

LEED[®] ASSESSMENT

NPS[®] products contribute
to obtaining LEED[®] credits MR,
IN (v4 and v4.1 BD + C)

©Copyright
TECNOSTRUTTURE s.r.l.

Technical
support by

MDS
MACRO
DESIGN
STUDIO

Tecnostrutture s.r.l.

Via Meucci 26
30020 Noventa di
Piave (VE)

+39 0421 570970

info@tecnostrutture.eu
www.tecnostrutture.eu

p.4	1	INTRODUCTION
p.4	2	TECNOSTRUTTURE VALUES
p.5	3	SUSTAINABILITY OF CONSTRUCTION PRODUCTS AND LEED®
p.5	4	TECNOSTRUTTURE®: SUSTAINABLE SOLUTIONS
p.6	4.1	Tecnostrutture® analyzed products
		a. Airfloor® Slab
		b. NPS® Basic beam
		c. NPS® Cls beam
		d. Pillar NPS® PDTI®
		e. Pillar NPS® PTC®
p.8	4.2	Tecnostrutture® contribution towards LEED v4 BD+C and v4.1 BD+C sustainability rating systems
		· SS prerequisite Construction Activity Pollution Prevention
		· MR prerequisite/credit Construction and Demolition Waste Management Planning / Construction and Demolition Waste Management
		· MR credit Building Product Disclosure and Optimization: Environmental Product Declaration1
		· MR credit Building Product Disclosure and Optimization: Sourcing of Raw Materials
		· IN credit Integrative Analysis of Building Materials
p.10	5	GLOSSARY OF ENVIRONMENTAL TERMS OF CONSTRUCTION PRODUCT

INTRODUCTION

Tecnostrutture® s.r.l. was founded in 1983 as a business operating in the public and private construction industry. Specialised in the reinforced concrete prefabricated industry, the company began to produce metal trusses in 1984, developing its own technologies, calculation processes and production.

In 2013 Tecnostrutture launched New Performance System NPS®, an integrated offsite construction solution, consisting of beam, column and slab. In 2014 he patented Airfloor™, the lightest composite slab on the market. Innovative for its self-supporting capacity up to 5 meters, speed and ease of installation.

Producing and supplying NPS® precast components, Tecnostrutture s.r.l. also offers the technical support of its engineering staff.

Tecnostrutture strives to simplify and organise work in the work site by developing an industrialisation of construction that guarantees the customer fixed times and costs, greater safety and cutting-edge technology. These are the factors that have allowed Tecnostrutture to take part in and often be the protagonist of building large infrastructures, tertiary and residential projects.

Tecnostrutture has its main headquarters at Noventa di Piave in the province of Venice. In 2011, it inaugurated its representative office in Germany, with reference to central and northern European markets.

Production activity to create the metal structures takes place at Noventa di Piave (Venice), at two plants. Further two plants are dedicated to the production of concrete footing used by a few types of NPS® Beams. Another site is reserved for the spinning of NPS® PTC® Columns made with high performance concrete. A further plant is located in southern Italy in Corigliano Calabro.

Tecnostruttura is a member of the Italian Seismic Engineering Association, a supporting member of EUCENTRE (European Center for Training and Research in Earthquake Engineering), a member of the Italian Association for Sustainable Infrastructures, of the Green Building Council Italy and of the Council of Tall Building and Urban Habitat.

TECNOSTRUTTURA VALUES

Knowledge, Robustness, Timing and Essentiality are the values that guide us every day in contributing to the evolution of the construction sector and the improvement of people's quality of life.

Culture

Curiosity, courage and ambition make us active players in our sector, in spreading a new culture of building. Research and development, carried out together with reference technical-scientific partners, allow us to go beyond the limit of current knowledge, breaking traditional patterns.

Robustness

Experience, resilience and vision are the solid pillars on which our work is based. Always being at the forefront in creating durable solutions that challenge time and space: this is the approach with which we guarantee safety and reliability to our customers.

Timing

We have adopted an active attitude towards time, giving it the right value. We work fast to achieve the defined objectives, and with precision to attain optimal results. Our operational approach integrates transversal skills, which translates into simple, fast and efficient project execution.

Essentiality

The essential and minimalist style in building, working and living to which we aspire, is contained in our guiding principle "less is more". In a sustainable way, through a conscious and optimal use of resources, we reduce instead of adding, generating simplicity where there is complexity, valuing only what is necessary and essential, thus achieving our ultimate goal of improving people's quality of life.

SUSTAINABILITY OF CONSTRUCTION PRODUCTS AND LEED®

The construction sector is responsible for the emission of about 36% of CO2 and 30% of waste, starting from this assumption it is natural to understand that the paradigm change in construction, dictated by the sustainability parameters now recognized at a global level, is necessary. The transition to a circular, zero-emissions economy is challenging, but achievable.

In recent years, environmental sustainability protocols have spread and have defined new quality standards in construction. Investors, designers, construction companies are increasingly led to work in an integrated way to obtain the expected result.

The protocol used globally, promoted and adopted in many countries around the world is LEED. This evaluation system takes into consideration not only the parameters related to energy and water saving but defines the characteristics of environmentally preferable materials, it rewards projects that placed in already developed contexts and guarantees, through their requirements, high levels of internal comfort for the occupants.

The choice of materials with sustainable characteristics therefore becomes of fundamental importance to create a building with high environmental performance. Some criteria of the handbook reward the materials with EPD (Environmental Product Declaration), a document that analyzes the life cycle of the material itself, other requirements reward the recycled content rather than the transparency of the composition of the products themselves. Compliance with REACH is another preferential factor.

This document analyzes the sustainability characteristics of Tecnostrutture® products which contributes to obtain the credits relating to the LEEDv4 v4 BD + C: NC and LEED v4.1 BD + C: NC protocol.

LEED®

<https://new.usgbc.org/leedT>



Leadership in Energy and Environmental Design, developed since 1993 by the U.S. Green Building Council (USGBC®), is a voluntary rating system that assesses and certifies the sustainability level of buildings. It is the most widely used green building rating system in the world and it is a collector of measurable environmental strategies to be pursued along all the process: from design to construction and operation phases of sustainable buildings.

LEED is composed by several categories and related requirements (prerequisites and credits): location and transportation, sustainable site, energy and water consumption, construction material, indoor air quality. The "Materials and Resources" category, in particular, focuses on life cycle impacts, materials selection, waste management.

Tecnostrutture® analyzed products

AIRFLOOR® SLAB

The lightest slab on the market. It ensures thermal insulation; it is fast to be placed and meets every project requirement.

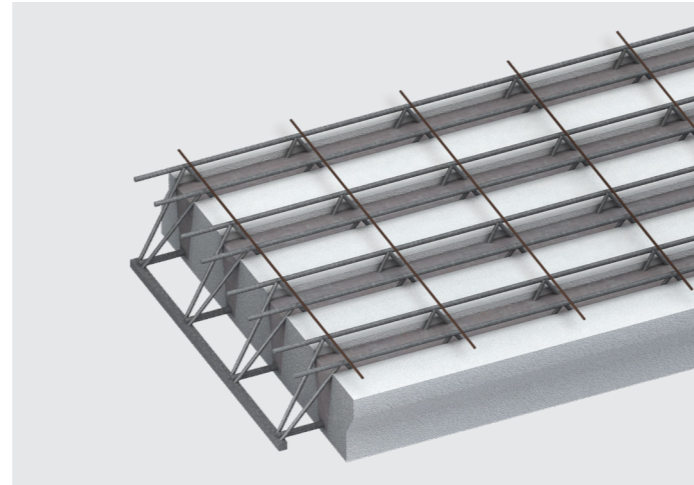
With max. 45 kg/m², Airfloor® is self-supporting up to 5 meters. The EPS (airpop) layer offers thermal insulation and works as casting formwork.

The placement is easy: panels fit together thanks to the structural protrusion of the slab. Casting can start immediately without need for additional nets. The basis is smooth, without downstanding and equipped to accommodate false ceiling.

Airfloor® has been patented by Tecnostrutture s.r.l.

- BENEFITS**
- The lightest self-supporting slab on the market
 - Suitable for highly seismic areas
 - Self-supporting
 - Slim floor, beam-slab without downstanding
 - Suitable for drawing needs
 - Fire resistant with proper finishing
 - Thermal insulation
 - Easy and fast placement
 - Equipped to accommodate false ceiling

> [Link to the website](#)



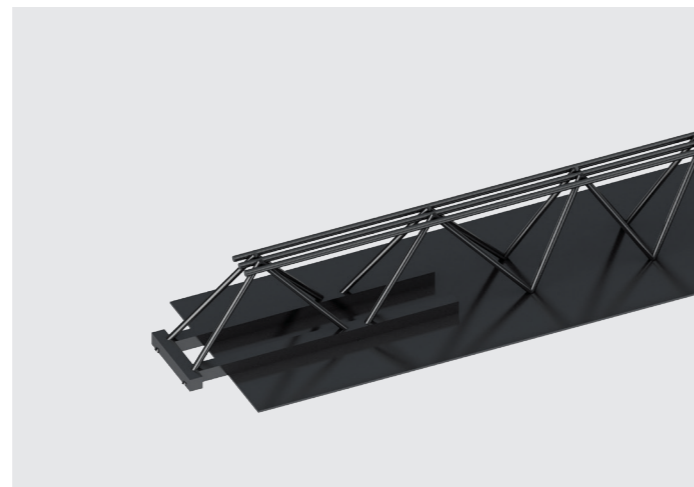
- AREAS OF USE**
- Residential
 - Offices and Shops
 - Renovations
 - Upward extensions
 - High-rise buildings

NPS® BASIC BEAM

The self-bearing composite steel truss and concrete NPS® Basic beam is recommended for structures with large spans, residential and industrial buildings, and for infrastructure.

The metal structure, made of structural steel pursuant to Standard UNI EN 10025-2 and with EN 1090-1 CE marking is composed of:

- lower chord formed by a plate and possible additional rebar soldered to it;
- upper chord formed by at least one pair of profiles;
- connection web, simple or double, soldered to the upper and lower chords;
- appropriately sized support terminals, which serve as anchoring devices, resist sliding actions.



NPS® CLS BEAM

The self-bearing composite steel truss and concrete NPS® CLS Beam offers integrated fire resistance in conformity to Eurocode 2-2. It is ideal for fire-resistant structures with large overloads and/or spans; it is particularly suited to coupling with hollow core slab or slab ceilings.

The metal structure, made of structural steel (UNI EN 10025-2), with EN 1090-1 CE marking, is made of one or more trusses welded using metal active gas welding (Process UNI EN ISO 4063-135).

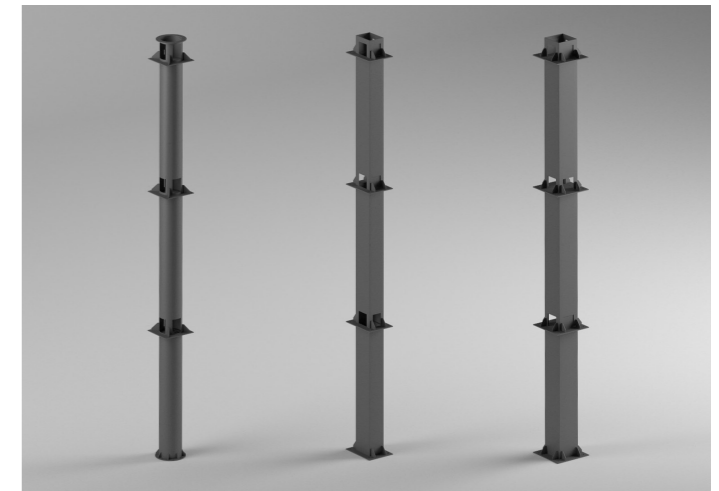
The lower chords are inserted in a class C28/35 concrete footing (UNI EN 206-1:2006), precast and equipped with reinforcement and surface reinforcement sized to support the load of the heavy ceilings on NPS® CLS Beam.



COLUMN NPS® PDTI®

Recommended for construction in seismic zones, and to make the best use of space thanks to the compactness of sections with the same required performance, for structure ductility and beam-column node confining. It is suitable for infrastructure, major projects, and just as it is for residential buildings.

EN 1090-1 CE marked, NPS® PDTI® is comprised of metal profiles with circular, square or rectangular sections, usually filled with concrete. It joins the versatility of a metal structure in the provisional phase with the resistance of a composite steel-concrete structure in the working phase. It can be supplied with helical or vertical welding, and if requested in a multi-story version, even with a differentiated section for each interfloor.



PILLAR NPS® PTC®

Ideal as a design component thanks to its numerous color finishes, polishing or chrome plating. It is recommended to exploit available space to the fullest, thanks to the compactness of its sections given the same required performance.

With UNI EN 13225 CE marking, the patented NPS® PTC® Column is realized using spun concrete for high performance, up to class C70/85.

The spinning treatment allows a reduction in the structural section, with resulting benefits in terms of usability of space, a greater bearing capacity compared to traditional structures and extremely homogenous surfaces.



Tecnostrutture® contribution towards LEED v4 BD+C and v4.1 BD+C sustainability rating systems

The sustainability quality of Tecnostrutture® products is recognized through the certifications of its characteristics and its contribution towards the requirements of LEED rating system. Here the main sustainability indicators of Tecnostrutture® products and relevant credits of LEED v4 BD+C and v4.1 BD+C rating systems that these characteristics contribute to.

SS prerequisite Construction Activity Pollution Prevention

The mandatory prerequisite intent is to reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust. The use of partially or totally prefabricated elements such as Tecnostructures® products allows to minimize the work on site and, more generally, the impact on the environment. For products that require the creation of on-site castings, such as the NPS® Basic beam or the NPS® PDTI® Pillar Tecnostructures® recommends to agree in advance with the concrete supplier methods and responsibilities for concrete truck mixer washing management. In order not to avoid runoff of liquids with a negative impact on the environment, these waters must be collected and left to dry, finally the dry concrete residue must be sent for recycling as waste.

MR credit Building Product Disclosure and Optimization: Environmental Product Declaration

The credit intent is to encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.

The availability of product-specific type III Environmental Product Declaration (EPD) contributes to this credit, that promotes the transparency of life-cycle information regarding the environmental impacts of construction products. Tecnostrutture® developed a Life-Cycle Assessment (LCA) for each product evaluating its potential environmental impact throughout its life cycle. Each LCA provides a comprehensive picture of the product, enabling project teams to make more informed decisions in relation to its environmental impacts, this is the base for the EPD developed in compliance with ISO 14025 and EN 15804.

MR prerequisite/credit Construction and Demolition Waste Management Planning / Construction and Demolition Waste Management

The mandatory prerequisite and the credit intent are to reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials. The use of partially or totally prefabricated elements such as Tecnostructures® products allows to minimize or avoid the waste production during installation. Tecnostructures® products do not generate waste on site as they are factory custom-made products produced optimizing raw materials. Beams and pillars arrive on site without packaging, eliminating the problem of managing casings at the root.

For LEED v4 BD+C MR credit Building Product Disclosure and Optimization: Environmental Product Declaration option 1 each product-specific Type III Environmental Product Declarations that conforms to ISO 14025 and EN 15804 or ISO 21930 is evaluated as 1.

For LEED v4.1 BD+C MR credit Building Product Disclosure and Optimization: Environmental Product Declaration option 1 each product-specific Type III Environmental Product Declarations that conforms to ISO 14025 and EN 15804 or ISO 21930 is evaluated as 1,5.

For each Tecnostrutture® product is available a third part verified EPD, products are grouped as follows:

- Airfloor® Slab
- NPS® Basic beam and NPS® Cls beam
- Pillar NPS® PDTI®
- Pillar NPS® PTC®

MR credit Building Product Disclosure and Optimization: Sourcing of Raw Materials

The credit intent is to encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner. For each Tecnostrutture® product is available a specific recycle content declaration compliant with ISO 14021 Environmental Labels and Declarations—Self Declared Environmental Claims (Type II Environmental Labeling). Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content, based on weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

For LEED v4 BD+C MR credit Building Product Disclosure and Optimization: Sourcing of Raw Materials option 2 each product that meet the recycled content responsible extraction criteria is evaluated for the product cost and contributes to reach the threshold of 25%, by cost, of the total value of permanently installed building products in the project. For LEED v4.1 BD+C MR credit Building Product Disclosure and Optimization: Sourcing of Raw Materials option 2 each product that meet the recycled content responsible extraction criteria is evaluated for the product cost and contributes to reach the threshold of 20%, by cost, of the total value of permanently installed building products in the project. Tecnostrutture is committed to make available on request a self-declaration reporting the pre-consumer and post-consumer recycled content for each product.

IN credit Integrative Analysis of Building Materials

The credit intent is to encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To inform decision-making by project teams by rewarding building material manufacturers that share life cycle health, safety and environmental information about their products.

For each Tecnostrutture® product is available a specific declaration with all information required for the Integrative Analysis of Building Materials, that requires to consider:

- Intended and reasonably anticipated uses of the product,
- Potential hazardous exposures,
- Product service life,

- Waste generation and/or materials reuse,
- Contributions to health, safety and the environment, including improvements to occupant safety, air quality, water quality, materials reuse, energy efficiency, and carbon mitigation.

The completed table is available on request for each product:

- Airfloor® slab
- NPS® Basic beam
- NPS® Cls beam
- Pillar NPS® PDTI®
- Pillar NPS® PTC®

GLOSSARY OF ENVIRONMENTAL TERMS OF CONSTRUCTION PRODUCTS

Environmental Product Declaration (EPD)

An EPD is an independently verified and registered document that provides in a standardized way the environmental impacts (e.g. global warming potential, depletion of abiotic resources, acidification potential) of a product or system. The way to standardize the information for a specific product type is defined by the relevant Product Category Rule (PCR), which is consistent with EN 15804.

A Type III EPD includes data from a Life-Cycle Assessment (LCA) of the product or system and is defined by the relevant PCR so that all EPDs for that product type are comparable. Type III EPDs conform to ISO 14025 or ISO 21930.

Post-consumer recycled content

Post-consumer recycled content is consumer waste, much of which comes from residential curbside recycling programs for aluminum, glass, plastic, and paper. Other post-consumer feedstock is generated when construction and demolition debris is recycled. To be a feedstock, the raw materials must have served a useful purpose in the consumer market before being used again.

For LEED default recycled content for steel products where no recycled content information is available, assume the recycled content to be 25% post-consumer. No other material is known to have a similarly consistent minimum recycled content.

Pre-consumer recycled content

Pre-consumer recycled content comes from process waste that is used to make a different product. For instance, a composite board manufacturer may use sawdust from a lumber mill or waste straw from a wheat farm. This definition does not include in-house industrial scrap or trimmings, which are normally fed back into the same manufacturing process.

The end product must be considered when determining whether a waste product is pre-consumer or postconsumer. For example, a power plant's end product is electricity, so waste products from the combustion of coal may be considered pre-consumer waste but not postconsumer; the power plant is not an end-use consumer of the coal.

Life Cycle Assessment (LCA)

LCA is an evaluation of the potential environmental impacts of a product system throughout its life cycle, based on ISO 14040 and ISO 14044 standards. An LCA provides a comprehensive picture of a product, enabling project teams to make more informed decisions in relation to its environmental impacts.

Recycled Content

Recycled content claims for products must conform to the definition in ISO 14021–1999, Environmental Labels and Declarations, Self-Declared Environmental Claims (Type II Environmental Labeling).