PRODUCT DATASHEET

DESCRIPTION

Bold extruded polycarbonate sheets are produced in accordance with ISO 11963: 2012 and EN 16240: 2013 standards and can be used both indoors and outdoors for a wide variety of purposes such as use in construction and automotive industry, safety and so on. They provide long-life products with high transparency, excellent impact resistance, weathering and aging resistance with one or two-sided UV protective layer, easy and safe manufacturing and handling. We have them available in a wide range of thicknesses, colors, textures and special effects.

TYPICAL PRODUCT PROPERTIES DATA

Properties	Method	Units	Compact Polycarbonate
General			
Density	ISO 1183	g/cm^3	1,2
Water absorption	USI 62 (1)	%	0,15
Mechanical			
Tensile strength in yield	ISO 527-2	Mpa	60
Elongation in yield	ISO 527-2	%	6
Elongation at break	ISO 527-2	%	> 100
Traction module	ISO 527-2	Mpa	2300
Flexural strength	ISO 178	Mpa	90
Flexural module	ISO 178	Mpa	2300
Impact Resistance (Unnotched Charpy)	ISO 179/1fu	kJ/m^2	No Break
Impact resistance (Izod notch)	ISO 180/1A	kJ/m^2	> 65
Optical			
Refractive index	ISO 489		1,585
Light transmission (thickness dependent)	ASTM D1003	%	81-90
Haze (3mm transparent sheet)	ASTM D1003	%	< 1
Thermal			
Vicat softening temperature (50N)	ISO 306	°C	144
Heat deflection temperature (1,82 Mpa)	ISO 75-1	°C	130
Linear thermal expansion coefficient (0-500C)		µm/m°C	6,5
Thermal conductivity	ASTM C177	W/mK	0,2
Maximum continuous service temperature		°C	85
Short term maximum service temperature		°C	120
Minimum continuous service temperature		°C	-25
Short term minimum service temperature		°C	-40
Electrical			
Dielectric constant (50 Hz)	DIN 53483		3
Dissipation factor Tanδ (100 MHz)	DIN 53483		0,0006
Dissipation factor Tanδ (1 MHz)	DIN 53483		0,009
Volumetric resistivity	IEC 60093	Ohm.cm	$>10^{14}$
Superficial resistivity	IEC 60093	Ohm	$>10^{15}$

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DIMENSIONS

Thicknesses (mm)	Width (mm)	Lenght (mm)
0,5 - 15,0	1000, 1220 e 2050	600 - 6000

The sheets can also be manufactured in special measures, in this case with a custom order, following the client's previous request.

TOLERANCES FOR DIMENSIONS

SHEETS Thickness (mm)	Thickness tolerances, %	Width tolerances (mm)	Length tolerances (mm)	Diagonal tolerances (mm)	Flatness Tolerances
< 1,5	±8	Sheets cut in Production: -0,0 / +3,0	Sheets cut in Production: -0,0 / +3,0	Sheets cut in Production: Lenghts ≤ 4000 mm - ≤ 2 Lenghts > 4000 mm - ≤ 4	Maximum allowable curvature -0.5% of linear dimensions. Maximum allowable curvature across the entire width of the slab - ≤ 5 mm per meter of width. Maximum allowable curvature along the length of the board - ≤ 5 mm per meter of length.
≥ 1,5, < 2,0	±4				
≥ 2,0, < 15,0	±3	Sheets cut to special measure: ± 0,50	Sheets cut to special measure: ± 0,50	Sheets cut to special measure: ≤ 0,50	
≥ 15,0, < 19,0	±5				

OPTICAL QUALITY

Maximum number of sheets	- Black spots of 0.4 mm in size, with a minimum distance between them of 1 meter. - 0.2 mm air bubbles, with a minimum distance between them of 1 meter. - "Fish eyes" of 1 mm in size, with a maximum of 5 items in an area of 0.5 m^2.

COLORS

Compact polycarbonate sheets are naturally colorless and transparent, where pigments can be added to obtain a diverse range of colors. The light transmission of colored sheets varies depending on their thickness.

For an up-to-date color gamut list, contact your Bold business advisors.

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DEFINITIONS

SHRINKAGE

After heating, the extruded polycarbonate sheets will shrink during the cooling process. Shrinkage is greater in the extrusion direction. This characteristic of compact polycarbonate must be taken into account when planning end sheet dimensions.

Plate thicknesses, mm	Standard degree	
	E.D. shrinkage*,%	T.D. shrinkage **, %
≥ 1,80, < 2,30	6 - 7	0,5
≥ 2,30, < 3,50	5 - 6	0,5
≥ 3,50, < 4,00	3 - 4	0,5
≥ 4,0, < 6,00	2 - 3	0,5
≥ 6,00	2	0,5

*E.D. Machine Extrusion Direction
**T.D. Machine Extrusion Transverse Direction

UV PROTECTION

Compact polycarbonate has excellent UV radiation filtration. They block harmful UV radiation by transmitting visible light and parts of IR radiation. However, polycarbonate itself is not UV resistant and must be stabilized or protected with UV absorbing additives.

A co-extruded UV layer that is an integral part of the sheet protects the sheets from the degradation of solar ultraviolet radiation. The effectiveness of this protection has been confirmed in field and laboratory durability tests of yellowing index (YI), light transmission (LT) and maintenance.

Mechanical properties

All Bold compact polycarbonate sheets are guaranteed against loss of physical, mechanical and optical properties during the term.

Details are available on the Bold website (bold.net).

FIRE TEST PERFORMANCE

Polycarbonate is a thermoplastic, so it will eventually melt and burn under the intense heat of fire. However, Polycarbonate is considered a self-extinguishing material, meaning it will stop burning when the fire source is removed. Unlike other materials, they do not produce toxic or corrosive gases when burning.

Extruded sheets of compact polycarbonate are classified:

- HB according to UL94 for thin sheets (0.50 mm to 5.90 mm thick),

- V2 according to UL94 for sheets with higher thicknesses (Thickness greater than 6mm),

- V0 for Grade "F" fire retardants (Custom Product),

- B-s1, d0 according to UNE-EN ISO 13501 (specific thickness).

- B-s1, d0 according to UNE-EN ISO 13501 (specific weights).

NOISE REDUCTION

Compact polycarbonate sheets are widely used as noise reduction barriers along roads and highways and meet the following standards:

EN-14388: 2005 - Road traffic reduction device.
EN-1793 - Road traffic reduction device - Acoustic properties.
EN-1794 - Road traffic reduction device - Non-acoustic properties.

CHEMICAL RESISTANCE

Bold polycarbonate sheets can be safely used with most chemical materials and components, however some common materials are not compatible with polycarbonate. Chemical stability depends on many factors, such as concentration of chemical agents, internal stresses and exposure temperature.
Due to the complexity of chemical compatibility, all materials intended for contact with the sheets must be tested at all times.

ENVIRONMENTAL STRESS CRACK

Environmental stress cracking (ESC) is the result of a combination of stress and exposure to chemicals. The stress level required for ESC is less than the normal mechanical failure stress of polycarbonate in a chemical-free environment.
Stresses can be created during formation and fabrication and can be controlled by an annealing process. Stresses can also be created by improper installation. Cold bent blades under permanent induced stress or blades under periodic stress (fatigue) are also susceptible to ESC.

STORAGE

Compact polycarbonate sheets should be stored with their original protective mask in a dry, shady and well-ventilated area, WITHOUT EXPOSURE to direct sunlight, wind, dirt or hard objects. Avoid storage in areas with excessive heat or aromatic cleaning solvents.
They must be stored horizontally on their delivery pallets and placed in a soft material (such as cardboard) to prevent damage. DO NOT store sheets under flexible PVC covers, as flexible PVC is not compatible with polycarbonate and can cause serious damage to the sheets. Pay attention to avoid pressure on unsupported areas.

PROTECTION FILM

Both surfaces of the compact polycarbonate sheet are protected by a fully recyclable polyethylene (PE) film. Keep this film in position for as long as possible and remove it immediately after installation.
Sharp objects, sharp particles or even small fragments can penetrate the protective PE mask and damage the product. Therefore, always place the sheets on a clean, smooth surface. The protective film of compact polycarbonate is suitable for thermoforming. High temperature deep elongation thermoforming applications can make the PE film adhere more tightly. The printed film must be removed prior to term formation to avoid transfer of printing ink to the sheet surface.

CLEANING AND MAINTENANCE

Compact polycarbonate sheets are produced in a "clean room" environment and do not need to be cleaned prior to use. However, cleaning may be necessary after fabrication, before sensitive processes such as vacuum metallization or printing, or for maintenance during use.

Provides a longer and more effective shelf life when cleaning with warm soapy water using a mild liquid soap. If any dirt remains, gently wipe it off with a soft cloth.

- Commercial liquid cleaners may not be compatible with polycarbonate and are not recommended.

- Sponges, squeegees, brushes or sharp instruments should not be used for cleaning sheets as they can damage the UV protection coating and/or cause scratches on the sheet surface.

ENVIRONMENTAL ADVANTAGES

Compact polycarbonate sheets are environmentally friendly. The sheets and their polyethylene from the protective layers are fully recyclable. They do not contain any toxic materials or heavy metals that could cause environmental damage or health hazards. Ozone Depleting Substances (ODP) are not used to manufacture compact polycarbonate sheets and do not release polluting substances into the environment during manufacture. They do not produce toxic or corrosive gases during burning, fires can be extinguished with water.

Can be used for energy recovery and chemical or mechanical recycling.
Polycarbonate scrap is not classified as hazardous waste, small amounts can be disposed of as household waste. Large amounts must be disposed of in recycling.

IMPROVEMENT OF COMPACT POLYCARBONATE PLATES

Compact polycarbonate sheets can be cut, sawed, drilled, milled and bent easily using standard wood or metal workshop equipment. However, it is always recommended to use specific tools specially designed for plastics.

- Cold bending:
Compact polycarbonate sheets are flexible and can be cold bent in a straight line.

When cold bending, a permanent plastic deformation is induced in the bending line, this deformation causes a reduction of the mechanical properties in the bended area. In addition, plastic deformation causes internal frozen stresses that reduce the chemical resistance of the sheet in the bent area and increase its susceptibility to ESC attack. Annealing can cause a partial improvement in mechanical and chemical resistance.

For compact polycarbonate sheets up to 6 mm, the recommended minimum bending angle is 90°. For higher thicknesses, up to 12 mm, the recommended minimum bending angle is 135°.