8.6
Author of the life cycle assessment Thinkstep Italy Via Bovini 41, 48123 Ravenna www.thinkstep.com	**Verification** Independent verification of the declaration according to /EN ISO 14025:2010/ ☐ Internally ☒ Externally
EPD Owner METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy Contact: Andrea Mafezzoni a.mafezzoni@metra.it	**Publisher and Programme Operator** EPDITALY, VIA GAETANO DE CASTILLIA 10, MILANO, ITALIA
CPC Code: 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 products NC 65STH HES WS and NC 75STH HES WS (both 1,23 m x 1,48 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[1]	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.

[1] Module not declared (MND)

Product description

1.1. Declared unit

The declared unit is 1 m^2 of NC 65STH HES WS / NC 75STH HES WS windows.

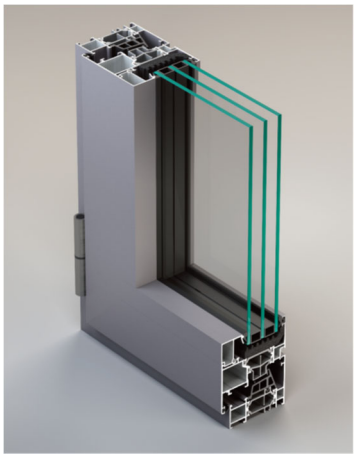
Name	NC 65STH HES WS	NC 75STH HES WS	Unit
Declared unit	1	1	m^2
Conversion factor to 1 window	1,82	1,82	m^2
Conversion factor to 1 kg	0,01280	0,01268	m^2/kg
Transparent area	74	74	%

1.2. Product

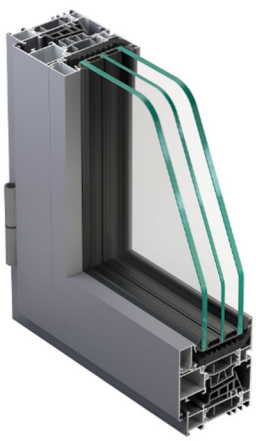
The composition is as following:

Material	NC 65STH HES WS [%]	NC 75STH HES WS [%]
Glass	71,70%	71,00%
Aluminium	17,30%	17,38%
Plastic	3,08%	3,17%
Other metals	3,65%	3,61%
EPDM	2,47%	2,95%
Other	1,81%	1,90%
	100,00%	**100,00%**

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

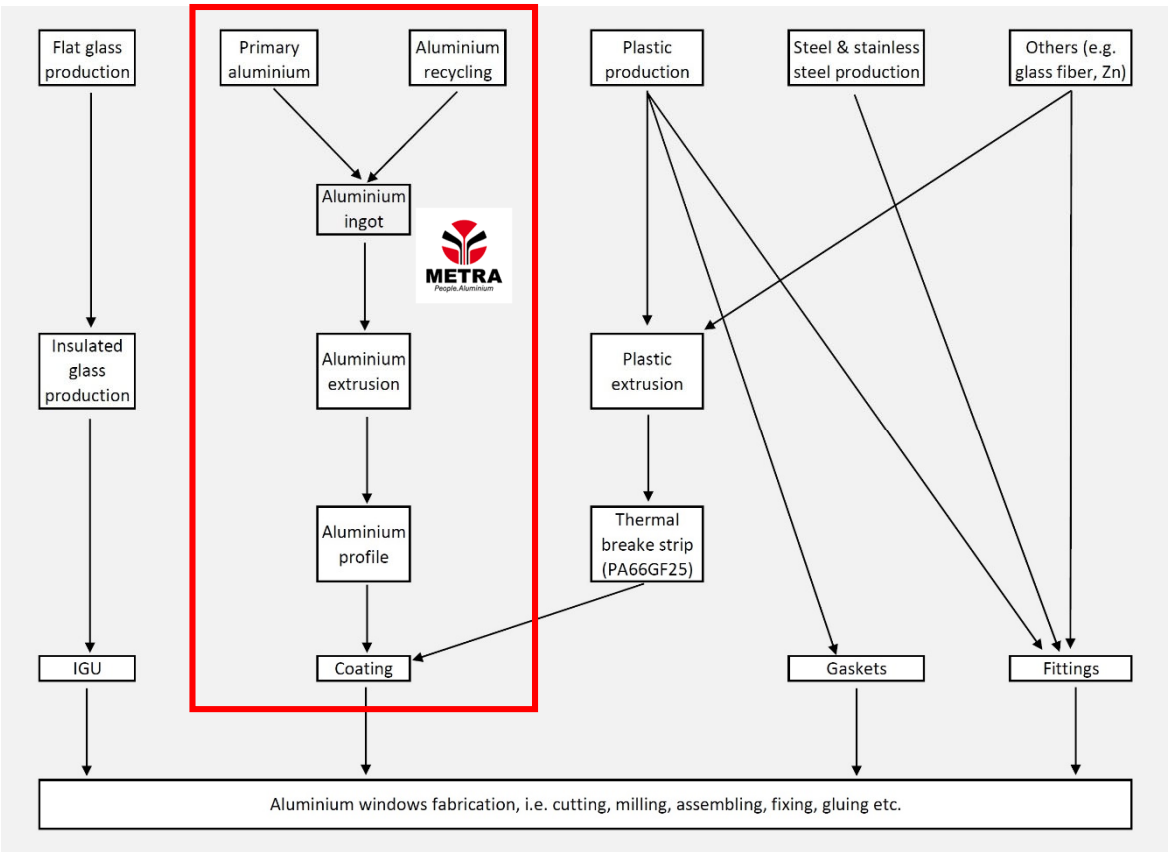


NC 65STH HES WS



NC 75STH HES WS

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

1.4. Technical data

Category	Description & Value	Standards
Thermal Insulation	Heat transfer coefficient of frame (Uf) down to 1,2 W/m^{2}K for NC65STH HES WS and up to 1,0 W/m^{2}K for NC75STH HES WS depending on the frame/vent combination	EN ISO 10077-1 EN ISO 10077-2
Air permeability	Class 4	EN 12207
Watertightness	9A	EN 12208
Wind load resistance	Up to C5	EN 12210
Operating forces	Class 1	EN 13115
Mechanical properties	Class 4	EN 13115
Mechanical durability	Class 3	EN 12400

Category	Description & Value	Standards
Sound insulation	Up to 47dB	EN ISO 10140-2 EN ISO 717-1 EN ISO 10140-1

	Technical properties
Size	1230x1480 mm
Frame depth	NC65STH HES WS - 65mm NC75STH HES WS - 75mm
Vent depth	NC65STH HES WS - 75mm NC75STH HES WS - 85mm
Glazing unit	8/16/44.2 (double)
Fitting	MR540i
Conversion factor to 1 kg	NC65STH HES WS 0,01280 m^2/kg NC75STH HES WS 0,01268 m^2/kg
Conversion factor to 1 window	1,82 m^2
Declared unit	1 m^2
Transparent area fraction [%]	74 %

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 (45%), aluminium angle brackets (48%), polyethylene film (6%) and 1% of polypropylene wrapper and tape. The total packaging weight for the given product is 11,103 kg.

1.6. Detailed product description

The windows must be realised with the METRA NC 65 STH – HES WS system. 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 and respecting the tolerances according to EN 12020-2. The system must provide profiles with thermal break, realized with insulating bars made of fibre glass reinforced polyamide at 25%. The profile is tested and certified according to standard EN 14024 by an accredited certifying body to ensure the mechanical resistance of the joint between polyamide bars meets requirements. The insulating bars allow anodization and painting at temperatures up to 180°C - 200°C for 15 minutes without any alteration of the joint's quality. The profiles have bars with width over 34 mm. The triple chamber profiles enable the use of 2 corner cleats o 2 U-bolts. The frames and sashes host glass sheets respectively from 48 and 58 mm for the base line.

Corner joints are built with die-cast aluminium corner keys to be fitted to the internal and external tubular structures of the thermal-break profiles. Corner cleats are fastened by plugging and/or crimping. Alignment of profiles at corner joints is ensured by special aligning corner cleats. The sashes are also provided with an external and internal aligning corner cleats. T-shaped U bolts are fixed through pins. The sections of the horizontal and vertical profiles are carefully sealed before being joined by the corner cleats in order to avoid infiltration or corrosion.

The external profiles of the sashes provide a groove for the infiltration and condensation waters, to allow their outflow through specific slots. The polyamide bars have a suitable geometrical shape in order to avoid any eventual stagnation of infiltration and condensation waters and to be perfectly coplanar with the transversal sides of the aluminium profiles. The external profiles of frames and sashes are provided by a groove for the gathering of infiltration water. The slots for drainage and ventilation on the frames are protected by special caps with internal anti-reflux membranes.

All gaskets are be made of EPDM. Windows are provided with a central tightening gasket (open joint). The perimeter continuity of this gasket is ensured by the use of suitably glued vulcanised corners. Internal and external tournant-type glass-holding gaskets are used. These gaskets ensure perimeter continuity without cuts at corners. The internal glass-holding gaskets also compensate for any difference in thickness, which is inevitable in double glazing and/or laminated sheets, as well as ensure proper perimeter pressure.

The glazing bead profiles are contrast or snap-on fitted. Under wind pressure, glazing beads guarantee total pressure on the glass sheet / panel without yielding. 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.

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

NC65STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
GWP	[kg CO_2-Eq.]	1,56E+02	5,04E+00	2,67E-01	-4,46E+01
ODP	[kg CFC11-Eq.]	1,69E-10	1,10E-13	6,08E-14	-4,37E-11
AP	[kg SO_2-Eq.]	6,27E-01	2,82E-03	1,55E-03	-2,15E-01
EP	[kg PO_4^{3-}- Eq.]	7,40E-02	7,03E-04	2,35E-04	-1,62E-02
POCP	[kg Ethen Eq.]	1,54E-02	1,72E-04	1,21E-04	-6,15E-03
ADPE	[kg Sb Eq.]	1,48E-03	1,78E-07	1,01E-07	-1,05E-03
ADPF	[MJ]	2,11E+03	1,79E+00	3,46E+00	-4,73E+02

NC75STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
GWP	[kg CO_2-Eq.]	1,59E+02	5,69E+00	2,68E-01	-4,48E+01
ODP	[kg CFC11-Eq.]	1,71E-10	1,21E-13	6,11E-14	-4,42E-11
AP	[kg SO_2-Eq.]	6,34E-01	2,96E-03	1,56E-03	-2,15E-01
EP	[kg PO_4^{3-}- Eq.]	7,49E-02	7,38E-04	2,37E-04	-1,62E-02
POCP	[kg Ethen Eq.]	1,60E-02	1,82E-04	1,22E-04	-6,19E-03
ADPE	[kg Sb Eq.]	1,49E-03	1,91E-07	1,01E-07	-1,05E-03
ADPF	[MJ]	2,17E+03	1,92E+00	3,48E+00	-4,76E+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

NC65STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
PERE	[MJ]	4,84E+02	INA	INA	INA
PERM	MJ	0,00E+00	INA	INA	INA
PERT	[MJ]	4,84E+02	2,78E-01	4,38E-01	-1,94E+02
PENRE	[MJ]	2,24E+03	INA	INA	INA
PENRM	[MJ]	7,88E+01	INA	INA	INA
PENRT	[MJ]	2,32E+03	1,99E+00	3,59E+00	-5,51E+02
SM*	[kg]	5,06E+00	0,00E+00	0,00E+00	3,12E+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]	1,21E+00	1,28E-02	6,61E-04	-5,04E-01

NC75STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
PERE	[MJ]	4,89E+02	INA	INA	INA
PERM	MJ	0,00E+00	INA	INA	INA
PERT	[MJ]	4,89E+02	3,02E-01	4,40E-01	-1,95E+02
PENRE	[MJ]	2,30E+03	INA	INA	INA
PENRM	[MJ]	8,95E+01	INA	INA	INA
PENRT	[MJ]	2,39E+03	2,14E+00	3,61E+00	-5,56E+02
SM*	[kg]	5,06E+00	0,00E+00	0,00E+00	3,12E+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]	1,23E+00	1,43E-02	6,62E-04	-5,05E-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

NC65STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
HWD	[kg]	1,05E-05	7,12E-09	6,02E-08	-6,15E-07
NHWD	[kg]	2,76E+01	3,27E-01	1,64E+01	-1,22E+01
RWD	[kg]	8,47E-02	8,00E-05	5,19E-05	-3,11E-02
CRU*	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	1,69E+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	8,74E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	1,48E+01	0,00E+00	0,00E+00

NC75STH HES WS

Parameter	Unit	TOTAL A1-A3	C3	C4	D
HWD	[kg]	1,06E-05	7,65E-09	6,03E-08	-6,16E-07
NHWD	[kg]	2,82E+01	3,51E-01	1,64E+01	-1,22E+01
RWD	[kg]	8,55E-02	8,77E-05	5,22E-05	-3,14E-02
CRU*	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	1,69E+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	9,78E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	1,66E+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

1.7. Calculation rules

Declared unit

The declaration refers to the declared unit of 1 m^2 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.

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

- 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 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 addiction, 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 %
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.	**0**
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.	**80**
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.	**5**
	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.	**15**

	NC65STH HES WS/NC75STH HES WS [kg/m^2]
Wooden pallets	2,719
PP fibers	0,038
PE film	0,386
PVC Tape	0,003
Aluminium spacers	2,953
Total kg/m^2	**6,099**

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^2 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
Glass	50% landfilling and 50% recycling
Non glass- metals	5% landfilling and 95% recycling
Non glass- plastic	5% landfilling and 95% incineration with energy recovery

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

[2] The /prEN 17213/ has been used as a reference for the type of transport means and distances.

References

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.