CEL COMPONENTS

SANDWICH PANELS AND HONEYCOMB

www.celcomponents.com

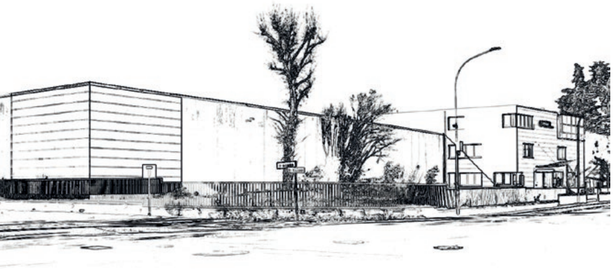












The company

CEL supplies honeycomb cores and sandwich panels with applications in different sectors:

- Marine: shipyards and yachts (furniture, floorings, bulkheads, etc.)
- Railway: railcars (floorings, partitions, ceilings, etc.)
- Automotive: crash absorbers
- Clean Rooms, negative room pressure and bio-containment
- Protective barriers
- Buildings (ventilated facades, elevator cabins, etc.)
- Interiors (furniture, walls, etc.)
- Support for natural and engineered stone (marbles, semi-precious stones, mosaics, etc.)
- Ballistic (shock and debris absorbers)
- Lighting: Anti-reflection and dimming systems
- Refrigeration and air deflection
- Vacuum tables

Company quality policy and mission

Constantly pursuing innovation and sustainable opportunities.
We manage our development projects with proficiency, embracing dialogue.
We pursue excellence, growth and upmost respect for people.
EMPOWERING LIGHTNESS is not just a motto, but a way of thinking.

Certifications

In order to achieve its goals, CEL has restructured its process and its organization.
Not only does the company have three internal laboratories to test its products, but they also meet the standards of UNI EN ISO 9001-2015.
In addition, they work in compliance with ISO 14001 and ISO 45001 certification.

Sustainability

Sustainability it is one of the focus points of CEL's policy. Life cycle and recyclability of its products are considered.
COMPOCEL AL's Lifecycle has been analysed to better understand its environmental impact. A BIM model is available.
CEL also uses green energy to produce their products.

Certifications summary table

Application	Norm	Classification	Description	Products		
	IMO MED 0407 FPT CODE 2010	**MOD. B & D** Incombustibility	3.13 Non combustible materials	Aluminium Honeycomb		
		MOD. B & D Low flamespread	3.18 Surface materials and floor coverings	Alustep F Alustep HFR	Alustep FN Compocel AL FR	Compocel ALF
		C Class Division Incombustibility	3.64 C class divisions	Compocel AL FR		
	U.S. COAST GUARD	**MOD. B & D** Incombustibility	164.109 Non combustible materials	Aluminium Honeycomb		
		MOD. B & D Low flamespread	164.112 Interior Finish (Bulkheads and Ceiling Finishes)	Alustep F Alustep HFR	Alustep FN Compocel AL FR	Compocel ALF
	NFP 92-507	**M0** Incombustibility	Fire Safety - Construction - Interior Equipment	Aluminium Honeycomb		
		M1 Not flammable	Fire Safety - Construction - Interior Equipment	Compocel AL FR		
	UNI EN 13501-1	**A1** Incombustibility	Classification according to the fire performance of construction products and building elements	Aluminium Honeycomb		
		B - Low flamespread **s1** - Smoke emission absent **d0** - No dripping	Classification according to the fire performance of construction products and building elements	Compocel AL FR		
	UNI EN 13501-1	**A2** - Non combustible **s1** - Smoke emission absent **d0** - No dripping	Suspended ceilings, countertops	Compocel AL FR		

Application	Norm	Classification	Description	Products
	UNI EN 13501-1	**A2** - Non combustible **s1** - Smoke emission absent **d0** - No dripping	Ventilated facades	Compocel AL FR
	UNI EN 13501-1	**A2fl** - Non combustible **s1** - Smoke emission absent **d0** - No dripping	Floors	Compocel AL FR Compocel FLOOR
		Bfl - Low flamespread **s1** - Smoke emission absent **d0** - No dripping	Floors	Compocel AL FR Compocel FLOOR
	UNI EN 13501-1	Hazard level **HL2**	R1 - Partition walls and bulkheads R2 - Suspended ceilings, countertops	Alustep F (from 4 to 49 mm) Alustep FN (from 10 to 25 mm)
		Hazard level **HL3**	R10 - Floors	Alustep F Alustep FN
			R1 - Partition walls and bulkheads R2 - Suspended ceilings, countertops	Compocel ALF (23 mm)
			R1 - Partition walls and bulkheads R2 - Suspended ceilings, countertops R10 - Floors	Compocel AL FR

American Standards							Products
	American Standards	**ASTM C67-M18** Water absorption	**ASTM E72-15** Transversal load resistance	**ASTM C297 M-16** Resistance to traction	**ASTM E84-17** Flame propagation	**TAS 201, TAS 203** Hurricane resistance	Compocel AL FR Alustep 500 SL

Shipyards and Shipbuilding

Honeycomb cores and sandwich panels are used in shipyards to reduce the weight of structures, fixtures and furniture, while maintaining high mechanical properties. Many are the applications: partitions, interiors, furniture, ceilings, and floor systems for engine rooms. Aluminium honeycomb and sandwich panels Compocel AL FR*, Compocel ALF*, Alustep F*, Alustep HFR* e Alustep FN* obtained IMO MED Certification Mod. B and D according to FTP Code 2010. COMPOCEL AL FR achieved also C class division certificate.



Mini Transat - Luca Rosetti - Nomex Panels





SANDWICH PANELS, HONEYCOMBS AND FOAMS:



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

IMO MED CERTIFICATION MOD. B, D and PARTITION C.
USCG 164.112



COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*
Upper face anti-slip coatings.
Lower skin: raw aluminium.

IMO MED CERTIFICATION MOD. B and D
USCG 164.112



COMPOCEL ALF*
Skins: fibreglass impregnated with phenolic resin.

IMO MED CERTIFICATION MOD. B and D
USCG 164.112



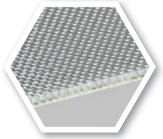
ALUSTEP F*
Skins: fibreglass impregnated with phenolic resin.

IMO MED CERTIFICATION MOD. B and D
USCG 164.112



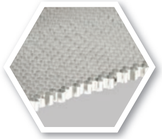
ALUSTEP FN*
Skins: fibreglass impregnated with phenolic resin.

IMO MED CERTIFICATION MOD. B and D
USCG 164.112



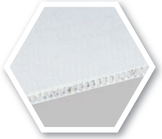
ALUSTEP HFR*
Skins: fibreglass impregnated with epoxy resin.

IMO MED CERTIFICATION MOD. B and D
USCG 164.112

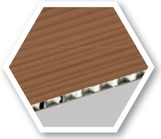


ALUMINIUM*

IMO MED CERTIFICATION MOD. B and D
USCG 164.109



ALUSTEP W
Skins: fibreglass impregnated with epoxy resin.



COMPOCEL ALH*
Faced on one or both sides with decorative laminate.
Upper and lower skin in raw aluminium.

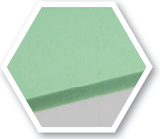
COMPLIES WITH STANDARD ISO 4211-4: 1988 IMPACT TEST



COMPOCEL W
Skins: plywood



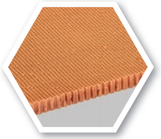
PMI



PVC - PET



POLYPROPYLENE



ARAMID PAPER

OTHER CUSTOM PANELS AVAILABLE UPON REQUEST

* Certified products must be required in advance and might have a price surcharge due to certified materials.

Railways

In the railway sector, CEL's sandwich panels are used as partitions, ceilings, floors, bulkheads, tables, etc. These lightweight panels are generally composed of three layers: a core in pet foam, aluminium or aramid paper honeycomb bonded with two skins either in aluminium, high pressure laminate or fibreglass.





SANDWICH PANELS AND HONEYCOMBS:



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

CLASSIFICATION
HL3 for R1 - R2 - R10
according UNI EN 45545-2



ALUSTEP F*
Skins: fibreglass impregnated with phenolic resin.

CLASSIFICATION
HL3 for R1 - R2 - R10
according UNI EN 45545-2



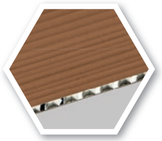
ALUSTEP FN*
Skins: fibreglass impregnated with phenolic resin.

CLASSIFICATION
HL2 for R1 - R2 / HL3 for R10
according UNI EN 45545-2



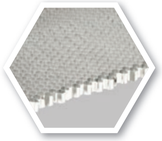
COMPOCEL ALF*
Skins: fibreglass impregnated with phenolic resin.

CLASSIFICATION
HL3 for R1 - R2
according UNI EN 45545-2



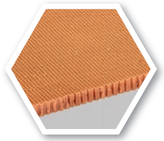
COMPOCEL ALH*
Faced on one or both sides with decorative laminate. Upper and lower skin in raw aluminium.

ASSESSMENT OF RESISTANCE
TO IMPACT according
to ISO 4211-4: 1988



ALUMINIUM*

CLASSIFICATION
A1 according
UNI EN 13501 - 1



ARAMID PAPER



According to the UNI-EN 45545-2:2015 sandwich panels COMPOCEL AL FR*, ALUSTEP F* and ALUSTEP FN* obtained class HL3 (maximum safety limit) for R10.
COMPOCEL AL FR* and COMPOCEL ALF* obtained HL3 also for R1 and R2. ALUSTEP F* and ALUSTEP FN* obtained class HL2.



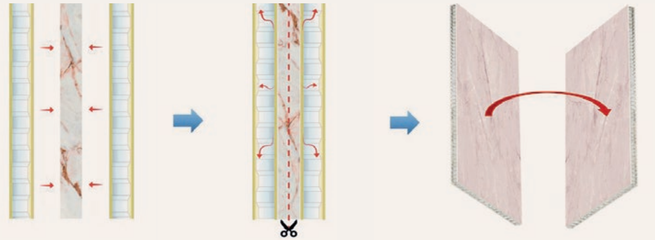
The panels that meet the risk levels HL3 and HL2 of the UNI-EN 45545-2:2015 standard are used in the interiors of railway carriages, particularly in: floors, ceilings, vertical and partition walls, tables, seats, luggage racks, etc.

* Certified products must be required in advance and might have a price surcharge due to certified materials.

Stone reinforcement

CEL's lightweight sandwich panels with honeycomb cores faced with sheets of fibreglass impregnated with epoxy or phenolic resin (Step-Series) are used to reinforce marble and semi-precious stones. By applying the panels to natural stones, the thickness of the slabs can be halved, greatly reducing the material weight and cost. This application is not only limited to marble and precious stones, but can also be used with any natural or engineered stone or porcelain material.





1 - GLUING
Two **panels** are glued to one side of the **stone**.

2 - SPLITTING
Honeycomb **panels absorb the stresses** produced by the splitting process, thus **avoiding fractures** in the material.

3 - RESULT
The marble **surface doubles** while the **weight decreases** drastically.



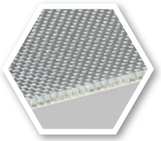
Backlit marble - Clearstep

SANDWICH PANELS:



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

IMO MED CERTIFICATION MOD. B AND D USCG 164.112
A2 e Bs1d0 ACCORDING UNI EN 13501 - 1
STANDARD ASTM C297 / ASTM E72-15 / ASTM E84-17A
TAS 201 /T AS 203



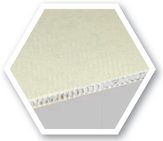
ALUSTEP HFR
Skins: fibreglass.

IMO MED CERTIFICATION
MOD. B e D
USCG 164.112



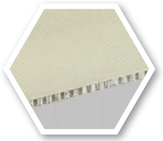
ALUSTEP F*
Skins: fibreglass impregnated with phenolic resin.

IMO MED CERTIFICATION
MOD. B AND D
USCG 164.112

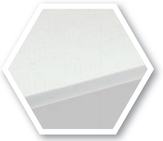


ALUSTEP 500 SL
Skins: fibreglass impregnated with epoxy resin.

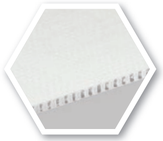
STANDARD
ASTM C297
ASTM E72-15 / ASTM E84-17A
TAS 201 / TAS 203



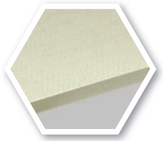
ALUSTEP 500
Skins: fibreglass impregnated with epoxy resin.



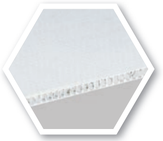
CLEARPET
Skins: fibreglass.



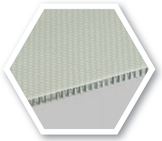
CLEARSTEP
Skins: fibreglass impregnated with epoxy resin.



PVC-STEP
Skins: fibreglass impregnated with epoxy resin.



ALUSTEP W
Skins: fibreglass impregnated with epoxy resin.



ALUSTEP 300 L
Skins: fibreglass impregnated with epoxy resin.

OTHER CUSTOM PANELS AVAILABLE UPON REQUEST

* Certified products must be required in advance and might have a price surcharge due to certified materials.

Building

In the building industry, CEL's sandwich panels are used for cladding, floors and ventilated facades and decorative uses. CEL supplies a wide variety of panels faced with different materials: aluminium and stainless steel are just two examples. CEL's aluminium honeycomb is classified A1 and M0 while COMPOCEL AL FR is classified A2, A2fl and B according to the UNI EN 13501-1 and M1 according to the French building norms.







Airport Charles de Gaulle - Compocel AL panels

SANDWICH PANELS AND CORES:



COMPOCEL AL

COMPOCEL AL FR*

Skins: aluminium.

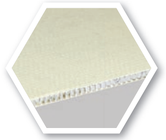
CLASSIFICATION
A2 e Bs1d0 ACCORDING UNI EN 13501 - 1
M1 ACCORDING NF P92-507
STANDARD ASTM C297 / ASTM E72-15 / ASTM E84-17A
TAS 201 / TAS 203



COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*

Upper face anti-slip coatings.
Lower skin: raw aluminium.

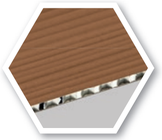
CLASSIFICATION
A2fl s1 d0 ACCORDING
UNI EN 13501 - 1



ALUSTEP 500 SL*

Skins: fibreglass impregnated with epoxy resin.

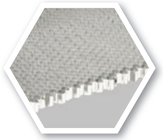
STANDARD
ASTM C297 / ASTM E72-15 / ASTM E84-17A
TAS 201 / TAS 203



COMPOCEL ALH*

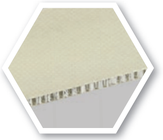
aced on one or both sides with decorative laminate.
Upper and lower skin in raw aluminium.

ASSESSMENT OF RESISTANCE
TO IMPACT ACCORDING
TO ISO 4211-4: 1988



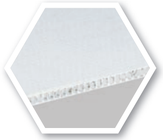
ALUMINIUM*

CLASSIFICATION
M0 ACCORDING NF-P92507
A1 ACCORDING UNI EN 13501 - 1



ALUSTEP 500

Skins: fibreglass impregnated with epoxy resin.



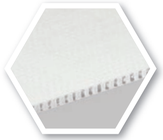
ALUSTEP W

Skins: fibreglass impregnated with epoxy resin.



ALUSTEP F

Skins: fibreglass impregnated with phenolic resin.



CLEARSTEP

Skins: fiberglass impregnated with epoxy resin.

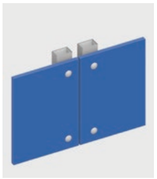


CLEARPET

Skins: fiberglass impregnated with epoxy resin.



Suspended vertical
System with hook



System with bolt coupling

* Certified products must be required in advance and might have a price surcharge due to certified materials.

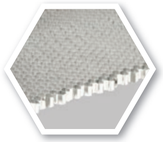
Canopies

CEL Components supplies panels for metro, bus, and train station canopies: shaped, perforated, and with inserts according to customer specifications. The panels are available in various sizes and types to meet any aesthetic and technological requirements.



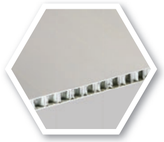
Geneva Airport

SANDWICH PANELS, HONEYCOMBS AND FOAMS:



ALUMINIUM*

CLASSIFICATION
A1 ACCORDING
UNI EN 13501 - 1
M0 ACCORDING NF-P92507



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

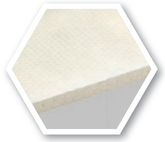
CLASSIFICATION
A2 e Bs1d0 ACCORDING
UNI EN 13501 - 1



COMPOCEL ALP
Skins: aluminium.



PVC - PET - PMI



POLYPROPYLENE







Geneva Airport

* Certified products must be required in advance and might have a price surcharge due to certified materials.

Interiors

CEL's sandwich panels are highly valued by designers.
Ultralight, with outstanding dimensional stability and available in a variety of coatings, they allow unlimited in creativity design.
They have multiple applications (tables, seats, countertops, separating walls, etc.) depending on the sector, from shipyards and yahcts, to railways, or shop's interios, etc.



Interiors Shop – Screen in aluminium honeycomb



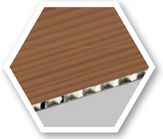
Le Madeleine - Trois Quartiers - Ora-ïto – Aluminium Honeycomb

SANDWICH PANELS, HONEYCOMBS AND FOAMS:



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

CLASSIFICATION
A2 e Bs1d0 ACCORDING
UNI EN 13501 - 1



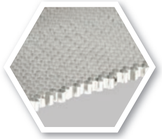
COMPOCEL ALH*
Faced on one or both sides with decorative laminate. Upper and lower skin in raw aluminium.

ASSESSMENT OF RESISTANCE
TO IMPACT ACCORDING
TO ISO 4211-4: 1988



COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*
Upper face chosen among different antiskid/ anti-slip coatings.
Lower skin: raw aluminium.

CLASSIFICATION
A2fl s1 d0 ACCORDING
UNI EN 13501 - 1



ALUMINIUM*

CLASSIFICATION
A1 SECONDO
UNI EN 13501 - 1



COMPOCEL WP
Skins: plywood.



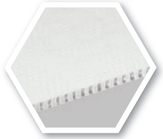
STEP SERIES
Skins: fibreglass impregnated with epoxy resin.



ALUSTEP F
Skins: fibreglass impregnated with phenolic resin.



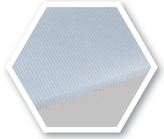
COMPOCEL W
Skins: plywood.



CLEARSTEP
Skins: fibreglass impregnated with epoxy resin.



POLYPROPYLENE



POLYCARBONATE



PVC - PET

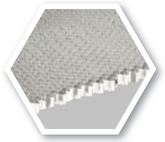
* Certified products must be required in advance and might have a price surcharge due to certified materials.

Cleanrooms

Cleanrooms are uncontaminated areas used for scientific purposes, such as laboratories of various kinds (chemical, mechanical, opto-electronical), where airborne micro particles, environmental pollutants and microbes must be greatly reduced. CEL's sandwich panels for clean rooms are generally made of an aluminium honeycomb core bonded with two skins of high-pressure laminate or aluminium; they can be painted with anti-static ESD if specifically requested. These panels are normally used in walls, doors, floors, and ceilings.



SANDWICH PANELS AND HONEYCOMBS:



ALUMINIUM*

CLASSIFICATION
A1 ACCORDING
UNI EN 13501 - 1



COMPOCEL AL
COMPOCEL AL FR*

Skins: aluminium.

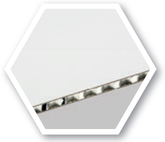
CLASSIFICATION
A2 e Bs1d0 ACCORDING
UNI EN 13501 - 1



COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*

Upper face chosen among different antiskid/ anti-slip coatings. Lower skin: raw aluminium.

IMO MED CERTIFICATION MOD. B e D
USCG 164.112



COMPOCEL H

Skins: high pressure laminate.



Biohazard environments

Health and hygiene safety, can also be guaranteed by the use of new construction materials. Most of CEL's sandwich and honeycomb panels are applied by systems engineers, manufacturing companies in clean rooms, protected environments or bio-containment modules. Lightness, but great rigidity, resistance and special surface finishes, even with antibacterial paints are an excellent response to the needs of systems engineers who provide turnkey modules.



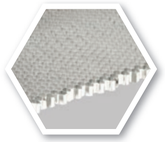
SANDWICH PANELS AND HONEYCOMBS:



COMPOCEL AL
COMPOCEL AL FR*

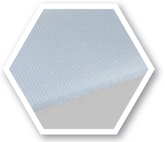
Skins: aluminium.

CLASSIFICATION
A2 e Bs1d0 ACCORDING
UNI EN 13501 - 1



ALUMINIUM*

CLASSIFICATION
A1 ACCORDING
UNI EN 13501 - 1



POLYCARBONATE

CEL IS SUPPLIER FOR
CURA
THE MODERN CONCEPT OF CONTAINERS.

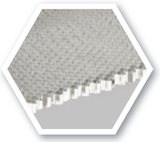
* Certified products must be required in advance and might have a price surcharge due to certified materials.

Acoustic climate panels

The acoustic climate panels have been specially designed to overcome health, noise, weight and ventilation problems; on the one hand they improve the acoustics by absorbing certain frequences, on the other hand they reduce reverberation in closed spaces. CEL offers aluminium as a solution for sound absorption and air conditioning; panels can be extremely light, 2m in width and 6m in length.



SANDWICH PANELS AND HONEYCOMBS:

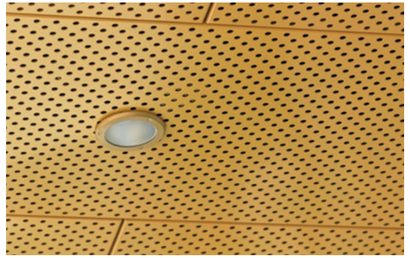


ALUMINIUM*



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

CLASSIFICATION
A1 SECONDO
UNI EN 13501 - 1



DOUBLE-SIDED PERFORATION

The perforations on both sides of the panels permits to use them as part of conditioning systems that absorb sound waves, through an internal non-woven fabric, allowing the passage of evenly distributed hot/cold air.

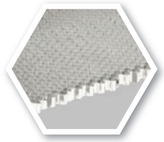
Honeycomb for Laser and Waterjet Cutting Machines

Laser jet cutting and engraving machines, made of aluminium honeycomb are used in different sectors: from footwear to textiles, from gift items to furnishings, from modelling to advertising. Even water jet cutting machines with honeycomb worktops, such as polypropylene create different types of objects.

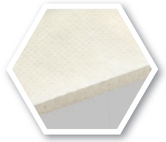




HONEYCOMBS:



ALUMINIUM



POLYPROPYLENE

ALUMINIUM HONEYCOMB

The 3000 aluminium series, available in 3 and 6 mm diameter hexagonal cells with anti-corrosion treatment and with customizable thicknesses is the most suitable element for laser cutting working tables. It is perfect for cutting wood, acrylic, plexiglass, paper, plastic, rubber and many other non-metallic materials. The aluminium honeycomb working tables for laser cutting machines are particularly suitable when processing small details which, without adequate support, would fall off the cutting table.

POLYPROPYLENE HONEYCOMB

The sheets in polypropylene honeycomb covered wit non-woven fabric are used for water jet cutting tables.
They reduce misting and splashing, are robust, practical to handle and economical.

* Certified products must be required in advance and might have a price surcharge due to certified materials.

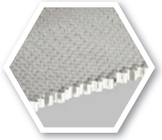
Ballistic Panels

Honeycomb panels have extraordinary potential when applied in ballistics. They can in fact absorb strong shock waves, splinters and retain fragments. They are light and therefore easy to be transported as well.
Compared to normal kinetic absorption strategies, composite materials offer modular solutions with low space consumption. In addition, they can be easily mounted and replaced.



Termini Station - Floating parking - Compocel AL reinforced

SANDWICH PANELS AND HONEYCOMBS:



ALUMINIUM*

IMO MED CERTIFICATION MOD. B e D
USCG 164.109
CLASSIFICATION
M0 ACCORDING NF-P92507
A1 ACCORDING UNI EN 13501 - 1



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

CLASSIFICATION
A2 e Bs1d0 ACCORDING UNI EN 13501 - 1
M1 ACCORDING NF P92-507
STANDARD ASTM C297 / ASTM E72-15 / ASTM E84-17A



COMPOCEL ALP
Skins: aluminium.

The thick aluminium structure absorbs impacts, thanks to its ability to be deformed.



SOME OF THE REALIZED PROJECTS

2019 - Roma Termini - PARKING - Floating floor - 14000 sqm
ITALY
This system is used in the lower floor of the parking lot, coupled with the supporting structure. It has been designed to withstand the weight of the upper structure in case of collapses due to an explosion.

2019 - Protection for electronic instruments - ISRAEL
Part of a shelter system for electronic instruments mounted on a truck.
Polypropylene was chosen for its lightness and for its thermal insulation characteristics.

2018 - Underbody for armored vehicles
EGYPT
High-density aluminium panels are used as I.E.D shield (Improvised Explosive Devices) in vehicle floors. Specific alloys and densities coupled with the appropriate size are capable of absorbing the power of a close detonation.

2005 - Heat deflectors for rocket launchers
ITALY
A combination of carbon and aramid fibres and special resins helps protecting the vehicle from the heat released by the missiles at the time of injection.
The heat of the propulsion is absorbed by a medium density aluminium honeycomb positioned under the fabric.

* Certified products must be required in advance and might have a price surcharge due to certified materials.

Flightcases & racing boxes

CEL designs and manufactures flight cases for lighting, acoustic sector and motorsport, offering a range of boxes suitable to every need. CEL's products stand out for their lightness and sturdiness, suitable for being transported on any vehicle, thus reducing transport costs. Elegance, precision and quality are the keywords of a company that aims to comply with the most demanding requests.



Wind energy

In the wind energy sector, aluminium honeycomb, foams, and sandwich panels can be used in and for rotor blades, nacelles and turbine generator housings.

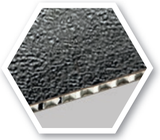


SANDWICH PANELS:

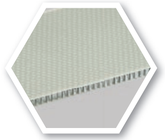


COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

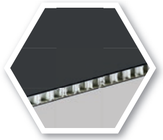
CLASSIFICATION
A2 and Bs1d0 SECONDO UNI EN 13501 - 1
M1 ACCORDING NF P92-507
STANDARD ASTM C297 / ASTM E72-15 / ASTM E84-17A



COMPOCEL ALH
Both skins in Aluminium, upper skin: HPL Laminate.



ALUSTEP 300 LIGHT
Skins: fibreglass.



CARBONSTEP
Pre-impregnated carbon skins.

CUSTOMIZATIONS:
basic colours, HPL laminates, engraving and screen printing.

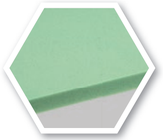




HONEYCOMBS AND FOAMS:



DRILLED ALUMINIUM HONEYCOMB



PVC - PET - PIR



PMI



DRILLED ALUMINIUM HONEYCOMB	
ALLOY	**SERIES 3000**
CELL DIAMETER	Ø 3/8" +/-10%
PERFORATION	YES
FOIL THICKNESS	70 MICRON+16/-8 MICRON
DENSITY	54 KG/M³ +/-10%
TOTAL THICKNESS	60mm +/- 0.05
DIMENSIONS	L-1250 mm (-0/+50 mm) X W-2500 (-0/+50 mm) EXPANDED L-1000 mm (-0/+100) X W-3000 (-0/+100) OVEREXPANDED.

* Certified products must be required in advance and might have a price surcharge due to certified materials.

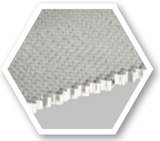
Automotive

Some CEL's products are applied in the automotive sector. As they absorb kinetic energy, both honeycomb cores and sandwich panels are used as shock absorbers. In particular, a thick slice of aluminium honeycomb used as crash absorber, is encapsulated in a metal box, and positioned either in the front or the back of vehicles to absorb energy. CEL can deliver IMDS datasheets for its automotive products.

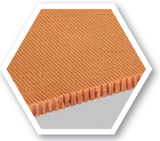




HONEYCOMBS:



ALUMINIUM



ARAMID PAPER



PVC - PET



PMI

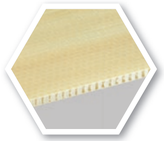
SANDWICH PANELS:



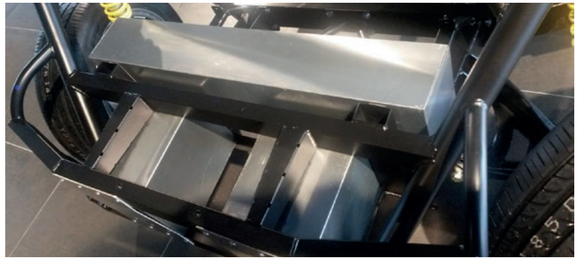
COMPOCEL AL
COMPOCEL AL FR
Skins: aluminium.



STEP SERIES
Skins: fibreglass impregnated with epoxy resin.

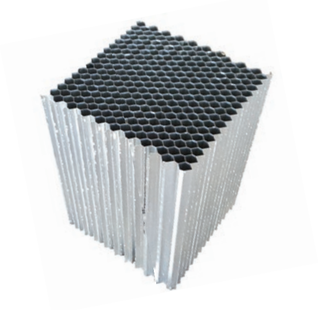


POLISTEP
Skins: fibreglass impregnated with epoxy resin.



Crash absober - Tazzari Zero

Aluminium and aramid paper honeycomb cores are also used in composite panels destined to the vehicle platform (e.g. the underside of the vehicle).



* Certified products must be required in advance and might have a price surcharge due to certified materials.

Elevators

In elevators, CEL's panels can be used both in floors with an anti-skid covering and as wall and ceiling coverings. The high-performance Compocel AL FR * panel has an excellent reaction to fire in different sectors: Mod. B and D certifications for the maritime sector and A2s1d0 for walls and facades and Bs1d0 for building floors.



Railcars

Lightness is the keyword in vehicles such as cabins and cable cars. Sandwich panels are used both to lighten structures and to avoid the imperfections of the joints in coverings, ceilings and floors.



LEITNER SpA – Telefericos Y Nieve - Re-fitting of cable cars at Santa Cova – Montserrat – Spain. Cable car interiors - Compocel AL

SANDWICH PANELS AND HONEYCOMBS:



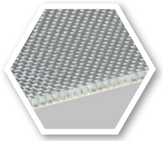
COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

IMO MED CERTIFICATION MOD. B e D USCG 164.112
A2 s1d0 ACCORDING UNI EN 13501 - 1
STANDARD ASTM C297 / ASTM E72-15 / ASTM E84-17A



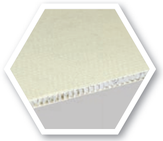
COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*
Upper face anti-slip coatings.
Lower skin: raw aluminium.

CLASSIFICATION
A2fl s1 d0 ACCORDING
UNI EN 13501 - 1



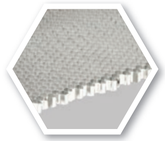
ALUSTEP HFR
Skins: fibreglass.

IMO MED CERTIFICATION
MOD. B e D
USCG 164.112



ALUSTEP 500 SL*
Skins: fibreglass impregnated with epoxy resin.

STANDARD
ASTM C297 / ASTM E72-15 / ASTM E84-17A
TAS 201 / TAS 203

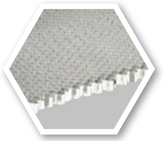


ALUMINIUM*

CLASSIFICATION A1 ACCORDING
UNI EN 13501 - 1
M0 ACCORDING NFP 92-507



COMPOCEL SANDWICH PANELS AND HONEYCOMBS:



ALUMINIUM*

CLASSIFICATION
A1 ACCORDING
UNI EN 13501 - 1



COMPOCEL AL
COMPOCEL AL FR*
Skins: aluminium.

CLASSIFICATION
A2 s1d0 ACCORDING
UNI EN 13501 - 1



COMPOCEL AL FLOOR
COMPOCEL AL FR FLOOR*
Upper face anti-slip coatings.
Lower skin: raw aluminium.

CLASSIFICATION
A2fl s1 d0 and B s1 d0 ACCORDING
UNI EN 13501 - 1



COMPOCEL ALP
Skins: aluminium.



LEITNER SpA – Telefericos Y Nieve - Compocel AL
Wagon at cable car lift departure

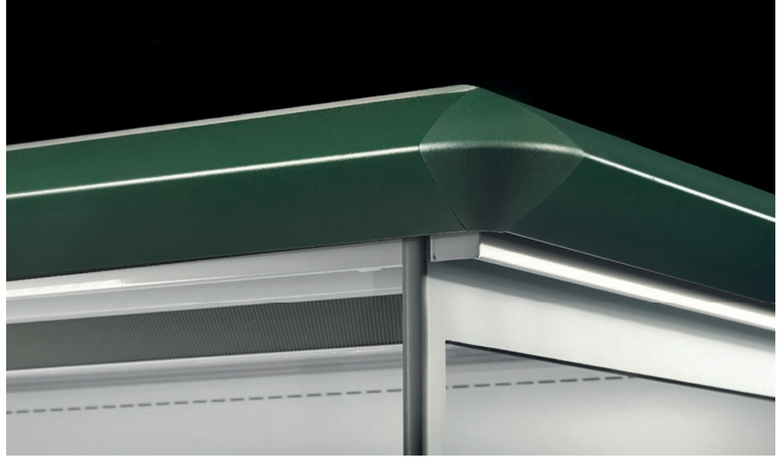


LEITNER SpA – Telefericos Y Nieve - Compocel AL
Cable car -work in progress

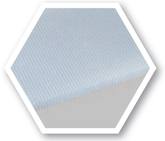
* Certified products must be required in advance and might have a price surcharge due to certified materials.

Refrigeration and airflow deflection

Polycarbonate honeycomb is a clean thermoplastic material that is highly appreciated in the production of refrigerating devices, wind tunnels ventilating plants, sterilized rooms, silencers and climatic chambers. The application of polycarbonate sheets on air diffusers not only eliminates turbulence, but it also reduces impurities and humidity, as well as noise and energy consumption.



HONEYCOMBS:



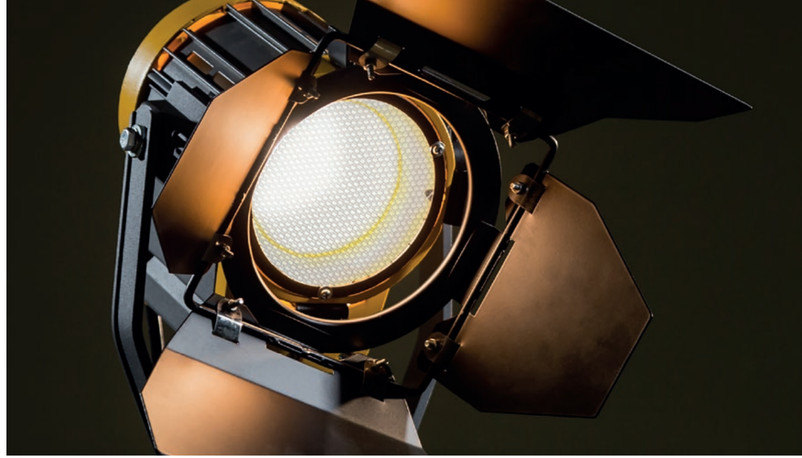
POLYCARBONATE



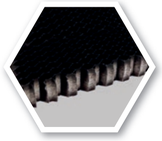


Lighting

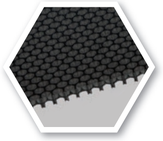
CEL's aluminium and polycarbonate honeycomb cores are used as grids in front of spotlights to trap the peripheral light in all directions and limit glare. On request, the honeycombs can be painted and cut in circles of different diameters.



HONEYCOMBS:

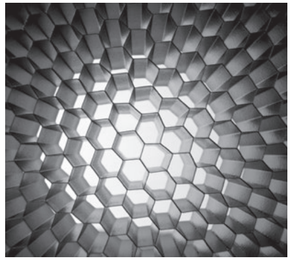


ALUMINIUM



POLYCARBONATE







* Certified products must be required in advance and might have a price surcharge due to certified materials.

Glues and Adhesives

CEL Components also offers two-component polyurethane and epoxy adhesives. They are used in the production of sandwich panels since they glue a variety of core materials (aluminium or thermoplastic honeycomb, PIR, PVC, PET, etc.), with different skins in metals (aluminium, tinplate, etc.), fibreglass, high pressure laminate, wood, plywood, etc.

WHICH GLUE?

Two-components **EPOXY GLUE**		Two-components **POLYURETHANIC GLUE**
Personalized, high sealing	General characteristics	Personalized, tough, resilient, good shock absorption
✓	Solvent free	✓
Custom	Color of solid product	Beige
€ €	Cost	€
2 - 7	Breaking strength	15
20 - 50	Tensile strength (Mpa)	10 - 20
Environmental temperature	Solidification temperature (°C)	60 - 80
✓ ✓	Behaviour to humidity	✓
from 100 to 300.000	Viscosity (cPs)	till 25.000-30.000
1 - 2	Density (g/ml)	1,3 - 1,7
Water, acids and organic solvents	Good resistance	Water and organic solvents
5 min - 12 h	Gelation time (sp 1mm)	5 - 80 min



The combination of different materials has permitted us to pass fire reaction tests in different sectors: Building, Railway, Shipbuilding.

The good adhesion capacity, waterproofness and resistance to mechanical stresses are excellent characteristics of CEL glues.

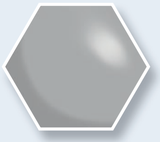
Deco finishes

CEL Components offers a wide range of finishes, applied to standard panels, to obtain an elegant and ready-to-use material.
The dimensions depend on the type of panel and the finish chosen, which can be applied on one or both sides.

Quality, composition and formulation of the finishes allows CEL to respond to every application need:
washability, breathability, being able to perform touch-ups, durability over time.


RAL 9016


SURTEC 650

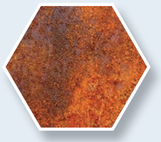

BASIC / RAW


HPL



SERIGRAPHS


CONCRETE

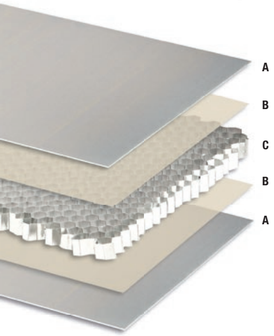

METALLIC


MIRRORED


WOOD


BASIC COLORS

Compocel AL



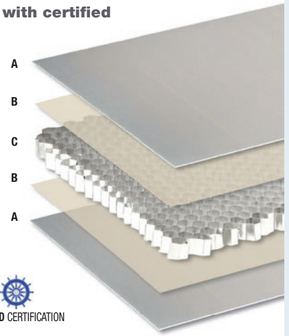
COMPOCEL® AL is a sandwich panel with a core in aluminium honeycomb bonded with two skins of aluminium. COMPOCEL® AL FR* offers superior mechanical properties and excellent fire ratings. It has passed the most stringent tests of European Regulation in shipbuilding, building and railway sectors.

A = SKINS IN ALUMINIUM - Thickness mm: 0,5 - 0,8 - 1 (standard)
B = STRUCTURAL ADHESIVE
C = ALUMINIUM HONEYCOMB CORE

SHIPBUILDING · BUILDING · RAILWAY · STONES, MOSAICS, MARBLE SUPPORT · FLOOR · PANELS · AUTOMOTIVE

Compocel AL FR*

Produced with certified material



IMO MED CERTIFICATION

Technical Characteristics		
panel size	mm	standard 1250 x 2500 / 1250 x 3000 / 1500 x 3000; On request up to 2000 x 7000
thickness' tolerance	mm	± 0,3
dimension's tolerance	mm	± 30
planarity ***	mm/m	+/-1
skins' thickness	mm	from 0,5 to 5,0
skin alluminium alloy		1000 series, 3000 series, 5000 series
honeycomb alluminium alloy		3000 series, 5000 series
thickness of honeycomb foil	µm	50 and 70
diameter of honeycomb	Ø = mm	from 3 to 19
honeycomb density	Kg/m³	from 20 to 163
skin characteristics		rough/primer/polyester/PVDF/ anodised

Panel Phisic and Mechanic Performances									
type panel (some examples)		Panel Thickness mm	6	10	15	10	15	20	25
		Skin Thickness mm	0,5 + 0,5			1,0 + 1,0			
panel weight ‡		Kg/m²	3,8	4,0	4,3	6,7	7,0	7,3	7,6
compressive stabilised strength MPa ** ‡	ASTM C 365-365 M	Mpa	2,9						
maximum load ** ‡	ASTM C 393 †	N	190	340	520	600	1.000	1.350	1.700
deflection at maximum load ‡	ASTM C 393 †	mm	14	8	6	8	6	4	3
skins E Elastic Modulus		Mpa	68.000 - 70.000						
moment of inertia I **		mm⁴/m	7.600	22.000	52.000	40.000	98.000	181.000	288.000
average resistance to peeling ** ‡	ASTM D1781-98 (2012)		> 280 N/76 mm or 40 Nmm/mm						
maximum service temperature **		°C	- 40 / + 60; on request + 80 / + 100 / + 150						
thermal expansion coefficient **		°C ⁻¹	2,3 x 10-5						

** Tested by Internal Laboratory *** Approximate value † Sample dimension with 4 support points (L, W) 540x50mm; distance among the lower points 500mm, distance among the upper points 250mm ‡ Values for a panel with a honeycomb core of Ø6 56kg/m³ (Ø 1/4")

COMPOCEL AL FR - Reaction to FIRE				
Application	Norm	Classification	Description	Certifier
	MED IMO 0407	MOD. B LOW FLAMESPREAD MOD. D LOW FLAMESPREAD	Aluminum honeycomb panel complying with the MED directive for the application in ships registered or applied in the European Union. Item N. MED / 3.18a, IMO 2010 FTP Code, Annex 1	Istituto Giordano
		C. CLASS DIVISION INCOMBUSTIBILITY	luminium honeycomb panel complying with the MED directive for the application in ships registered or applied in the European Union. Item N. MED / 3.64, FTP Code IMO 2010, Annex 1	
	U.S Coast Guard	MOD B MOD D	Aluminium honeycomb sandwich panel	Istituto Giordano
	UNI EN 13501-1	A2 s1 d0 INCOMBUSTIBILITY COMPOCEL AL FR COMPOCEL AL FLOOR, ALURIS, ALUMAN	A2 - Non combustible s1 - Smoke emission absent d0 - no dripping	Leitat Istituto Giordano
	UNI EN 13501-1	A2fl s1 d0 INCOMBUSTIBILITY COMPOCEL AL FR COMPOCEL AL FLOOR, ALURIS, ALUMAN	A2fl - Non combustible s1 - Smoke emission absent d0 - No dripping	Istituto Giordano
	UNI EN 13501-1	Bfl s1 d0 LOW FLAMESPREAD COMPOCEL AL FR COMPOCEL AL FLOOR, ALURIS, ALUMAN	Bfl - Low flame spread s1 - Smoke emission absent d0 - No dripping	Istituto Giordano
	UNI EN 13501-1	A2 s1 d0 INCOMBUSTIBILITY	Only 20mm A2 - Non combustible s1 - Smoke emission absent d0 - no dripping	Istituto Giordano
	NFP 92-507	M1 NOT FLAMABLE	M1 - Not flamable	C.S.T.B.
	UNI EN 13501-1	B s1 d0 LOW FLAMESPREAD	B - Low flame spread s1 - Smoke emission absent d0 - no dripping	Leitat
	UNI EN 45545	HL3 HAZARD LEVEL	Meets requirements for applications: R2 - Suspended ceilings, countertop R1 - Partitions R10- Floors	Istituto Giordano

Sector		American Standards					Certifier
		ASTM C67-M18 Water absorption	ASTM E72-15 Transversal load resistance	ASTM C297 M-16 Resistance to traction	ASTM E84-17 Flame propagation	TAS 201, 203 Hurricane resistance	Intertek

* Certified products must be required in advance and might have a price surcharge due to certified materials.


(1)


(2)


(3)

Possible applications for different sectors
(1) Components and walls for the medical sector
(2) Worktops and doors for furniture
(3) Lightweight panels for boats/yachts

PROCESSING


Cut to size*


Milling


Drilling


Joining


Cut to shape*


Panel folding


Panel edgings


Inserts

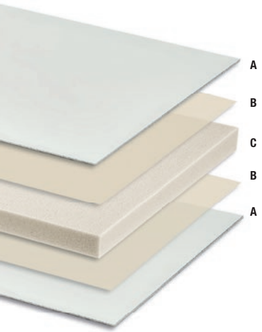

Painting


Veneering

* Finishes available also for cortified panel.

EXAMPLES OF HOOKING





Compocel ALF

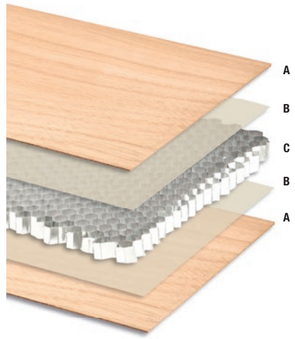
COMPOCEL® ALF panel is a three-layered sandwich panel. On both sides it is covered with aluminium sheets glued to a foam core, such as PET, a completely recycled material. It is an excellent thermal insulator and can be used in various sectors. It can be built with the necessary inserts and edges, according to customer specifications.

A = SKINS IN ALUMINIUM - Thickness mm: 0,5 - 0,8 - 1 (standard)
B = STRUCTURAL ADHESIVE
C = FOAM CORE

AUTOMOTIVE INTERIORS

Features of the certified version				
Type	Norm	Sector	Classification	Thickness
Low flamespread	IMO MED FTP Code 2010	Shipbuilding	Mod B and D	23mm
Low flamespread	U.S. COAST GUARD	Shipbuilding	Mod B and D	23mm
Bulkheads, interiors, and ceilings, R1, R2	UNI EN 45545	Railway	Class HL3	23mm

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Compocel W

COMPOCEL® W is a sandwich panel with an aluminium honeycomb core and plywood skins. All CEL's products are produced according to customers' needs. The main characteristics of this panels, such as the type of coating, sizes and finishes, are customizable.
COMPOCEL® W is normally used for interior design and furniture in various sectors.

A = SKINS IN MARINE PLYWOOD quality Okoumè
Thickness: from 1,5 to 8 mm
B = STRUCTURAL ADHESIVE
C = ALUMINIUM HONEYCOMB CORE

SHIPBUILDING INTERIORS

OTHER COMPOCEL PANELS WITH MARINE PLYWOOD SKINS



Compocel WP

With a polypropylene honeycomb core.

NAVALE INTERIORS



Compocel WF

With a foam core.

SHIPBUILDING INTERIORS

Compocel

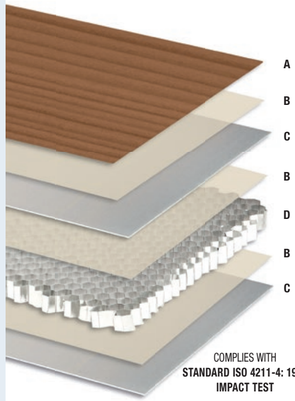


Compocel ALP

COMPOCEL® ALP is a sandwich panel with aluminium skins and polypropylene honeycomb core. It offers high mechanical characteristics; thus, it is applied both in shipbuilding and in the transport sector. It is used in general for: floors, furnishings, interiors and it can be used in environments with a high level of humidity.

A = SKINS IN ALUMINIUM - Thickness mm: 0,5 - 0,8 - 1 (standard)
B = STRUCTURAL ADHESIVE
C = POLYPROPYLENE HONEYCOMB CORE

AUTOMOTIVE



Compocel ALH

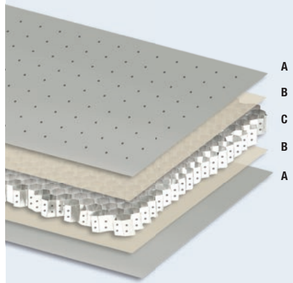
COMPOCEL® ALH is a COMPOCEL AL sandwich panel with a decorative plastic laminate cover on one or both sides. In this way, plastic laminate is reinforced through the aluminium skins. In shipbuilding and railway sector this type of panels is used for furnishings and interiors.

A = SKIN IN HIGH PRESSURE LAMINATE
Thickness mm: from 0,7 to 4
B = STRUCTURAL ADHESIVE
C = SKIN IN RAW ALUMINIUM - Thickness starting from 0.5 mm
D = ALUMINIUM HONEYCOMB CORE

COMPLIES WITH
STANDARD ISO 4211-4: 1988
IMPACT TEST

SHIPBUILDING INTERIORS RAILWAY FLOOR

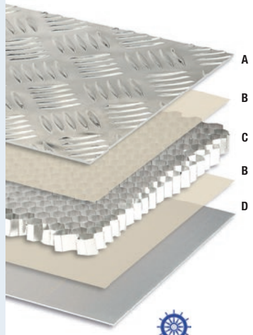
Compocel



VACUUM Tables

- Aluminium honeycomb core
- Excellent flatness
- Lightness
- Resistance to cleaning solvents
- Aluminium coverings and edges
- Other dimensions on request
- Specifications on request

A = SKINS IN Raw aluminium
Thickness: from 1.5 to 3 mm.
B = STRUCTURAL ADHESIVE
C = PERFORATED ALUMINIUM HONEYCOMB
Ø 19 mm, 2 HOLES Ø 7mm



Compocel AL FLOOR
Compocel AL FR FLOOR*

COMPOCEL® FLOOR ALU-RIS, ALU-MAN is an aluminium honeycomb core bonded with two aluminium skins. The upper face (thickness from 2mm) can be chosen among different antiskid / anti-slip coatings (almond pattern, rice corn pattern, etc.). As this panel is often used as flooring, where superior mechanical properties are required, the preferred thickness of the aluminium foil is 70 microns (high density), bringing the total thickness of the panel up to 20mm.

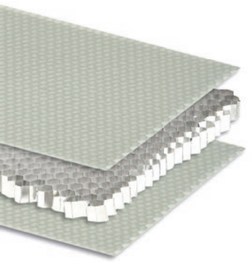
A = SKINS IN ALUMINIUM WITH ANTI-SLIP COATING
B = STRUCTURAL ADHESIVE
C = ALUMINIUM HONEYCOMB CORE
D = SKINS IN RAW ALUMINIUM

*CERTIFIED PRODUCTS MUST BE REQUIRED IN ADVANCE AND MIGHT HAVE A PRICE SURCHARGE DUE TO CERTIFIED MATERIALS.

IMO MED CERTIFICATION

SHIPBUILDING BUILDING FLOOR

* Certified products must be required in advance and might have a price surcharge due to certified materials.

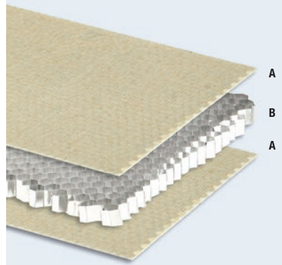


Alustep 300 Light

ALUSTEP ® 300 LIGHT is a lightweight composite panel with an aluminum honeycomb core faced with fibreglass impregnated with epoxy resin. This panel offers unique characteristics as it combines lightweight with superior mechanical properties. This is the lightest panel of Alustep series.

A = SKINS IN FIBREGLASS impregnated with epoxy resin 290g/m^2
B = CORE IN ALUMINIUM HONEYCOMB with hexagonal cells

SHIPBUILDING BUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT

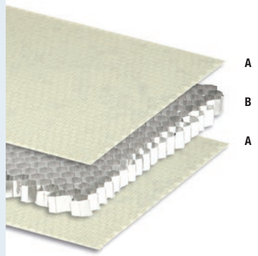


Alustep 500 Light

ALUSTEP® 500 LIGHT is a sandwich panel with a core in aluminium honeycomb faced with fibre glass impregnated with epoxy resin.

A = SKINS IN FIBREGLASS - 500g / m^2 impregnated with epoxy resin.
B = ALUMINIUM HONEYCOMB CORE.

SHIPBUILDING BUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT FLOOR

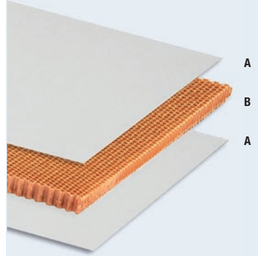


Alustep 500

ALUSTEP ® 500 is a sandwich panel with a core in aluminum honeycomb faced with fibreglass impregnated with epoxy resin. STEP series' panels permit huge savings as far as weight and thickness of slabs of natural stones, such as marble, granite and mosaics, are concerned. With the reduction of material and weight, material, logistics and installation costs can be significantly reduced.

A = SKINS IN FIBREGLASS impregnated with epoxy resin 500g/m^2
B = ALUMINIUM HONEYCOMB CORE

SHIPBUILDING BUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT FLOOR



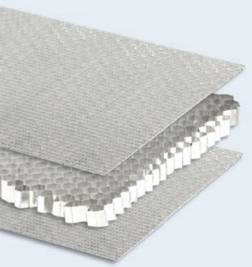
Alustep N

ALUSTEP ® N is a sandwich panel with an aramid paper honeycomb core and skins made of fiberglass impregnated with epoxy resin. This panel comes in three versions:
- 300 N: Lightweight and versatile, used in shipbuilding, automotive, and interior sectors.
- 500 N and 800 N: Characterized by greater rigidity and strength, also suitable for flooring applications, ensuring a reliable and durable performance in a wide range of uses.

A = SKINS IN FIBREGLASS - 500g/m^2 impregnated with epoxy resin.
B = ARAMID PAPER HONEYCOMB CORE

SHIPBUILDING AUTOMOTIVE INTERIORS FLOOR

Alustep



Alustep 500 SL*

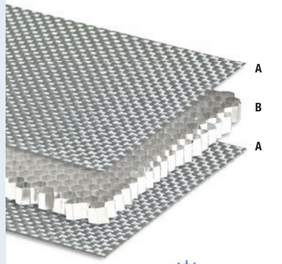
ALUSTEP® 500 SL is a sandwich panel consisting of a honeycomb aluminium core and two skins in fibreglass impregnated with epoxy resin.

A = SKINS IN FIBREGLASS - 490g / m^2 impregnated with epoxy resin.
B = ALUMINIUM HONEYCOMB CORE with hexagonal cells.

Conform to American Standards		
Norma	Settore	Certificazione / Classificazione
Water Absorption	Building	ASTM C67-M18
Strength-Transverse load	Building	ASTM E72-15
Flatwise tensile strength	Building	ASTM C297 M-16
Flamespread	Building	ASTM E84-17
Impact and Cyclic Wind Pressure	Building	TAS 201/TAS 203

IMO MED CERTIFICATION

SHIPBUILDING BUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT FLOOR PANELS



Alustep HFR*

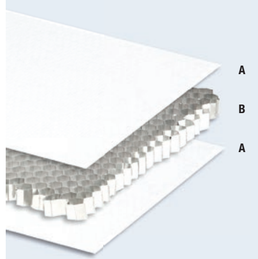
Alustep® HFR is a sandwich panel composed of an aluminium honeycomb core and two skins made of fiberglass impregnated with epoxy resin. It is the strongest panel of the Step series and has high resistance to moderate temperatures.

A = SKINS IN FIBREGLASS - 500g / m^2 impregnated with epoxy resin.
B = ALUMINIUM HONEYCOMB CORE with hexagonal cells.

IMO MED CERTIFICATION

SHIPBUILDING BUILDING INTERIORS FLOOR

Alustep

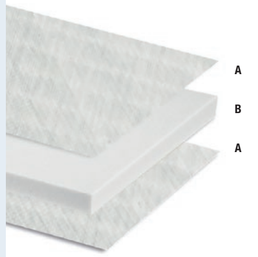


Alustep W

L'ALUSTEP ® W is a waterproof sandwich panel with an aluminium honeycomb core and skins made of fiberglass impregnated with epoxy resin. Natural stones such as marble, granite, or mosaics can be directly glued onto the Step series panels thanks to the fiberglass surface.

A = SKINS IN FIBREGLASS - 500g/m^2 impregnated with epoxy resin.
B = ALUMINIUM HONEYCOMB CORE with hexagonal cells.

SHIPBUILDING BUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT



Alustep 4X

ALUSTEP ® 4X is a sandwich panel with a core in PET or PVC foam, ensuring an ideal combination of strength and lightness. What makes the difference in this panel are its skins made of quadriaxial fiberglass impregnated with epoxy resin.
This panel offers exceptional rigidity compared to traditional fiberglass skins, making it the ideal choice for a wide range of applications, especially in the naval sector.

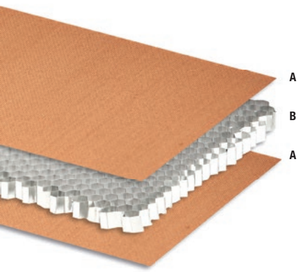
A = SKINS IN QUADRIAXIALFIBERGLASS - 500 g/m^2 impregnated with epoxy resin.
B = PET OR PVC FOAM CORE.

SHIPBUILDING

* Certified products must be required in advance and might have a price surcharge due to certified materials.

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Alustep



IMO MED CERTIFICATION

Alustep F*

ALUSTEP® F * is a sandwich panel with an aluminium honeycomb core and skins in fibreglass impregnated with phenolic resin. Thanks to the low flammability of phenolic resin, the certfied version of this panel can be used in the nautic and railway sector and in the means of transport in general.
Certified version available on request.

A = GLASSFIBRE SKINS IMPREGNATED WITH PHENOLIC RESIN.
Thickness mm: 0.25 ÷ 0.3.
B = ALUMINIUM Honeycomb core

SHIPBUILDING · BUILDING · INTERIORS · STONES, MOSAICS, MARBLE SUPPORT

Fire Classification/Certification				
Type	Standard	Sector	Certification Classification	Thickness
Low flame spread	IMO MED FTP Code 2010	Shipbuilding	Mod B e D	From 5 to 50mm
Floors, R10	UNI EN 45545-2	Railway	Class HL3	From 5 to 50mm
Ceilings, interiors, R1, R2	UNI EN 45545-2	Railway	Class HL2	From 5 to 50mm

* Certified products must be required in advance and might have a price surcharge due to certified materials.



IMO MED CERTIFICATION

Alustep FN*

ALUSTEP® FN * is a sandwich panel with an aramid paper honeycomb core and skins in fibreglass impregnated with phenolic resin. This panel is extremely light. Thanks to the low flammability of phenolic resin, this type of panel has a certified version (on request) which obtained certifications in the nautical and railway sectors.

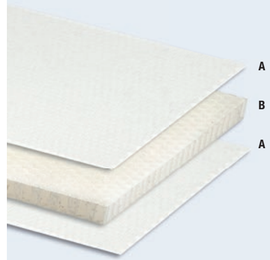
A = GLASSFIBRE SKINS IMPREGNATED WITH PHENOLIC RESIN.
Thickness mm: 0.25 ÷ 0.3.
B = ARAMID PAPER Honeycomb core

NAVALE · INTERIORS · FERROVIARIO · ALLEGGERIMENTO MARMI E MOSAICI

Fire Classification/Certification				
Type	Standard	Sector	Certification Classification	Thickness
Low flame spread	IMO MED FTP Code 2010	Shipbuilding	Mod B e D	From 4 to 25mm
Floors, R10	UNI EN 45545-2	Railway	Class HL3	From 4 to 25mm
Ceilings, interiors, R1, R2	UNI EN 45545-2	Railway	Class HL2	From 10 to 25mm

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Serie Step



Clearstep

CLEARSTEP is a lightweight sandwich panel with a polypropylene honeycomb core and skins in fibreglass impregnated with epoxy resin. This panel is normally used all those times when a clear background is required such as in the backlight, without compromising the visual characteristics of the clear surfaces on which it is glued.

A = SKINS IN GLASSFIBRE - Thickness: 0.4 mm impregnated with epoxy resin.
B = POLYPROPYLENE HONEYCOMB CORE.

STONES, MOSAICS, MARBLE SUPPORT · BACKLIGHT

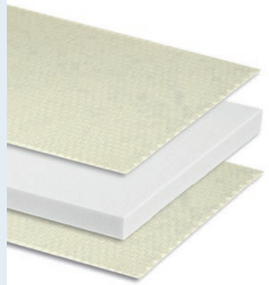


Clear-Pet

CLEAR-PET is a lightweight sandwich panel with a PET foam core and skins in a fibreglass impregnated with epoxy resin.
The sandwich panels made with foam cores allow to reduce the thickness of the stone slab, obtaining lighter but equally resistant tops and coatings. PET foam is almost white. This foam core glued to a clear fibreglass permits to create a light surface maintaining the visual characteristics of the panels. Pet core is completely made of recycled material.

A = SKINS IN GLASSFIBRE - Thickness: 0.4 mm impregnated with epoxy resin.
B = PET FOAM CORE.

STONES, MOSAICS, MARBLE SUPPORT · BACKLIGHT

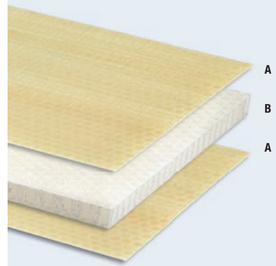


Pet-Step

PET-STEP is a sandwich panel with a PET core and skins in fiberglass impregnated with epoxy resin.
Thanks to the foam core these panels can be used in humid environments. Ideal also in order to reduce sound propagation.

A = SKINS IN GLASSFIBRE - 500gr / m² impregnated with epoxy resin.
B = PET FOAM CORE.

SHIPBUILDING · STONES, MOSAICS, MARBLE SUPPORT

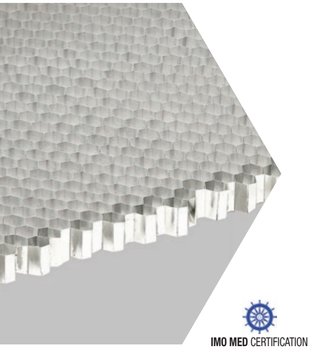


Polistep

POLISTEP is a lightweight sandwich panel with a polypropylene honeycomb core and skins in fibreglass impregnated with epoxy resin. This kind of panel permit to reduce the thickness of the stone slab, obtaining lighter but equally resistant tops and coatings. Natural stones such as marble, granite or mosaics can be glued directly to the raw surface of the fibreglass panel.

A = GLASSFIBRE SKINS - Thickness: 0.5 mm impregnated with epoxy resin.
B = POLYPROPYLENE HONEYCOMB CORE.

SHIPBUILDING · BUILDING · INTERIORS · STONES, MOSAICS, MARBLE SUPPORT · FLOOR



Aluminium honeycomb*

Aluminium honeycomb is a lightweight material with good mechanical properties: lightweight, stiffness, excellent fire reaction, compression, shear and corrosion resistance, flatness. Aluminium honeycomb is applied in different sectors. As core material, aluminium honeycomb is the central layer of sandwich panels used as floors, ceilings, doors, partitions, facades, working tables for automatic machines and for all products that require an optimal stiffness-to-weight-ratio.

Fire Classification/Certification				
Type	Norm	Sector	Certification Classification	Thickness
Non-combustible	FTP Code 2010	Shipbuilding	Mod B e D	From 3 to 50mm
Non-combustible	UNI EN 13501-1	Building	A1	From 3 to 50mm
Non-combustible	NF P92-507	Building	M0	from 5 to 50mm

IMO MED CERTIFICATION

* Certified products must be required in advance and might have a price surcharge due to certified materials.

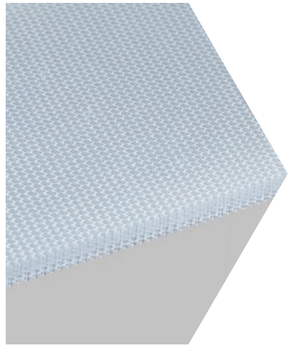
Technical features

Honeycomb core's properties	50 Microns				
Aluminium Alloy series 3000	3003/3005/3103/3104				
Ø honeycomb in mm ca.	3,2	6	9	12	19
Ø honeycomb in inches	1/8"	1/4"	3/8"	1/2"	3/4"
Density kg/m³	116	56 - 59	39 - 40	29 - 30	20 - 21
Compressive stabilised strength MPa	6,5	3,0 - 3,5	1,4 - 1,95	0,8 - 0,95	0,4 - 0,6

Honeycomb core's properties	70 Microns				
Aluminium Alloy series 3000	3003/3005/3103/3104				
Ø honeycomb in mm ca.	3,2	6	9	12	19
Ø honeycomb in inches	1/8"	1/4"	3/8"	1/2"	3/4"
Density kg/m³	163	80 - 83	54	40 - 42	27 - 29
Compressive stabilised strength MPa	10,2	4,3 - 4,6	2,5 - 2,6	1,41 - 1,5	0,85 - 0,9

** Other alloys on request

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Polycarbonate honeycomb

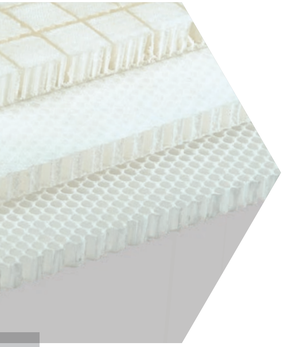
Polycarbonate honeycomb is a thermoplastic material available in different sizes, thicknesses, colours and cells diameter. It's used mainly for laminar-flow ventilation, commercial refrigeration, sterilized rooms, wind tunnels, and climatic chambers.
Honeycomb deflectors increase air flow efficiency and efficacy. Moreover, they eliminate turbulence, reduce impurity, humidity, and noise and energy consumption.
In lighting industry, black polycarbonate honeycomb is used as grid in front of led lamps to trap the peripheral light.

Technical features

Honeycomb core's properties	standard		on request		
Type	3, 5-90	6, 0-70	2, 5-110	4, 0-80	7, 0-70
CELI size mm	3, 5	6, 0	2, 5	4, 0	7, 0
Colour	grey • white • trasparent • black				
Density kg/m³	90	70	110	80	70
Compressive strength MPa	2, 8	1, 9	3, 6	2, 2	1, 8
Compressive modulus MPa	115	95	155	106	95
Shear strength MPa	1, 3	1, 0	1, 5	1, 1	1, 0
Shear modulus MPa	22	19	25	21	19
Effective temperature range °C	from -40 a +110				
Thickness mm	from 3 a 300				
Maximum length mm	3000				
Maximum Width mm	1350				

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Core



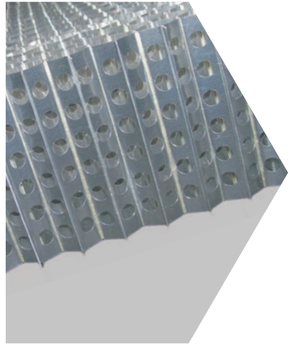
Polypropylene honeycomb

Thanks to its chemical-resistance and its reliability in aggressive environments, polypropylene honeycomb can be used as support for filters to reduce corrosive gas emissions. CEL supplies different types of polypropylene honeycomb:
• Polypropylene honeycomb without TNT (PP 8.80)
• Polypropylene honeycomb with TNT (a thin thermo-welded sheet on both sides; PP 8-80 T30, PP8-120 T30)
• Polypropylene honeycomb with TNT and a plastic film (thermo-welded on both sides; PP 8-80 T30 F75).
Polypropylene honeycomb, one of the core materials used for sandwich panels, is bonded to different materials (aluminium sheets, high pressure laminate skins, marine plywood, fibreglass, etc.), and can be thermo-welded or glued to TNT or technical fabrics, which makes the production of sandwich and lightweight panels easier. Polypropylene honeycomb is also used as flat surface for cutting tools (waterjet cutting machines).

Technical features

Honeycomb core's properties				
Type	8.80	8.80T30	T30F75	8.120T30
CELI size mm	8			
Colour	white			
Density kg/m³	80			120
Compressive strength MPa	1,5	1,60	1,60	3,4
Compressive modulus MPa	70			90
Shear strength MPa	-	0,50	0,50	1
Shear modulus MPa	-	12	13	18
Effective temperature range °C	from -30 a +80			
Maximum width mm	1400	1500	1500	1500
Minimum width mm	1002			600
Maximum length mm	29502	-	-	30002
Width tolerance mm	+/- 4			
Tolerance length mm	+/- 4			
CORE'S thickness mm	7 - 100	7 - 65	6 - 65	5 - 65

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Perforated aluminium honeycomb

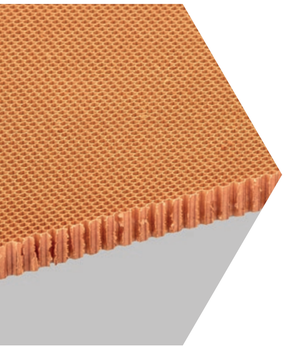
Perforated aluminium honeycomb is usually used as core for vacuum tables and as core for moulds in the wind blade industry. The honeycomb is normally perforated longitudinally to permit the correct air flow.
Perforations are implemented in compliance with our customers' needs although 6 hole-perforation is standard.

Technical properties

Honeycomb core's properties	
Type	Aluminium Alloy 3003/3005/3103/3104
Grade	Aluminium Commercial
CELI size	on request +/-10%
Perforation	Yes
Foil thickness	70 Micron +16/-8 Microns
Density	It depends on the cell +/- 10%
Thickness of slices	On request
Dimensions	L-1250 mm (-0/+50 mm) x W-2500 (-0/+50 mm) expanded L-8500 mm (-0/+100 mm) x W-3000 (-0/+100 mm) overexpanded. The regularity of the cell is not guaranteed.
Number of holes and their diameter	On request

Honeycomb core's properties	70 Microns				
Aluminium alloy	3003/3005/3103/3104				
Ø honeycomb in mm	3,2	6	9	12	19
Ø honeycomb in inches	1/8"	1/4"	3/8"	1/2"	3/4"
Density kg/m³	163	80 - 83	54	40 - 42	27 - 29
Compressive stabilised strength MPa	10,2	4,3 - 4,6	2,5 - 2,6	1,41 - 1,5	0,85 - 0,9

WIND ENERGY



Commercial and Aeronautical grade aramid paper

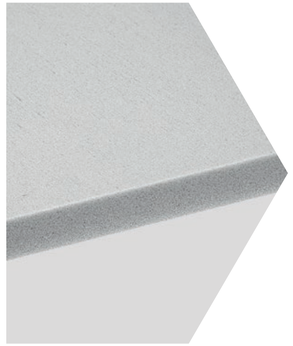
Aramid paper impregnated with a heat resistant phenolic resin is an extremely lightweight, strong, non-metallic product. As a core material, aramid paper offers a unique combination of properties that allows for superior electrical insulation. Used in boat hulls, auto racing bodies and military shelters, aramid paper honeycomb cores also have many applications in the aeronautical, railway and shipyard industries.

Technical features

Nomex Honeycomb-Commercial Grade					
Nomenclature			Compression Strength	L Shear	W Shear
	Ø CELI size mm	Density kg/m³	N/mm2	N/ mm2	N/mm2
Hexagonal	3,2	48	1,90	1,16	0,62
Hexagonal	3,2	64	3,10	1,48	0,82
Hexagonal	3,2	80	4,70	1,95	1,05
Hexagonal	3,2	96	6,60	2,45	1,42
Hexagonal	3,2	128	11,30	2,95	1,78
Hexagonal	3,2	144	13,20	3,05	1,90
Hexagonal	4,0	29	0,60	0,45	0,26
Hexagonal	4,0	80	5,10	1,90	0,98
Hexagonal	4,8	32	0,90	0,58	0,36
Hexagonal	4,8	48	2,60	0,98	0,56
Hexagonal	4,8	64	3,40	1,70	0,92

Nomex Honeycomb-Commercial Grade					
Nomenclature			Compression Strength	L Shear	W Shear
	Ø CELI size mm	Density kg/m³	N/mm2	N/ mm2	N/mm2
Hexagonal	4,8	80	6,00	1,95	1,10
Hexagonal	4,8	96	7,30	2,26	1,32
Hexagonal	6,4	24	0,54	0,34	0,18
Hexagonal	6,4	32	0,80	0,54	0,30
Hexagonal	6,4	48	2,05	1,00	0,56
Hexagonal	6,4	64	3,40	1,54	0,79
Hexagonal	9,6	24	0,54	0,34	0,18
Hexagonal	9,6	32	0,68	0,56	0,29
Hexagonal	9,6	48	1,80	1,15	0,66
Over expanded	4,8	29	0,60	0,31	0,32
Over expanded	4,8	48	2,30	0,60	0,72
Over expanded	4,8	64	3,80	0,72	0,90
Over expanded	4,8	72	4,00	0,75	0,92
Over expanded	4,8	80	5,30	0,88	1,17
Over expanded	4,8	96	6,70	0,92	1,28
Over expanded	6,4	48	2,30	0,60	0,72
Over expanded	6,4	64	3,20	0,72	0,90

SHIPBUILDING RAILWAY AERONAUTICS PANELS



PET foam core

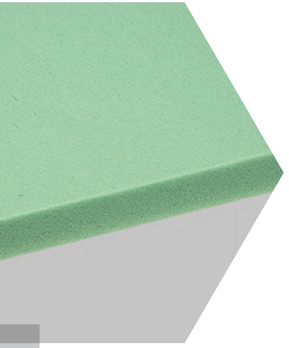
PET foam is a thermoplastic core material suitable to all those sandwich application with the scope of increasing performance and of reducing weight. It is used in sandwich panel in railcars and shipbuilding and windblades applications. It is easy to handle with and has good dimensional stability at elevated temperatures. PET foam can be also used in a of processes including infusion, prepreg and pressing.

SHIPBUILDING INTERIORS WIND ENERGY STONES, MOSAICS, MARBLE SUPPORT AUTOMOTIVE

Technical features

Typical properties for PET FOAM			GR70	GR80	GR100	GR115	GR135	GR150	GR200	GR250	GR320[1]
Density	ISO 845	kg/m³	70[2]	80[2]	100[2]	115[2]	135[2]	150[3]	200[3]	250[3]	320[3]
Compressive strength	ISO 844	MPa	0,75	1,0	1,5	1,8	2,3	2,6	4,0	5,3	7,0
Compressive modulus	ISO 844	MPa	40	57	77	90	105	120	175	235	320
Shear strength[4]	ISO 1922	MPa	0,5	0,6	0,75	0,95	1,2	1,35	1,75	2,0	2,1
Shear modulus[4]	ISO 1922	MPa	13	16	21	26	35	37	51	70	90
Shear elongation[4]	ISO 1922	%	15	13	10	10	7	7	5	3	2
Tensile strength	ASTM C 297	MPa	1,8	2,0	2,5	2,9	3,0	3,3	3,9	4,3	4,8
Tensile modulus	ASTM C 297	MPa	66	80	120	140	140	185	235	270	350
Thermal conductivity	at 23 °C	W/mK	0,034	0,034	0,034	0,034	0,037	0,041	0,043	0,047	tbd

Core



PVC foam core

PVC foam offers a good stiffness to weight ratio; it is resistant to compression; it does not absorb water. PVC sheets can be used as insulating materials as well.
It is easy to process i.e.: cutting and laminating.
Furthermore, this type of foam can be bonded both with polyester, vinylester and epoxy resin, thus being used as core for sandwich panels.

SHIPBUILDING INTERIORS STONES, MOSAICS, MARBLE SUPPORT AUTOMOTIVE INTERIORS PANELS

Technical features

Honeycomb core's properties				PVC 40	PVC 48	PVC 60	PVC 80	PVC 100	PVC 130	PVC 200
Density kg/m³	ASTM D1622	kg/m³	nominal	40	48	60	80	100	130	200
Compressive strength	ASTM D1621-10	MPa	average min-ave min-min	0,51 0,30 0,20	0,69 0,48 0,37	0,96 0,75 0,61	1,43 1,22 1,03	1,93 1,72 1,47	2,73 2,52 2,25	4,84 4,64 4,00
Compressive modulus	ASTM D1621-10	MPa	average min-ave min-min	24 10 5	33 18 13	46 31 25	68 53 44	90 76 64	125 111 99	212 198 172
Tensile strength	ASTM D1623	MPa	average min-ave min-min	0,74 0,47 -	0,95 0,66 -	2,11 1,33 1,19	2,60 1,82 1,63	3,08 2,31 2,06	3,81 3,04 2,79	6,61 5,61 5,33
Tensile modulus	ASTM D1623	MPa	average min-ave min-min	74 44 36	87 57 49	106 75 66	137 107 94	169 138 123	216 185 170	415 343 317
Shear strength	ASTM C273	MPa	average min-ave min-min	0,41 0,34 0,25	0,55 0,49 0,40	0,77 0,70 0,60	1,13 1,06 0,92	1,49 1,43 1,25	2,03 1,97 1,79	3,59 3,23 2,81
Shear modulus	ASTM C273	MPa	average min-ave min-min	13 9 6	16 12 10	21 17 14	29 25 22	37 33 29	49 45 41	78 74 65
Shear elongation at break	ASTM C273	%	average	5	9	13	20	25	32	41
Dimensions: l-w-t		mm	length width thickness	1330 2850 84	1270 2730 80	1150 2450 78	1020 2180 72	950 2050 68	850 1900 58	750 1600 48



PMI foam core

PMI (polymethacrylimide) foam is specially developed to be used as a structural core in connection with vacuum infusion processes.
It is applied in components of aviation, aerospace, sports equipment with resin injection process to reduce the weight.

SHIPBUILDING AERONAUTICS

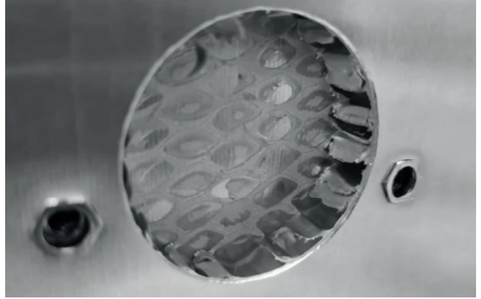
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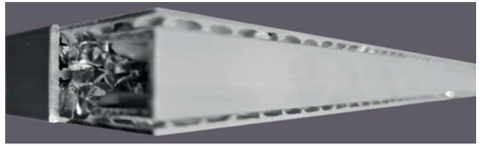
Typical properties for PMI			PMI 24	PMI 30	PMI 50	PMI 75	PMI 110	PMI 200
Density	ISO 845	kg/m³	24±3	30±3	50±5	75±7	110±10	200±15
Compressive strength	ISO 844	MPa	0,25	0,40	0,85	1,70	3,60	9,50
Tensile strength	ASTM D638	MPa	0,6	0,80	1,68	2,30	3,70	7,00
Elastic modulus	ASTM D638	MPa	25	38	83	108	197	380
Elongation at break	ASTM D638	%	2,8	2,4	2,6	2,8	2,8	3,0
Flexural strength	ASTM D790	MPa	0,4	0,80	1,60	2,90	5,20	13,0
Shear strength	ASTM C273	MPa	0,3	0,40	0,85	1,25	2,38	5,00
Shear modulus	ASTM C273	MPa	12	15	30	48	80	160
Compressive creep	GB/T 15048	%	≥2,0					/
Temperature resistance	DIN 53424	°C	≥200					

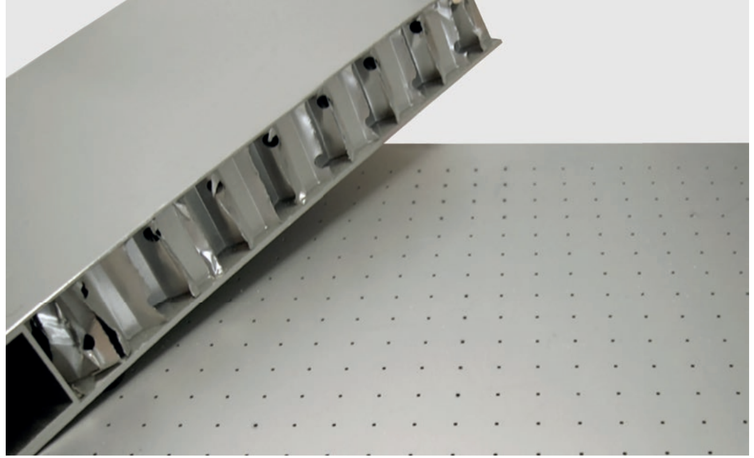
CEL develops

To meet the rigorous and ever-evolving demands across various branches and sectors, and to tailor projects to individual customer needs, CEL employs a high-tech industrial process designed in collaboration with designers and engineers.









Vacuum Tables

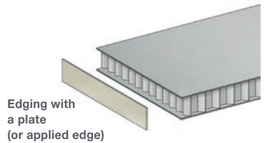
CEL has recently acquired the newest generation 9-axis CNC machine. This state-of-the-art machine enables the production of large-scale panels in a variety of different materials (wood, plywood, aluminium, plastic, laminate, etc.). The honeycomb core is perforated according to the specifications of our customers. This procedure allows the flat part or panel to be held tightly during cutting and plotting, allowing surfaces to be worked with uninterrupted passes. The tables are available in a wide range of sizes and configurations.

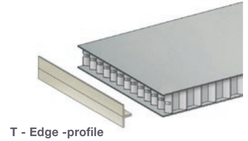
Cutting, sawing, drilling or shaping

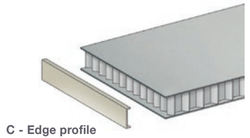
These mechanical processes are performed by a CNC (Computer Numerical Control).

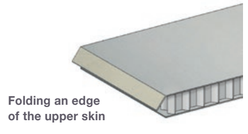
Edging

Panels can be processed with different edges using a variety of materials depending on the aesthetic requirements.









Routing and folding technique - also for tray productions

The panel skins are cut according to the drawings (final dimensions) specified by the customer. V-shaped or rectangular grooves are made along folding lines, without cutting the upper skin, whereupon the adhesive is applied. The low density of the material enables easy folding. After folding the object is cleaned, dried and packaged.

Joining and fixing

For some projects or uses, the panels are provided with anchoring systems to fasten them to other surfaces. The type of panel and the chosen material determine the most suitable fastening system.
Here are a few options:
- The panels are attached to each other by visible or blind rivets and screws
- Fixing with self-tapping screws (sealing washers) in aluminium or stainless steel suitable for the corresponding substructure
- Fastening with drilling screws

Skin finish

OXIDATION: natural aluminium plates can be treated with anodic oxidation.

PAINT: raw aluminium panels can be painted with powder or liquid colours.

SERIGRAPHY: new digital technologies enable prints with exceptional resolution and durability thanks to the use of UV-reactive inks. Architects' and designers' personalisations are infinite and unique.

CEL COMPONENTS

SANDWICH PANELS AND HONEYCOMB

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