

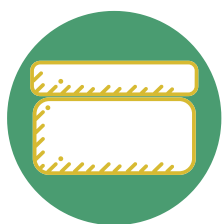
TECHINICAL DATA

POLIBOX[®]



(R)evolutionary

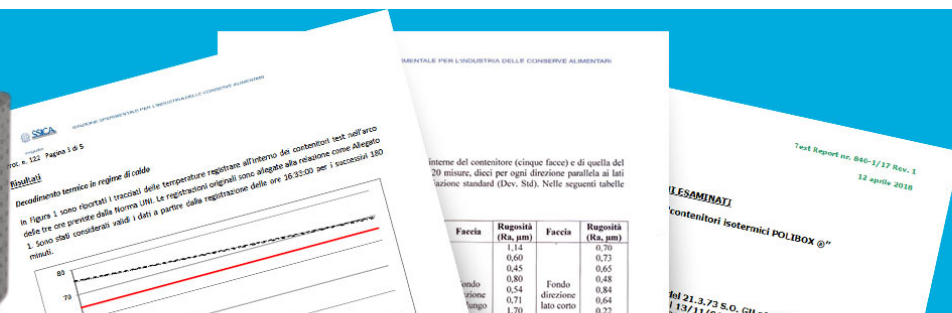
ABOUT US



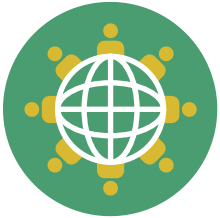
With **POLIBOX®** brand we are today the leading company in the production of the most complete range of isothermal containers for the conveyance of meals and foods at a controlled temperature.



We offer **ADVANCED RESTAURANT SOLUTIONS**. Our reference sectors are commercial and collective, school and hospital catering. We also extend our duty to the banqueting sector, the agro-food chain, logistics and pharmaceutical companies.



OUR COMMITMENT



Our **commitment** will always be to put the customer at the center of our daily actions by offering the best products, focusing on quality, social responsibility and environmental sustainability. WE HAVE THE RIGHT INGREDIENTS FOR YOUR SUCCESS!



We have always been interested in the **research** and **development** of finished and innovative materials and products, always conceived as components of **integrated systems**. We follow the production of our items timely and totally, from the purchase of some raw materials to the control of the production processes of the specialized industries that work in partnership with us.



Technical updating and direct communication are the daily stimuli that allow us to improve the quality of the product, the level of service and the value for money. We guarantee technical know-how and skills to offer customized solutions to our customers who receive the maximum care in all phases of sales and after-sales. The commercial and production partnership with major national and international groups offers the possibility of guaranteeing **advanced solutions**.



THE EXPANDED POLYPROPYLENE (EPP)



Expanded Polypropylene (PPE) is made up of 98% air, it is recyclable and has an excellent ecological balance.

The weight reduction of each container, up to 37.5% less, guarantees a significant reduction in CO2 emissions during production.

2

The pearls are swelled up to 50 times their volume with hot water vapor

1

From oil to pearls



3

EPP does not cause damage to the environment as it consists of air and only 2% of pure hydrocarbon structural material

EPP BENEFITS

*There are many benefits of using PPE.
It is a sturdy, durable, light and ...
recyclable material!*



RECYCLABILITY

Polibox is 100% recyclable.



STRUCTURAL RESISTANCE

Load-bearing structural support thanks to the high strength/weight ratio.



LIGHTNESS

The reduction in the mass of the material and the number of components drastically reduces the weight of the Polibox containers



EPP



ENERGY ABSORPTION

The closed cell structure guarantees the return to the original shape in a controlled way after dynamic stress



RECYCLABILITY



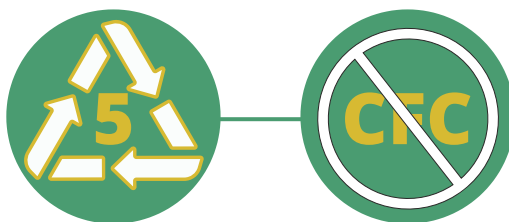
EPP can be disposed of with other municipal solid waste without producing toxic or harmful substances.



Expanded polypropylene is 100% recyclable. It is a chemically neutral raw material that does not pollute either the air or groundwater during the disposal process.

With our isothermal containers we want to promote the reduction of the environmental impact, which is why when you use the Polibox containers you contribute to energy saving, waste reduction and respect for the environment.

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LCA CYCLE

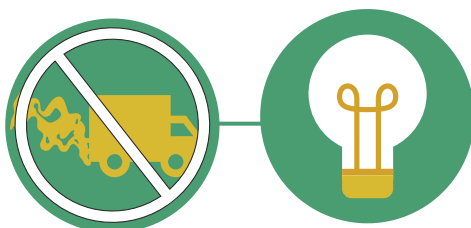
The LCA cycle is essential for companies that want to make environmental decisions



As a result of the collaboration established with the Department of Agricultural and Environmental Sciences of the University of Milan, the LCA cycle of a Polibox isothermal container was evaluated.

With "Life Cycle Assessment" (LCA) we identify the operational tool to measure the environmental performance of a product or service throughout its life cycle (supply chain), from raw material to disposal.

The low weight of the Polibox containers (85% less than traditional containers) involves a reduction of the load equal to 27%. This leads to savings in fuel and consequently a reduction in emissions produced during transport. The impact derived from the disposal of the Polibox containers have a very low incidence when compared with the entire life cycle.





WHY IS POLIBOX SUITABLE FOR FOOD?

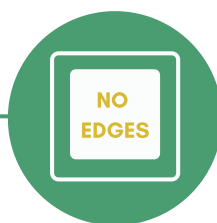


EPP is a material suitable for contact with all types of food, it does not give off odors and anomalous tastes.

Polibox® isothermal containers protect food from mechanical stresses thanks to the thickness and structure of the closed cell expanded polypropylene.

They are light and have no protrusions and sharp edges to protect the safety of operators during handling and transport operations.

They are industrial washing and disinfection with detergents safe. Polibox must be washed only with hot water and humid steam up to a temperature of 110°C.



DECLARATION OF CONFORMITY (MOCA)



The EPP used has been tested in accordance with the provisions on MOCA – Materials and Objects in Contact with Food – at national and European level.

Thanks to the results obtained from laboratory tests carried out on expanded polypropylene samples, **Polibox® containers are suitable for contact** with all types of food (OM6 test conditions as per Annex V EU Regulation 10/2011).

Further analysis were carried out in February 2021 and the raw material was found to comply with **EU Regulation 1245/2020**, which introduces substantial changes to EU Regulation 10/2011.

The necessary supporting documentation is available to the supervisory authorities, as required by **EU Regulation 1945/2004** art. 16 paragraph 1.



ISOTHERMAL SAFETY



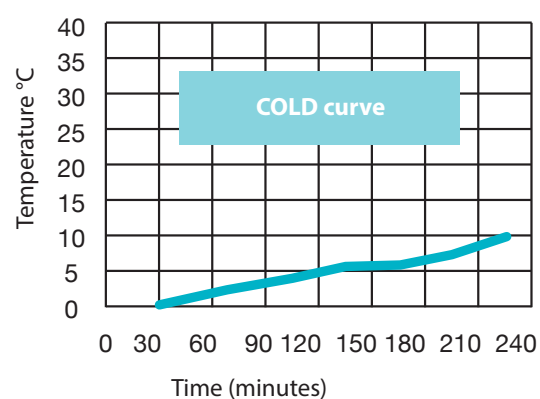
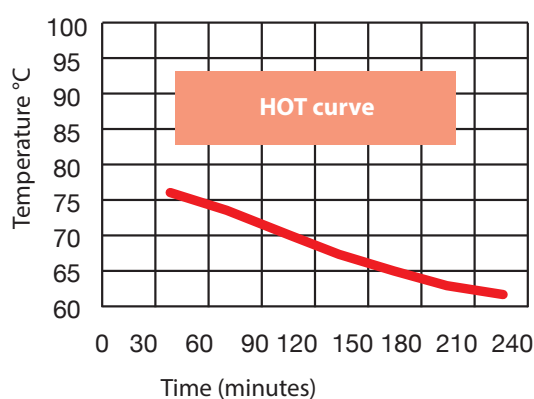
EPP has a closed cell structure which provides excellent energy dissipation characteristics

EPP is CO₂ expanded and has no residual blowing agents.

The Polibox® containers are suitable for protecting against thermal stresses thanks to the insulating properties of the expanded polymer which has a resistivity coefficient (Lambda) of 0.039 W/mk and guarantees a thermal drop of 1.5–2.5°C/h/container.

Temperature curve

Thermal insulation efficacy test carried out with hot and cold products



The translated figures and tables are taken from a laboratory test carried out in Italian.



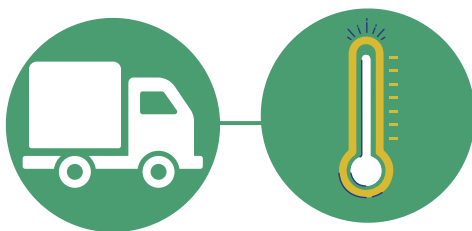
MAXIMUM TIGHTNESS

The closed cell structure of the PPE, in addition to guaranteeing excellent isothermal qualities, provides excellent insulating qualities



The structure of the Polibox® containers is highly insulated, thanks also to the interlocking lids. Our containers represent an excellent solution for handling.

The Polibox containers comply with the UNI 12571: 1999 standard, which specifies the temperature, hygiene and test methods for isothermal containers used in collective catering.

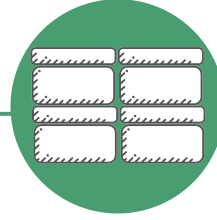
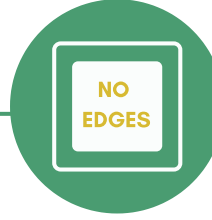


LIGHTWEIGHT, RESISTANT, HANDY AND STACKABLE



Sturdy, but light ... An excellent protection for your loads. They are the solution to large movements.

- The high density of PPE which guarantees excellent resistance to mechanical stress, without affecting the weight of the container, which remains contained thanks to the high presence of air in the structure.
- Polibox® containers are stable, absorb shocks and are scratch proof.
- Simple to handle, thanks to the lack of protrusions and edges and the comfortable ergonomic handles
- Ideally suited for transporting and storage in confined spaces, thanks to the possibility of stacking the containers



TECHNICAL FEATURES

EPP STANDARD TYPES

MODELS PPE	Pre-expanded density	Particles color
	(g/l)	
18	16 - 20	black
22	19 - 25	black
30	26 - 32	black
35	32 - 38	black
42	38 - 44	black
50	48 - 54	black
55	52 - 60	black
75	70 - 85	black



Some results obtained from laboratory analyzes carried out on expanded polypropylene

EPP PHYSICAL FEATURES

	TEST METHOD	U.M.	TESTED DENSITY*								
		g/l	20	30	40	50	60	80	100	120**	140**
LOAD TRACTION	ISO 1798 DIN 53571	kPa	230	350	500	600	700	950	1500	1200	1100
TRACTION LENGTHENING	ISO 1798	%	15	15	15	14	14	14	14	14	10
COMPRESSION LOAD	ISO 844 DIN 53421 speed: 5 mm/min	kPa									
25% Deformation			80	150	200	275	350	550	750	1000	1200
50% Deformation			150	200	300	400	500	800	1200	1500	1800
75% Deformation			340	450	600	800	1000	1600	2500	3700	5200
COMPRESSION SET 22h/23°C/25% def. measure after : 24h	ISO 1856	%	14	11	11	10	10	9	9	11	11
FLAME'S RESISTANCE	FMVSS 302 ISO 3795 thickness: 12.5 mm	mm/ min	100	80	60	50	40	30	25	23	22

* Data obtained with mold for blocks with dimensions 1000*300*150 mm, on Kurts K 813 EPP socket

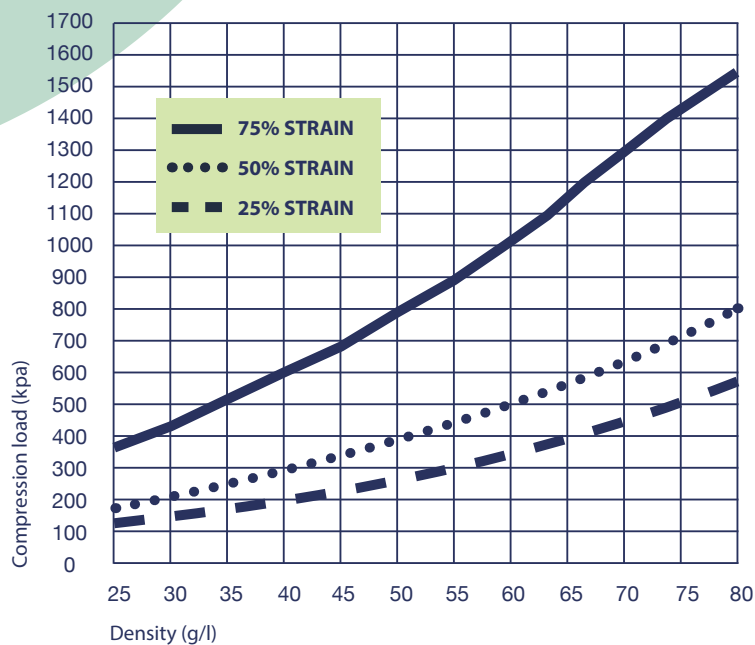
** USA import white material

The translated figures and tables are taken from a laboratory test carried out in Italian.

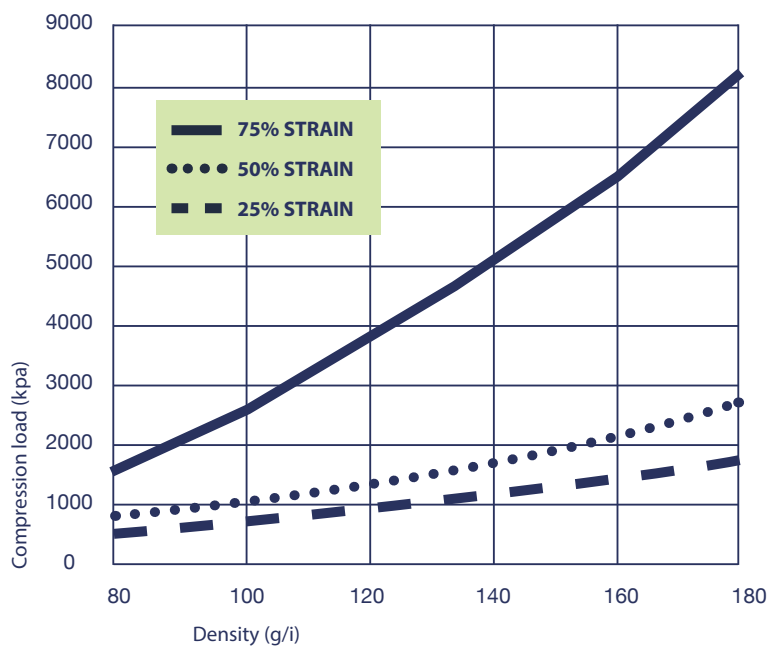
TECHNICAL FEATURES



COMPRESSION LOAD (STATIC) V/S Density ISO 844, DIN 53 421*



from 80 to 180 g/l
Test speed 5 mm/min

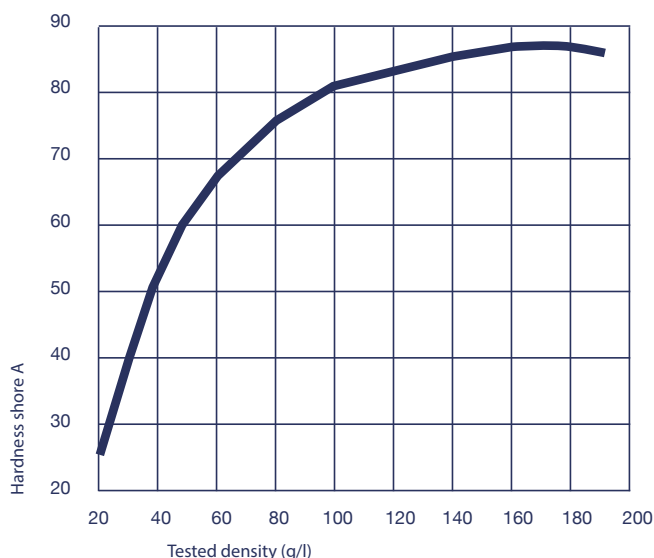


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"A" SHORE HARDNESS

ISO 868

TECHNICAL FEATURES



The translated figures and tables are taken from a laboratory test carried out in Italian.

CHEMICAL RESISTANCE OF EXPANDED POLYPROPYLENE SPECIMENS

The table below shows the qualitative effects of various aggressive chemicals on expanded polypropylene specimens. The results obtained from the tests are representative of the chemical resistance of the product.



CHEMICAL REAGENT	7 Days of immersion to 22°C
Gasoline	2
Kerosene	2
Toluene	2
Acetone	2
Ethyl alcohol	1
N-heptane	2
Acetado ethyl acetate	1
Methyl Ethyl Ketone (MEK)	2
10 % Sulfuric acid	1
10 % Nitric acid	1
10 % Hydrochloric acid	1
10 % Sodium hydroxide	1
Ammonia (aqueous solution)	1

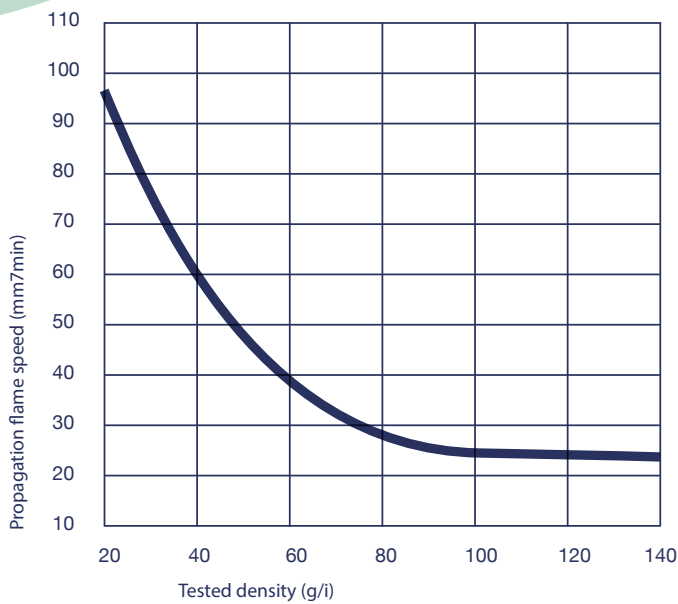
1 - No variation
2 - Slight growl

TECHNICAL FEATURES

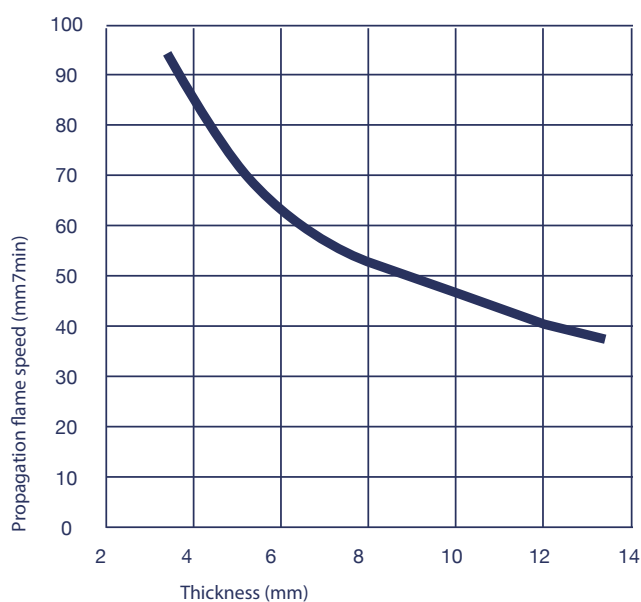


FLAME SPREAD SPEED V/S DENSITY FMVSS 302, ISO 3795 *

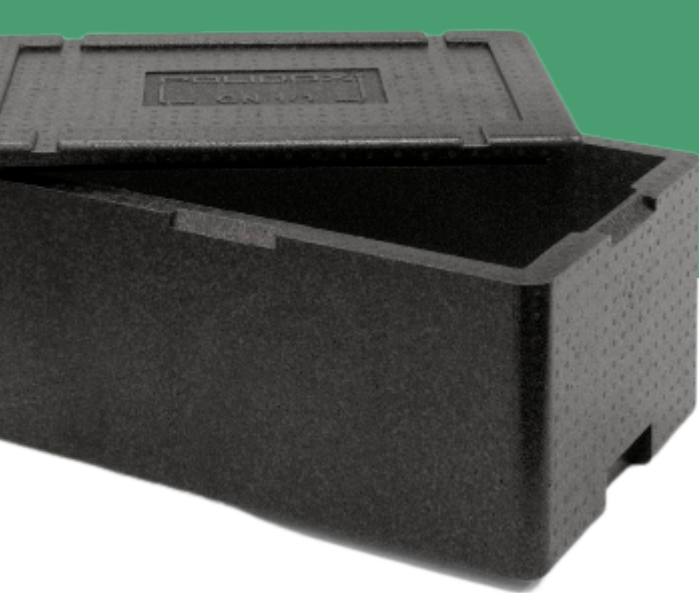
* Sample thickness 12.5 mm in both tests.



FLAME PROPAGATION SPEED V/S SPECIMEN THICKNESS FMVSS 302, ISO 3795 * Density 60 g / l



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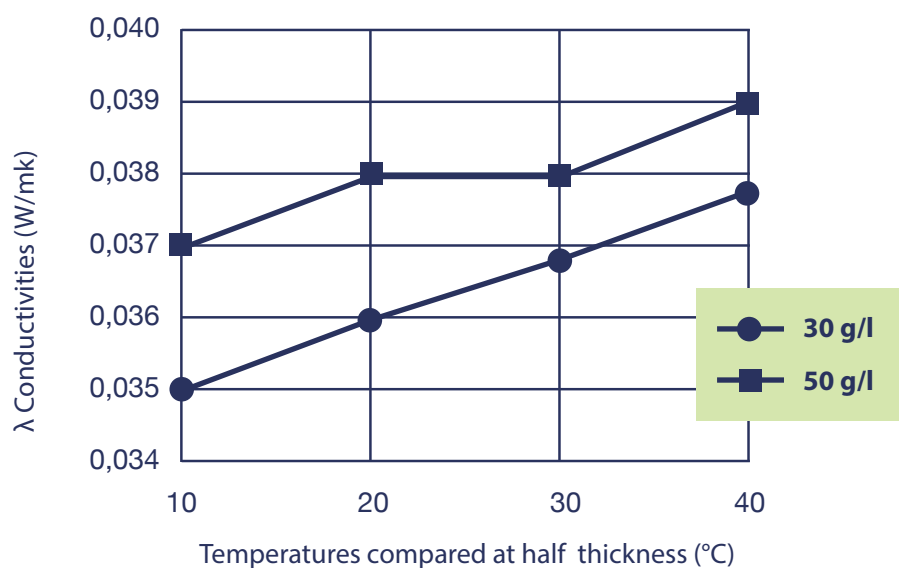
TECHNICAL FEATURES

THERMAL INSULATION VALUES

DIN 52616 / ASTM C 518

DENSITY (g/l)	COEFFICIENT λ (W/mK)			
	λ 10°C	λ 20°C	λ 30°C	λ 40°C
30	0.035	0.036	0.037	0.038
50	0.037	0.038	0.038	0.039

λ Conductivity (W/mK) with an internal temperature, at half thickness of the specimen, of 10 ° C, measured when the temperature difference between the external surfaces of the specimen is equal to 16 K.



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TECHNICAL FEATURES

THERMAL INSULATION VALUE

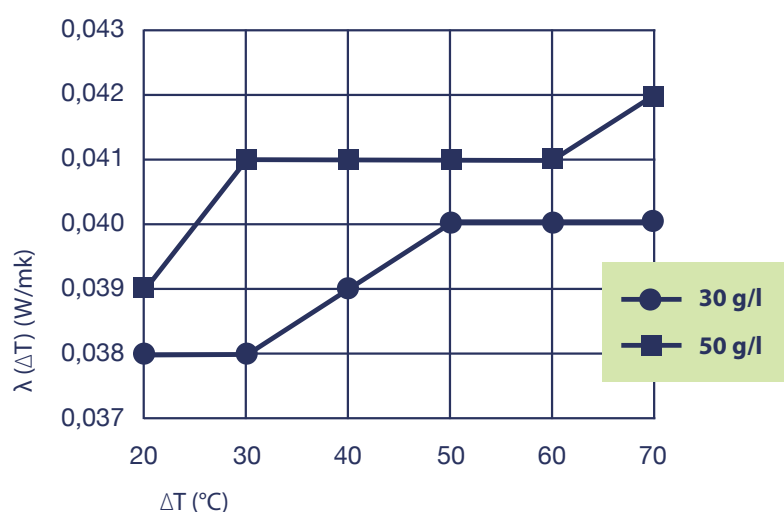
DIN 52616 / ASTM C 518



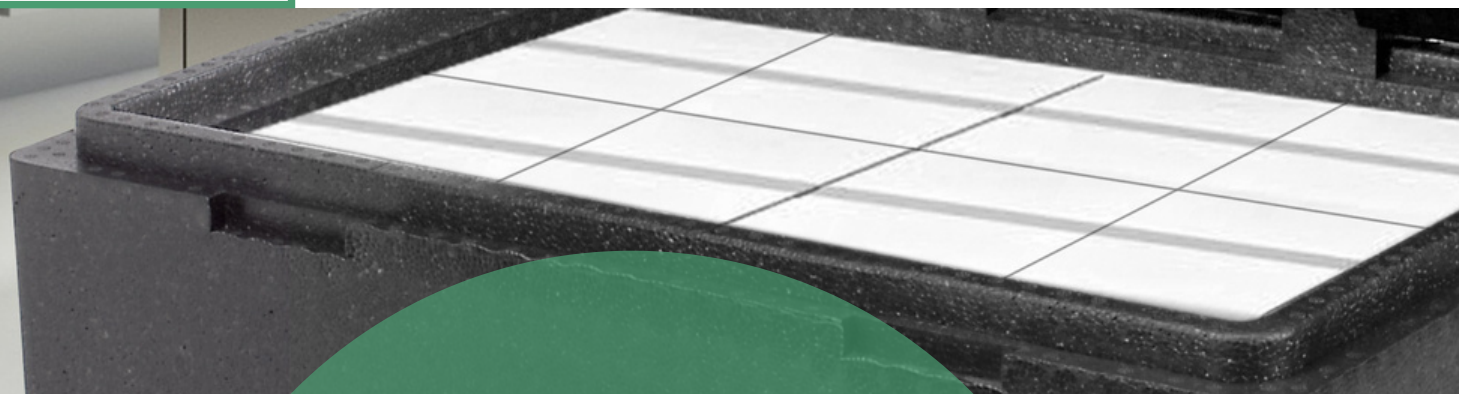
ΔT (°C)	$\lambda(\Delta T)$ CONDUCTIVITIES (W/mK)	
	$\lambda 10^\circ\text{C}$	$\lambda 20^\circ\text{C}$
20	0,038	0.039
30	0,038	0,041
40	0,039	0,041
50	0,040	0,041
60	0,040	0,041
70	0,040	0,042

$\lambda(\Delta T)$ Conductivity (W / mK) measured with a temperature difference between the two surfaces.

ΔT : Temperature between the two surfaces
T of the cold surface equal to 21°C



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TECHNICAL FEATURES

WATER ABSORPTION

DIN 53 428

The DIN 53 428 method describes the measurement of water absorption for a material after 1 day and after 7 days.

The specimens, 50*50*50 mm in size, are cut by eliminating the molding "skin", immersed in distilled water.

The weight of the specimens is measured before and after the dive.

IMMERSION TIME	WATER ABSORPTION * (VOL%)
1 DAY	~ 1
7 DAYS	~ 2,5

* Molding conditions and density can change the water absorption value

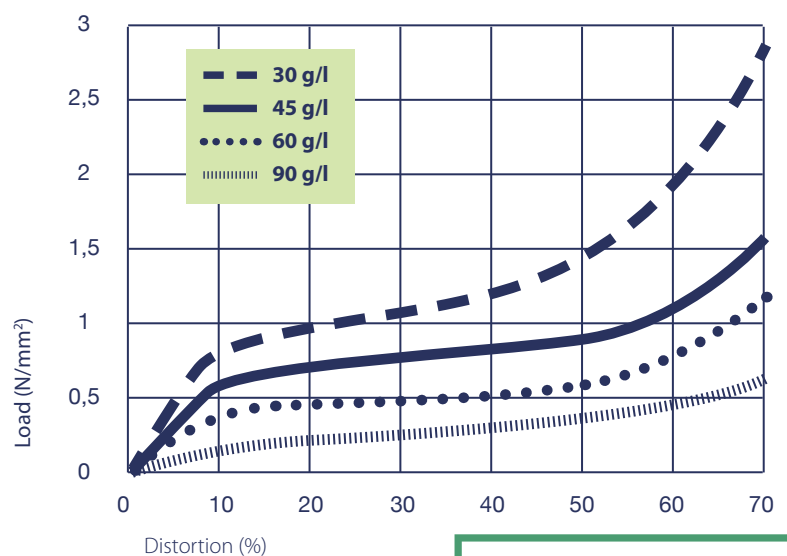


DATA FROM DYNAMIC IMPACT MEASUREMENTS*

ENERGY ABSORBERS

Test performed with JSPI instrumentation ($v = 8 \text{ m/s}$, weight varied to obtain 70% compression at each density).

The size of the specimens is 100*100*100 mm.



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POLIBOX®



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