NUDEC®

Displays, showcases and other publicity material at sales points

Industrial protection

Chocolate and confectionary moulds

Dispensing and recreational machines

Labelling

Orthopaedic parts and medical equipment components

Protective shields (anti-disturbance)

Security glazing

Construction components

Town furniture (anti-vandal)

Articles for use with foodstuffs

NUDEC® PETg

Polyethylenterephthalate copolymer sheets

- Easily thermoformable
- High impact strength, close to that of polycarbonate
- In impact-based applications, lower thicknesses to those of acrylic sheets can be employed with better results
- Ductile, elongation to breaking similar to that of polycarbonate
- Excellent chemical resistance
- They are available with UV protection (upon request)
- Excellent transparency and surface brightness
- Reduce noise transmission
- Sterilisable
- Recyclable

NUDEC® PETg

Properties

Dimensional stability to heat

Articles manufactured with this product must not be exposed to continuous use at more than 60°C, depending on application.

Transformation

It does not whiten when cold-bent up to 2,5 mm.
Can be cut with a guillotine.
They can be easily sawn, edged and drilled without any burring.
Easily welded even with PVC.
Surface scratches are easily eliminated with a hot air gun.
Unlike polycarbonate, it can be laser-cut.
The same tools employed in diamond buffing of acrylics can be used to buff NUDEC® PETg sheets.

Ageing

The UV component of sunlight causes degradation to all plastics in general. This degradation depends on the exposure conditions, in other words, on the actual duration of exposure to sunlight, the sheet inclination to the sun's rays, temperature and humidity and on sunlight intensity (geographical coordinates).

This degradation shows up as a progressive yellowing, a reduction in light transmission and loss of mechanical properties.

For exterior applications where the sheets are permanently exposed to ultraviolet light, a stabilised product, such as NUDEC® PETguv sheets, which are protected on both sides, are recommended.

When used in exterior applications, the protective film must be removed immediately, since exposure to sunlight can cause permanent adhesion to the sheet.

STANDARD SPECIFICATIONS FOR PETg RESIN

	CODE	UNIT	VALUE
PHYSICAL			
Density	ISO 1183	g/cm^3	1,27
MECHANICAL			
Tensile strength @ yield	ISO 527	MPa	53
Tensile strength @ breakage	ISO 527	MPa	26
Elongation @ breakage	ISO 527	%	>200
Elasticity modulus in traction	ISO 527	MPa	2.200
Resistance to flexion	ISO 178	MPa	79
Charpy impact test with notch	ISO 179	kJ/m^2	10
Charpy impact test	ISO 179	kJ/m^2	No breakage
Rockwell hardness, M / R scale	ASTM D-785		115
Ball pressure hardness	ISO 2039	MPa	(*)
OPTICAL			
Light transmission	ASTM D-1003	%	88
Refractive index	ASTM D-542		1,57
THERMAL			
Maximum Service temperature		°C	60
VICAT Softening temperature (10 N)	ISO 306	°C	83
VICAT Softening temperature (50 N)	ISO 306	°C	78
Heat deflection temperature, HDT A (1.8 MPa)	ISO 75-2	°C	68
Heat deflection temperature HDT B (0.45 MPa)	ISO 75-2	°C	72
Coefficient of linear thermal expansion	ISO 75-2	$x10^{-5}/°C$	6,8

These data correspond to raw material values.

(*) Non-applicable

CHEMICAL RESISTANCE

CHEMICAL PRODUCT	BEHAVIOUR		
	SATISFACTORY	REGULAR	UNSATISFACTORY
Mineral oil	X		
Vegetable oil	X		
Acetone			X
Acetic acid		X	
Water	X		
Turpentine	X		
Ammonia			X
Detergents	X		
Ethanol	X		
Petrol	X		
Glycerine	X		
Methanol		X	
Toluene			X

CERTIFICATIONS

PROPERTY	METHOD	UNIT
Food contact	EN 10-2011, FDA	
Fire performance	DIN EN 13501-1	B - s1, d0

A PETg safety file is available for any additional type of query.

Specifications valid for clear panels.

Handling

Cleaning

The sheets should be cleaned with a solution of warm water with a little neutral soap and rinsed with water employing a very soft sponge or chamois leather.

Cutting

Sawing

The common types of saws employed in wood or metal carpentry provide good results when sawing NUDEC®PETg sheets: disc, band, sabre, jigsaw, hewing, and handsaw. Disc or band saws produce the best edges and can perform almost all cutting operations.

Blade shape plays an important role in sawing plastics. It is recommended to employ a band saw with separated teeth because the empty space will facilitate the exit of the cut chips. The best results are obtained using teeth without any inclination and also somewhat jumped. To prevent the plastic from cracking or melting, the blade must be very sharp and the guide should very close to the cut to prevent vibration.

Die-stamping

NUDEC®PETg sheets can be satisfactorily die-cut with steel blades (up to 2 mm). The blade has to be quite frequently replaced or sharpened. The die-cutting press must be adjusted so that the run completely traverses the plastic sheet and stops before blade cause any nicks.

Polishing

Pre polishing is required to eliminate any marking caused by the cutting disc.

The following may be used:

- Rotating rigid fabric discs with buffing paste.
- Rotating soft fabric discs with buffing paste for the final finish.

Flame polishing can also be employed with a standard butane torch or a hot nitrogen welding torch, with precise maintenance of the exact distance between the sheet and the heat source. If the heat source is brought too close there is a danger of bleaching the surface or the material becoming too fluid.

Drilling

NUDEC®PETg sheets can be drilled quite easily with a normal stand drill or even with a hand-drill using clean, sharp drill bits. Drill bits designed for use with plastics are recommended. It is occasionally possible to use ordinary drill bits, but they should be sharpened to reduce the depth or cutting angle. During the drilling operation, the sheet must be firmly held, but avoiding excessive pressure at the same time. Speeds of up to 1.750 rpm are preferred for small drill holes and for larger holes, whereas speeds as low as 350 rpm are advised. The use of compressed air is recommended to prevent overheating, especially in cases where sheet thicknesses exceed 5 mm.

Gluing

Gluing with adhesives

Among the recommended adhesives are the cyanacrylates, together with two-component acrylics, polyurethanes and epoxies.

The following should be taken into consideration when selecting an adhesive:

- Chemical compatibility with the sheets
- Aesthetics of the finished joint
- Dilation and contraction with temperature changes
- Fragility, rigidity and flexibility
- Alterability with respect to outside weather, where applicable
- Duration and useful lifetime
- Adhesive strength (adherence to the plastic)
- Final usage requirements

For perfect gluing of the surfaces to be joined, they must fit together well (without exerting force and without leaving any cavities) and should also be smooth and unpolished.

Certain adhesives with volatile components may contract during drying. This effect can be compensated by cutting the joint at an angle, thus leaving space to be filled with a slight excess of adhesive.

Mechanical securing

This method is useful when assembling or installing large or heavy pieces. It is recommended that screws specifically designed for plastics are employed.

Thermoforming

There are various thermoforming techniques that can be applied to NUDEC®PETg sheets in order to obtain the desired shape once heated, using mechanical force, compressed air or a vacuum. Moulds can be made of plaster, water-cooled steel, cast aluminium or other materials, such as wood or epoxy.

For thermoforming:

- Pre-drying, as required for polycarbonate, is not necessary. Time and energy savings
- Thermoforming temperatures between 120 and 160° C. Very high temperatures can reduce the impact strength of the material.

All NUDEC products use film to protect the surface from possible damage during production and transport. This protective film is not prepared to withstand high temperatures and must be removed prior to thermoforming or hot-bending.

Bending

NUDEC®PETg sheets can be curved and bent with a small radius by first heating a narrow strip on both sides of the sheet using a electric heater. When the sheet reaches the correct temperature (above 105°C) a slight resistance will be noted to folding, this is when the sheet is easily bent.

If it is attempted to bend the sheet before it is heated sufficiently, stress will occur that will lead to breakage.

If, on the other hand, the sheet is over-heated, bubbles might appear along the section that is to be bent. It can also be cold bent up to 2.5 mm.

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Decoration

Hot stamping

Signs, drawings, trademarks and other figures can be hot-stamped on NUDEC®PETg sheets.

Printing

NUDEC®PETg sheets can be printed with standard presses; however, the ink does not penetrate in this plastic as it does with paper or fabric and is therefore liable to be erased with rubbing. This risk can be reduced by applying a layer of transparent lacquer over the print. They can also be painted, silk-screened and laser-decorated.

The print film should be removed just prior to printing to prevent the surface from damage.

NUDEC®PETg

Polyethylenterephthalate Copolymer sheets

Properties

Specifications

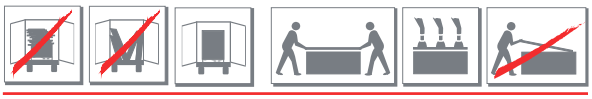
Handling

Transport

Storage

Responsibility clause

- NUDEC, S. A. supplies its products in accordance with the indications prepared by the purchaser with respect to the ordered material and quality. In this sense, NUDEC, S. A. provides its customers with all available professional and technical information deriving from its product analyses.
- Once the material has been delivered by NUDEC, S. A., the purchaser is fully responsible for all subsequent application, treatment, use and/or utilisation of this same material , whether by the actual purchaser or by third parties, with complete indemnity for NUDEC, S. A.
- The purchaser is wholly and soley responsible for carrying all tests or analyses, of any nature, which are required to verify that the product can be effectively applied for the purpose sought by the purchaser or by any third parties to whom the purchaser supplies the product or for whom its is installed.
- NUDEC, S. A. is exempt from any responsibility deriving from any inadequate or defective application of its products by the purchaser or subsequent third parties, and only accepts damages deriving directly from possible defects of its products at origin.



Transport

Dirt and sharp angles may damage the surface in the case of friction.

- During transport, stable, flat pallets should always be used and the sheets secured to prevent sliding.
- The sheets must not be allowed to slide over each other during loading and unloading operations.
- They should be lifted by hand without any dragging or by suction-cup lifting equipment.

Storage

An incorrect storage position can lead to permanent deformation.

- The sheets should be stored in closed premises that guarantee normal environmental conditions.
- The sheets should be stored one on top of the other on flat horizontal surfaces and fully supported over their total area.
- The topmost panel should be covered with a sheet of polyethylene or cardboard etc.
- NUDEC®PETg sheets must not be stored in direct sunlight or under conditions of high humidity and/or temperature as this can have a negative effect of protective film adhesion.

NUDEC®

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