ATENA S.P.A. HAS A QUALITY MANAGEMENT SYSTEM CERTIFIED BY RINA IN COMPLIANCE WITH ISO 9001

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 - EN 15804:2012+A2:2019

T-GRID

CEILING STRUCTURES

PROGRAMME:	INTERNATIONAL EPD® SYSTEM WWW.ENVIRONDEC.COM
OPERATOR:	EPD INTERNATIONAL AB
EPD REGISTRATION N°	S-P-06200
EPD REGISTRATION DATE:	27-07-2022
VALIDITY UNTIL:	27-07-2027
EPD PUBLICATION DATE:	04-08-2022
P.C.R.	CONSTRUCTION PRODUCTS PCR 2019:14 V 1.11
GEOGRAPHICAL SCOPE:	WORLDWIDE

EPD®

ECO PLATFORM EPD VERIFIED

GENERAL INFORMATION

Programme: International EPD® System

Address: EPD International AB
Box 210 60 - SE-100 31 Stockholm - Sweden
www.environdec.com - info@environdec.com

DETAILS

CEN STANDARD EN 15804 SERVES AS THE CORE PRODUCT CATEGORY RULES (PCR)

PRODUCT CATEGORY RULES (PCR): CONSTRUCTION PRODUCTS - PCR 2019:14 V 1.11

PCR REVIEW WAS CONDUCTED BY: THE TECHNICAL COMMITTEE OF THE INTERNATIONAL EPD® SYSTEM

INDEPENDENT THIRD-PARTY VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2006:

☒ External ☐ Internal | ***covering*** | ☐ EPD Process Certification ☒ EPD Verification

THIRD PARTY VERIFIER: RINA SERVICES

ACCREDITED BY: ACCREDIA

APPROVED BY: The International EPD® System

PROCEDURE FOR FOLLOW-UP OF DATA DURING EPD VALIDITY INVOLVES THIRD PARTY VERIFIER:

☒ YES ☐ NO

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

All technical specification data and information can be changed without advise.
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tel. + 39 0421 75526 export@atena-it.com

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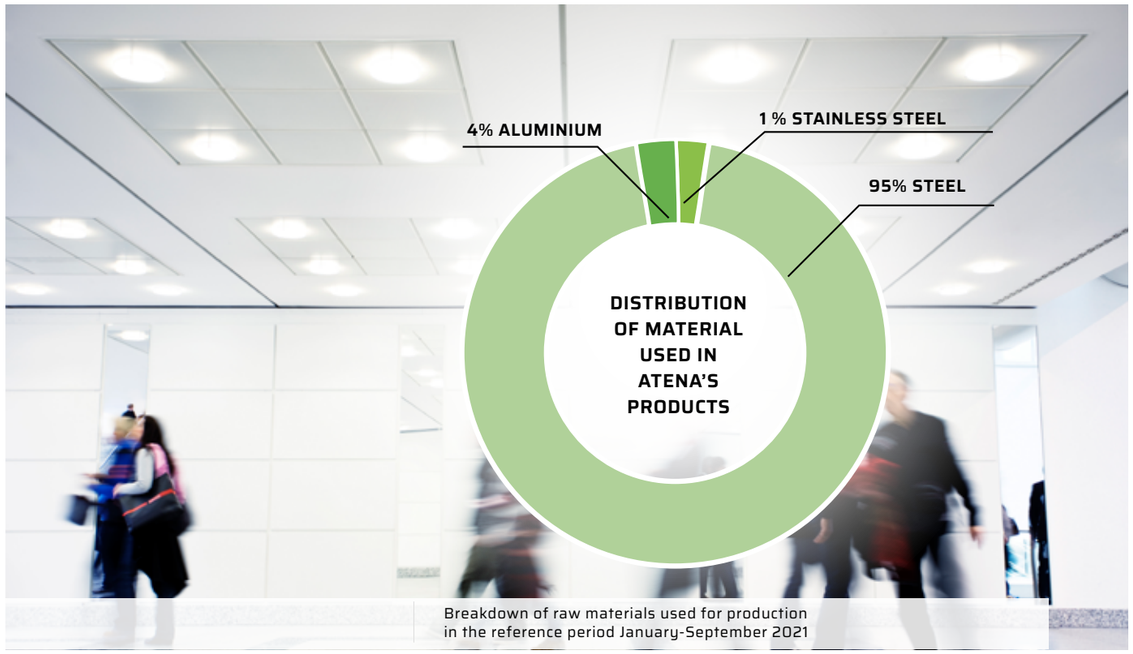
COMPANY INFORMATION

EPD owner: Atena S.p.A. | www.atena-it.com
Contact person: Ing. Monica Iogna Prat | monica@atena-it.com
EPD Development: Atena S.p.A.

Company description:
For over 30 years Atena S.p.A. designs and manufactures high quality metal ceilings, metal façades and ship fittings, for the international market. Precisely in its plant located in Gruaro VENEZIA Italia, Atena produces **T-grids**, **metal ceilings and counterwalls**, **channels and profiles for plasterboard constructions** and **external coverings.**

The product range includes:
Channels and profiles for plasterboard constructions ■ T-grid ■ Metal panel ceilings ■ Metal staves ceilings ■ Metal baffle ceilings ■ Expanded metal ceilings ■ Open cell metal ceilings ■ Special shapes metal ceilings ■ Floating island ceilings ■ Heathcare ceilings ■ Counterwall and partition systems ■ External coverings.
The ceiling systems above mentioned include all components thus exposed metal surfaces, bearing structures, suspensions, wall angles and related accessories such as clips, brackets, joints, anti-seismic kits and so on; the plasterboard sheet are not included in channels and profiles configurations as not part of Atena production.

Production site: Via Alcide de Gasperi 52, 30020 Gruaro VENEZIA - Italy
All products are manufactured in the Italian plant from metal coils/sheets cutting to products shaping and finishing.



Breakdown of raw materials used for production
in the reference period January-September 2021

Certifications:

Atena has a quality management system certified according Uni En Iso 9001

All products for civil applications are tested by independent laboratories, according to the UNI EN 13964 and meet the requirements of NTC 2018 and DM 11 January 2017, C.A.M.

The products intended for the naval market are certified according to MED DIRECTIVE 2014/90/EU.

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COMPANY INFORMATION

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CORPORATE ENVIRONMENTAL ENGAGEMENT

ENVIRONMENT

Raw materials produced with **recycling** processes;

Aluminum and steel products **100% recyclable**;

Products will not become **hazardous wastes** during demolition / removal.

LIFE BASED DESIGN

Acoustics, lighting technology and shape of spaces: the Atena **metal ceilings** and **coverings** are conceived to create comfortable environments that support the **psycho-physical well-being** of people according to the **modern environmental psychology criteria**.

EPD

EPD 2020 is the certification program started by Atena to stand out its best systems from the environmental point of view, in compliance with the current **green procurement** requirements.

HEALTHINESS

Safe and fireproof **products**

that do not release dangerous substances into the environment;

Paints and sublimations and digital printing are performed with

VOC-free substances.

SEISMIC ENGINEERING

Academic and experimental research, patented systems and technical solutions for the highest degree of **earthquake safety**.

GREEN BUILDING

Get credits for building certification according to the **LEED protocol** and to BREEAM and ITACA standards for cross-cutting aspects, by using Atena products.

Atena's commitment to **Environmental Sustainability** and **Safety** passes through all main company processes to produce **safe products**, whose use contributes to the construction of high performance buildings, conceived to **achieve the highest levels** of comfort, healthiness and respect for the environment.

GREEN ENERGY

The production plant is powered exclusively by **renewable sources: photovoltaic system** and certification program **"100% clean energy"** Dolomiti Energia ".

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PROUCT INFORMATION

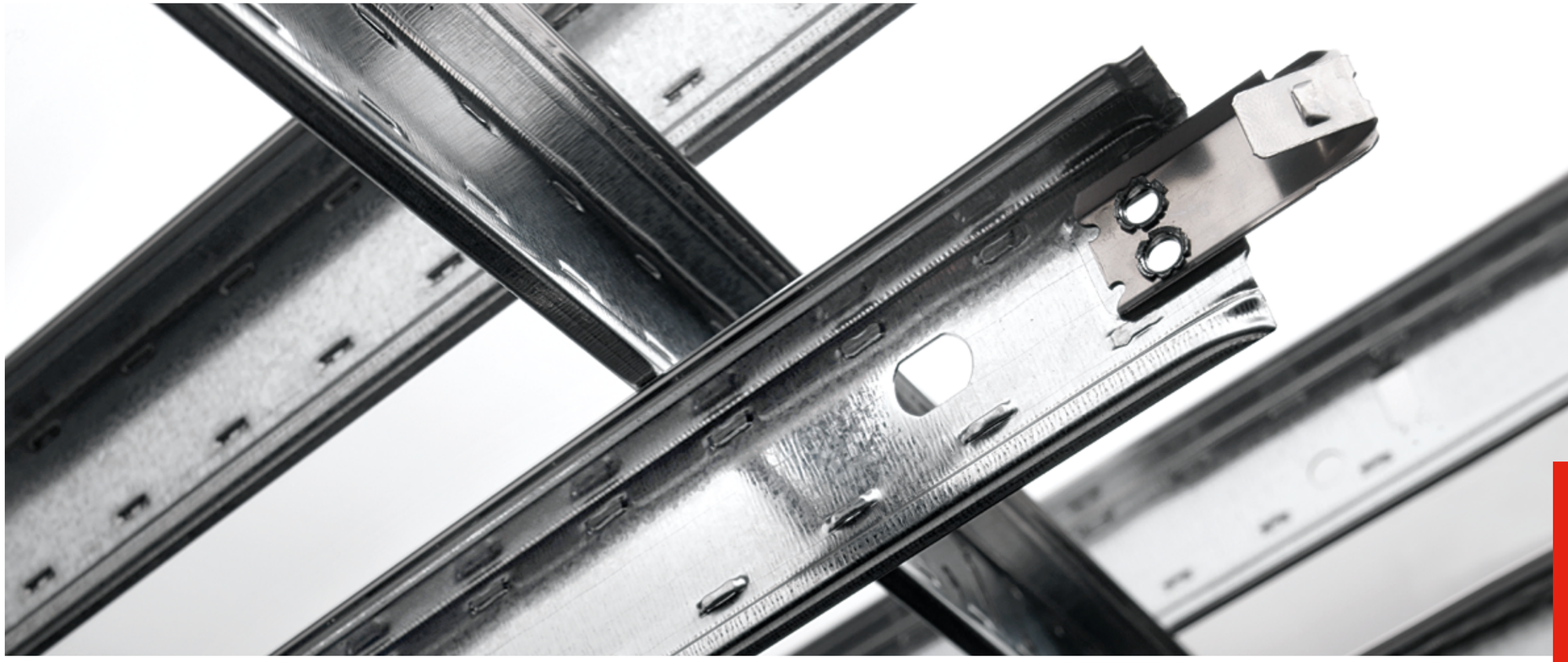
PODUCT GENERAL INFORMATION

Product identification:
this EPD reports the environmental information about **Atena Steel Strong T-grid** suitable for all kind of suspended ceilings made with metal, plasterboard and mineral fiber panels.

For this field Atena designs and manufactures a complete range of safe and longlasting structures, easy to install the Atena T-grid systems are widely used to realize high performance false ceilings in **offices, hospitals**, **schools**, **shops**, **swimming pools**, **sport centers** and **hotels**.

CPC: 4219 Other structures (except prefabricated buildings) and parts of structures, of iron, steel or aluminium; [...].

The following info-graphic datasheet reports the relavant safety and product information related to the environmental issue.



T-GRID STRUCTURE

- The **modular configuration mimimizes** the **refuse** at installation stage.
- Each **components** can be **individually replaced** if damaged during maintenance.
- **Visible metallic modules** can be **cleaned at site** and do not need to be replaced as often as the mineral wool.
- Structures are **easy to install** and adjust to allow an **easy access to plenum** for plants, lighting installation and maintenance.
- All systems can be reinforced with proper **antiseismic kit.**
- Atena products are, as a whole, manufactured using **recycling processes materials**, the **recycled content** is calculated as an average value and indicated according to C.A.M. and the ISO 14021 standard.
- Atena metal products are **100% recyclable** and at the end of their life cycle can be prepeared for re-use, recovery, recycling and selective demolition.
- All metal components are **safe** and **fireproof** do **not contain SVHC** (*Substances of Very High Concern)*, do **not release dangerous substances** into the environment including formaldehyde and will **not** become **hazardous wastes** during demolition / removal.

Sch. 1 - RELEVANT PRODUCT PERFORMANCES RELATED TO ENVIRONMENTAL ISSUE

DISASSEMBLY	Steel items are 100% recyclable and at the end of their life cycle can be prepeared for re-use, recovery, recycling and selective demolition. CAM 2.4.1.1	**MATERIAL DEMOLITION AND REMOVAL**	At the end of their life cycle, the Atena products become non-hazardous waste that can be prepared for re-use, recovery or recycling. CAM 2.5.1.
WASTE MANAGEMENT FROM CONSTRUCTION OPERATIONS AND DEMOLITION	Atena uses recyclable packaging only.	**SVCH[1] SUBSTANCES**	None Formaldheide E1 Class CAM 2.3.5.5
FIRE REACTION UNI EN 13501-1	Classe A1 UNI EN 13501-1	**EMISSIONE DI SOSTANZE PERICOLOSE**	VOC FREE [2] CAM 2.4.1.3 EN13964
AVERAGE OF RECYCLED CONTENT	24,4% [3] compliance CAM 2.4.1.8	**GREEN BUILDING**	Requirements: **LEED** (BREEAM and ITACA for cross-section aspect)

1) SVCH = Substances of Very High Concern | 2) Volatile Organic Compounds
3) The data expresses the average recycled content of the representative product presented in the EPD, calculated on the basis of the quantities of materials purchased in 2021 (January-September period); on page 9 the method and the applicable recycled values for the calculation and release of the recycled report referring to each specific configuration are indicated.

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PROUCT INFORMATION

T-PROFILES to realize MODULAR LAY-IN PANEL CEILINGS

Nello specifico le **strutture** rappresentate dalla presente **EPD** sono:

- **Runner**
- **Easy T24**
- **Easy A. T24***
- **Easy Fox h27**
- **Easy Fox h32**
- **Easy T15**
- **Base 35 (B35)**
- **Base 43 (B43)**
- **Easy Line**

The bearing structure of modular lay-in panel ceilings is made up of galvanised steel profiles which cross each other to make the desired mesh.

The lay-in structures differ from each other on the basis of the total weight per unit area (kg/ml) and the percentage composition by weight of the materials used in the system (galvanised steel, pre-painted steel and stainless steel). Within the analyzed products group, Atena selected a reference product whose weight and composition characteristics are explained in Table 2.

The environmental performance declared in the EPD document therefore refers to **1 kg of T-grid**, having as reference flow the article described in **Table 2**. All other products of the "T-grid" family show a variation of the GWP-GHG indicator compared to the reference product for A1-A3 modules **only between ± 10%** and are therefore adequately represented by the environmental profile of the analyzed model.

The weight per m² of each specific combination depends on the specific mix of components and their incidence per m². It is therefore always possible to convert the results of 1kg of representative configuration, for the kg per m² of the specific configuration, calculated on the basis of the incidence of the components per m².

* Easy Antisismica T24

Tab.2 - FEATURES OF "EASY T24" E "EASY ANTISISMICA T24" WHICH REPRESENT THE ENTIRE PRODUCT FAMILY:

PROFILE	COMPONENT	MATERIAL	Kg/ml	% IN WEIGHT	C.F. (A)	INCIDENCE **ml/m²**	Kg/m²	C.F. (B)
MAIN PROFILE **T24 - 3700 - H38**	Hidden side	Galvanised steel	0,283	68,9%				
	Visible side	Acc. zin. preverniciato	0,128	31,1%				
	Hook	-	-	-				
	TOTAL		**0,411**	**100%**	**2,43**	**0,85**	**0,35**	
CROSSING PROFILE **T24 - 1200 - H32**	Hidden side	Galvanised steel	0,210	67,3%				
	Visible side	Prepainted galv. steel	0,098	31,4%				
	Hook	Stainless steel	0,004	1,3%				
	TOTAL		**0,312**	**100%**	**3,21**	**1,70**	**0,53**	
CROSSING PROFILE **T24 - 600 - H32**	Hidden side	Galvanised steel	0,210	60,7%				
	Visible side	Prepainted galv. steel	0,128	37,0%				
	Hook	Stainless steel	0,008	2,3%				
	TOTAL		**0,346**	**100%**	**2,89**	**0,85**	**0,29**	
MODULE TOTAL 600X600 mm						**-**	**1,17**	**0,85**

Caption: C.F. (A) = Conversion factor calculated on weight per linear meter of each profile
C.F. (B) = Conversion factor calculated on weight per m² of the 600x600mm module configuration.

Recycled content: The selected T-grid which represents the whole family product "T-grid" is made up of galvanised steel, pre-painted galvanised steel and stainless steel. The **average recycled content** of the representative product of the whole family "T-grid" is equal to **24.4%** calculated considering the Kg/ml and equal to **24.7%** calculated considering the Kg/m² of the 600x600mm module as a weighted average obtained by multiplying the recycled content of each material with the relative weight in percentage assigned, considering the quantities purchased from the various suppliers in the period January-September 2021.

The recycled content value considered for the calculation are **25,1 %** for galvanised steel, **36,1%** for prepainted galvanised steel and **87,0%** for stainless steel. It is therefore always possible to calculate the recycled content of the specific system, adding the percentages of recycled content of each material making up the system, multiplied by their weight as a percentage. Here below the values calculated for all standard modules are reported.

On request, the recycled content for other modules can be calculated and reported in a specific report.

Recycled content per Kg/m² of the grid module 600x600 mm

MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.
Runner	24%	Easy Fox h27	24%	Easy T15	24%	Base 35	25%
Easy | Easy A.T24	25%	Easy Fox h32	24%	Easy Line	35%	Base 43	25%

Recycled content per Kg/m² of the grid module 600x1200 mm with 1200 cross T at an interaxe of 600 mm

MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.
Runner	24%	Easy Fox h27	24%	Easy T15	24%	Base 35	25%
Easy | Easy A.T24	25%	Easy Fox h32	24%	Easy Line	36%	Base 43	25%

Recycled content per Kg/m² of the grid module 600x1200 mm with 600 cross T at an interaxe of 1200 mm

MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.	MODEL	RECYCLED C.
Runner	24%	Easy Fox h27	25%	Easy T15	24%	Base 35	25%
Easy | Easy A.T24	25%	Easy Fox h32	25%	Easy Line	32%	Base 43	25%

LCA INFORMATION

Declared Unit: 1 kg of T-grid
having as reference flow the article whose composition is indicated in Schedule 2.

Reference service life: 50 years § 2.4.1 NTC2018

Time representativeness: 2021 (January-September)

Software: SimaPro 9.3.0.2.

Main data base: Ecoinvent 3.8

LCA peport: Lyfe Cycle Assessment applied to Atena products for EPD purposes

Intended audience: business

Geographical scope: worldwide

References:

- ISO 14025: 2010
- ISO 14040: 2021
- ISO 14044: 2021
- ISO 21930: 2017
- EN 15804:2012+A2:2019
- General Programme Instructions v.3.01. 2019
- PCR 2019:14 v 1.11. Construction product and construction service.
- Life Cycle Assessment applied to Atena products for EPD® purposes.

Methodology:

The environmental burden of the product has been processed according to General Programme Instructions for the International EPD® System version 3.01. 2019-09-18 and to the N.PCR 2019:14 V 1.11 Construction product and construction service EN 15804 - CPC code 4219 *"Cradle to gate with options."*

This declaration is based on the application of Life Cycle Assessment (LCA) including the phase: goal and scope definition, inventory analysis (LCI); impact assessment (LCIA); interpretation regarding the whole life-cycle system. Products, packaging and manufacturing process are described using Atena data and information for year 2021. Pollutant concentration in wastewater is considered negligible in accordance with the cut-off criteria established in PCR 2019:14 V 1.11.

The LCA study considers the procurement of raw materials and fuels, their transport to the production site, the actual production of the products and delivery to a representative final customer.

Customized LCA questionnaires were used to gather in-depth information about all main raw materials and energy consumption, air emissions, waste management and so on, therefore the data collected have been processed to represent the related environmental impacts.

Fig. 1 represents the system bunderies considered: raw materials supply (A1), transport (A2), manufacturing (A3), transport to final destination (A4), deconstruction - demolition (C1), transport (C2), waste processing (C3), disposal (C4), reuse - recovery - recycling potential (D) were considered.

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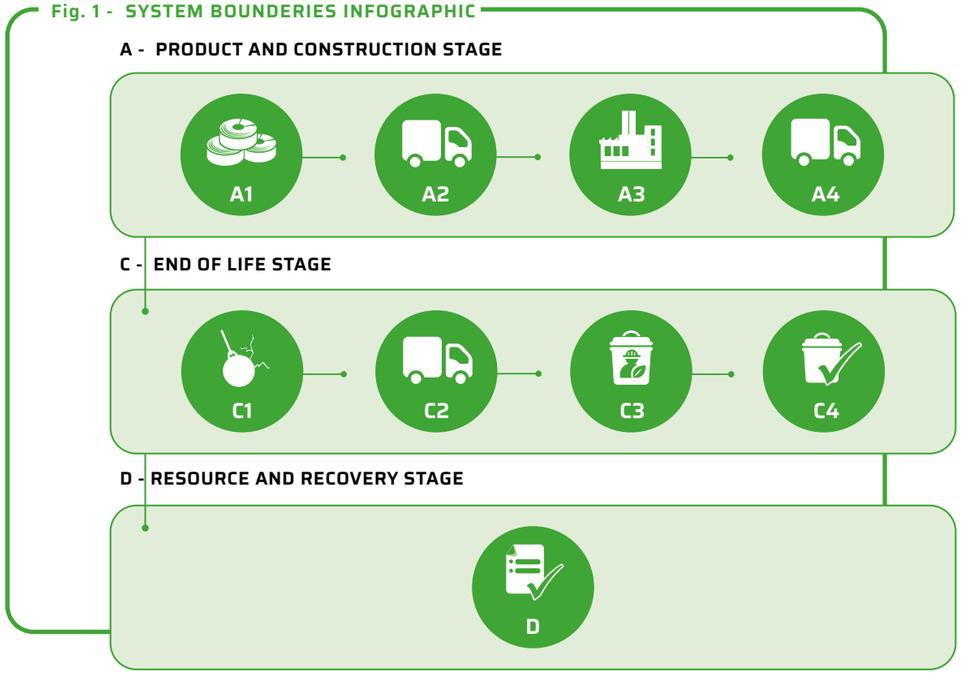
System bounderies:
The **EPD** covers: **A1 | A2 | A3 | A4 | C1 | C2 | C3 | C4 | D**;
the approch used is **"DALLA CULLA AL CANCELLO CON OPZIONI"** ***(CRADLE TO GATE WITH OPTIONS)***.

Sch. 3 - SYSTEM BOUNDERIES

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				RESOURCE AND RECOVERY STAGE
	Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling potential
MODULES	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Decleared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geographical scope	WLD	X	IT	WLD	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data		> 90%		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Product variation		± 10%		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site variation		Not applicable		-	-	-	-	-	-	-	-	-	-	-	-	-	-

Caption: X = included in LCA | MND = Module Not Declared | WLD = Worldwide | IT = Italy

Fig. 1 - SYSTEM BOUNDERIES INFOGRAPHIC



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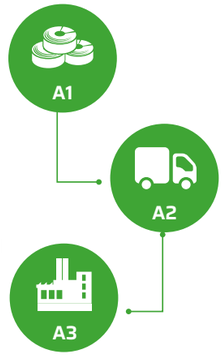
LCA SCENARIOS AND ASSUMPTIONS

PRODUCT STAGE



- **A1 - Raw material**
- **A2 - Transport to factory**
- **A3 - Manufacturing**

At this stage the environmental impacts refers to **raw material extraction**, **processing** and **trasport to Atena** factory.

A1 - Raw materials

The **raw materials** used for the **"T-grid"** product family manufacturig include **galvanised steel** for the hidden side, **pre-painted galvanised steel** for the visible side and **stainless steel** for the hook**;** raw materials are **totally recyclable**, and **free of biogenic carbon.**

Packaging: the analyzes carried out showed that the use of materials for packaging cardboard boxes, wooden pallets and stretch film affects the final results for less than 1%, **the biogenic carbon value** contained in the packaging is equal to **1,09E-03 kgC**. The packaging material is easily separable and can be reused or sent to recycling / disposal processes.

A2 - Transport to factory

For the main raw materials the transport to the production plant was estimated based on the position of the suppliers involved. In LCA report are therefore considered the following values: **279 KgKm** for galvanised steel, **113 KgKm** for pre painted galvanised steel, **403 KgKm** per l'acciaio zincato preverniciato, **250 KgKm** for packaging and paint.

A3 - Manufacturing

All Atena **products are manufactured** in its **headaquarter** located in Gruaro Venezia Italy. The sequential stages of the production process related to A3 described as follows:

- **Unloading of goods** arriving from the supplier, entry and storage of paint, coils and sheets.
- The manufacturing materials are subjected to **shaping** operations; so through automated **profiling machines** to achieve the conceived shapes.
- The finished products are then **packaged** using automated machines and prepared for shipment on wooden pallets.

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Comparability:

the data covered by this EPD can be compared with data created according to the criteria of the EN 15804: 2012 + A2: 2019 standard, of the General Program Instructions v.3.01. 2019 and PCR 2019: 14 v 1.11 construction products and services.

Allocation criteria and main assumptions: to associate of environmental loads to output flows, the distribution criteria applied to the LCA study considered both direct attributions to specific processes and indirect allocations according to the criterion of mass based on production in factory output. The values, therefore, related to the consumption of thermal and electrical energy, water withdrawals and waste flows and auxiliary materials, not directly assignable to specific processes, have been normalized on production in 2021, in the January-September period. For the transport stage of the finished product, an allocation was made on the basis of linear meter sold in the period January-September 2021.

The results were reported for product families for which the 10% limit of variability on the final impact of the identified classes is respected. The reference flow was defined on the basis of the net mass of the products including the generation of metal scrap from the main processes.The additional material, eliminated during the processing stage to manufacture the product, was not taken into account with reference to the production impacts and the advantages bound to the recycling processes to which it was subjected. It is assumed that the variation in size and shape of the components has no effect in relation to the consumption of gas, water and electricity; since the machines are on or off and consequently consume the same amount of energy regardless of the size of the products passing through them.

Electricity hypothesis and assumptions: regarding to electricity, the LCA study considered renewable sources only with reference to the plant consumption, both through self-production with a photovoltaic system, and through the purchase of electricity from a supplier with a contract that ensures 100% of hydroelectric sources; The self-produced electricity through a photovoltaic system was modeled using the ""*Electricity, low voltage {IT}| electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted | Cut-off, U"* dataset. Regarding the work carried out by suppliers, in the absence of primary data, a supply of medium voltage electricity from the Italian national grid was assumed. In this LCA study, electricity was modeled according to the national energy mix, appropriately modified according to the residual mix approach. The weighted average emission factor used for electricity is equal to 4,6E-04 kgCO2 eq/kWh (calculated using the GWP-GHG indicator).

Exclusion and cut-off criteria: even if the flows related to the packaging materials used to transport the products to the final customer and those related to the packaging of the accessories fall within the cut-off threshold whose contribution is less than 1%, they were considered in the LCA model using the data collected during the inventory phase.

Waste: the quantities of waste have been allocated to the production of the entire plant; for the transport of the same to the disposal plant, a representative Italian scenario, a vehicle with a load greater than 16t and an average distance of 200 km were considered. The waste has therefore been classified as **"non-hazardous to landfill"**, **"non-hazardous to recycling"**, **"hazardous to landfill"** and **"hazardous to recycling".**

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LCA SCENARIOS AND ASSUMPTIONS

COSTRUCTION STAGE

- **A4 - Transport from the gate to the site**
- **A5 - Assembly**

A4 -Transport from the gate to the site

Products are loaded directly onto the truck in the factory. In the the north of Italy delivery to customer is carried out by Atena trucks while for the other Italian regions and for the export market Atena uses vectors. For road transport by truck, an average Italian, European or extra-European scenario was considered, in relation to the country of destination.

Sch.4 - PRODUCT DISTRIBUTION:

PARAMETER	VALUE
Vehicle used for transportation	Long distance truck
Vehicle capacity	16-32 ton
Type of fuel and consumption	0,038 Kg Diesel to transport 1 ton for 1 Km
Average distance from the construction site	834 Km
Usable capacity (including returns with no load)	95%
Apparent specific weight of the transported products	7850 Kg/m^3 (steel)
Usage capacity (volumetric factor)	1

A5 - Assembly

The installation process is not covered by Atena therefore it has been considered out of scope.

END OF LIFE STAGE

- **C1 - De-construction demolition**
- **C2 - Transport to recycling sites and to final disposal**
- **C3 - Waste processing**
- **C4 - Disposal**

At this stage the evrironmental impacts refers to **End of Life Stage**

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C1 - De-construction demolition

This step refers to deconstruction, including dismantling or demolition of the product from the building including initial on site sorting of the materials.

Impacts related to this stage can be considered not relevant because the activites are generally carried out handly without using special machinery with not considerable energy consumption.

C2 - Transport to recycling sites or to final disposal

Regarding the transport stage of discarded products, as part of the waste processing, to recycling sites and the waste transport to final disposal, the LCA studio has estimated the impacts related to **150 km** by truck.

C3 - Waste processing

Waste treatment for reuse, recycling and energy recovery. At the end of its life, approximately **88,6%** of the **steel** product is **sent for recycling.** The scenario adopted considers the average European or global disposal scenarios depending on the countries where the product is disposed of.

C4 - Disposal

At the end of its life, approximately **11,4%** of the **steel** product is disposed of in **landfills**.

RESOURCE AND RECOVERY STAGE

D - Reuse- Recovery- Recycling potential

Module D describes the benefits deriving from the **recycling process of the various components of the product** at the end of its life. In particular, Module D evaluates the net benefits between the impacts generated by the secondary production of steel starting from scrap by electric arc furnace (EAF), accounted for with a positive sign, and the avoided impacts deriving from the primary production of blast furnace steel (BOF), accounted for with a negative sign.

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Atena products do not contain SVHC Substances of Very High Concern, do not release dangerous substances including formaldehyde, paints, sublimations and digital printing are carried out using VOC-free substances.

At the end of their life cycle, the Atena products become non-hazardous waste, that can be prepared for selective demolition, re-use, recovery and recycling; steel and aluminum components infacts are totally recyclable.

LCA IMPACT ASSESSMENT

The following paragraphs show the **environmental impact assessments** of all the products considered in the LCA study.

According to EPD standard, impact indicators are split in the following three classes:

- **ENVIRONMENTAL IMPACTS**,
- **RESOURCE CONSUMPTION,**
- **WASTE PRODUCTION.**

DECLARED UNIT:
1 Kg of T-grid.

Contribution analysis:

for all indicators more than 50% of the impacts are bound to the materials used to produce the systems (galvanised steel, pre-painted galvanised steel and paint), followed by the contribution of the process energies to which the materials are subjected; the energy consumptions in plant for these operations are not very significant, compared to those due to the operations that take place upstream carried out from the Atena plant.

ENVIRONMENTAL IMPACTS

CAPTION:

PEI	Potential environment impact	**AP**	Acidification potential of land and water
UM	Unit of measure	**EP,f**	Eutrophication potential, freshwater
GWP-t	Global warming potential, total	**EP,m**	Eutrophication potential, marine
GWP-f	Global warming potential, fossil	**EP,t**	Eutrophication potential, terrestrial
GWP-b	Global warming potential, biogenic	**POCP**	Photochemical ozone creation potential
GWP- luluc	Global warming potential, land use and change	**ADP,e**	Abiotic depletion potential, non fossil
GWP-GHG	Global warming potential, GHG	**ADP,f**	Abiotic depletion potential, fossil
ODP	Ozone depletion potential	**WDP**	Water use

Sch. 5 - ENVIRONMENTAL IMPACTS

PEI	UM	A1-A3	A4	C1	C2	C3	C4	D
GWP-t	**kg CO_2 eq**	2,67E + 00	1,24E - 01	0,00E + 00	2,08E - 02	0,00E + 00	5,86E - 04	-9,65E - 01
GWP-f	**kg CO_2 eq**	2,66E + 00	1,24E - 01	0,00E + 00	2,08E - 02	0,00E + 00	5,86E - 04	-9,65E - 01
GWP-b	**kg CO_2 eq**	7,81E - 03	7,25E - 06	0,00E + 00	1,28E - 06	0,00E + 00	1,14E - 07	-1,58E - 04
GWP-luluc	**kg CO_2 eq**	4,08E - 03	1,08E - 06	0,00E + 00	1,99E - 07	0,00E + 00	1,59E - 08	-4,07E - 05
GWP-GHG	**kg CO_2 eq**	2,66E + 00	1,24E - 01	0,00E + 00	2,08E - 02	0,00E + 00	5,86E - 04	-9,65E - 01
ODP	**kg CFC-11 eq**	3,88E - 07	2,92E - 08	0,00E + 00	4,92E - 09	0,00E + 00	1,36E - 10	-2,86E - 08
AP	**mol H + eq**	1,56E - 02	8,11E - 04	0,00E + 00	9,46E - 05	0,00E + 00	4,57E - 06	-3,62E - 03
EP,f [2]	**Kg P eq**	1,07E - 04	6,88E - 08	0,00E + 00	2,17E - 08	0,00E + 00	4,13E - 10	-3,97E - 05
EP,m	**Kg N eq**	2,81E - 03	2,70E - 04	0,00E + 00	3,46E - 05	0,00E + 00	1,95E - 06	-7,03E - 04
EP,t	**mol N eq**	2,77E - 02	2,98E - 03	0,00E + 00	3,80E - 04	0,00E + 00	2,14E - 05	-8,15E - 03
POCP	**kg NMVOC eq**	8,33E - 03	7,23E - 04	0,00E + 00	9,25 - 05	0,00E + 00	5,14E - 06	-2,60E - 03
ADP,e [3]	**Kg Sb eq**	2,78E - 05	5,25E - 09	0,00E + 00	1,14E - 09	0,00E + 00	2,77E - 11	-1,54E - 05
ADP,f [3]	**MJ**	4,53E + 01	1,75E + 00	0,00E + 00	2,95E - 01	0,00E + 00	8,28E - 03	-7,92E + 00
WDP [3]	**m³**	2,45E + 00	-2,75E - 04	0,00E + 00	-3,38E - 06	0,00E + 00	9,02E - 07	-1,33E - 01

(1) = 1 kg of phosphorus (P) is equivalent to 3,07 kg of phosphorus (PO_4).
(2) =The results of these environmental impact indicators must be used carefully because the uncertainties about these results are high or because experience with the indicator is limited.

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RESOURCE CONSUMPTION

CAPTION:

PEI	Potential environment impact
UM	Unit of measure
PERE	Renewable primary energy excluding that one used as raw material
PERM	Renewable primary energy used as raw material
PERT	Total use of renewable primary energy
PENRE	Non-renewable primary energy excluding that one used as raw material
PENRM	Non-renewable primary energy used as raw material
PENRT	Total use of non-renewable primary energy
SM	Use of secondary raw materials
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Net use of fresh water

Sch. 6 - RESOURCE CONSUMPTION

PEI	UM	A1-A3	A4	C1	C2	C3	C4	D
PERE	**MJ**	6,98E + 00	2,65E - 03	0,00E + 00	4,33E - 04	0,00E + 00	2,33E - 04	-6,87E - 01
PERM	**MJ**	1,33E - 01	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
PERT	**MJ**	7,11E + 00	2,65E - 03	0,00E + 00	4,33E - 04	0,00E + 00	2,33E - 04	-6,87E - 01
PENRE	**MJ**	4,93E + 01	1,71E + 00	0,00E + 00	2,89E - 01	0,00E + 00	8,09E - 03	-1,19E + 01
PENRM	**MJ**	6,09E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
PENRT	**MJ**	5,53E + 01	1,71E + 00	0,00E + 00	2,89E - 01	0,00E + 00	8,09E - 03	-1,19E + 01
SM	**Kg**	2,45E - 01	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
RSF	**MJ**	0,00E + 00	0,00E + 00	0,00E + 00	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	0,00E + 00	0,00E + 00	0,00E + 00
FW	**m³**	6,13E - 02	3,48E - 05	0,00E + 00	6,55E - 06	0,00E + 00	6,58E - 07	-2,39E - 03

WASTE PRODUCTION

CAPTION:

PEI	Potential environment impact
UM	Unit of measure
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 energy

Sch. 7 - WASTE PRODUCTION

PEI	UM	A1-A3	A4	C1	C2	C3	C4	D
HWD	**Kg**	1,09E - 03	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
NHWD	**Kg**	9,10E - 03	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	1,14E - 01	0,00E + 00
RWD	**Kg**	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
CRU	**Kg**	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
MFR	**Kg**	1,17E - 01	0,00E + 00	0,00E + 00	0,00E + 00	8,86E - 01	0,00E + 00	0,00E + 00
MER	**Kg**	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00
EEE	**MJ**	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00	0,00E + 00

All technical specification data and information can be changed without advise.
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