OPTIX® XT

EUROPE

EXTRUDED PMMA ACRYLIC SHEET

Acrylic (PMMA) extruded sheet is produced according to the ISO 7823-2:2003 standard and can be used both indoor and outdoor for a wide variety of domestic and industrial applications. OPTIX XT is available in wide range of thicknesses, translucent and opaque colors, textures, special effects and high impact grades (OPTIX XT Super). The complete range offers high transparency, inherent UV resistance, weathering and ageing resistance and can be easily machined or thermoformed by standard techniques.

TYPICAL PROPERTIES

PROPERTIES	METHOD	UNITS	VALUE
PHYSICAL			
Density	ISO 1183	g/cm^3	1.19
Water Absorption	ISO 62 (1)	%	0.3
Flammability (Thickness dependent)	UL94 BS 2782-0:2011 Method 508A	-	HB TP(b)
MECHANICAL			
Tensile Strength	ISO 527-2	MPa	72
Elongation at Break	ISO 527-2	%	4
Tensile Modulus	ISO 527-2	MPa	3300
Flexural Strength	ISO 178	MPa	106
Flexural Modulus	ISO 178	MPa	3350
Compressive Strength	ISO 604	MPa	117
Rockwell Hardness (M scale)	ISO 6508-1	HRM	95
Impact Resistance (Charpy unnotched)	ISO 179/1fu	kJ/m^2	15
Impact Resistance (Charpy notched)	ISO 179/1eA	kJ/m^2	2
Impact Resistance (Izod notched)	ISO 180/1A	kJ/m^2	1.5
OPTICAL			
Refractive Index	ISO 489	-	1.49
Light Transmission (3mm transparent sheet)	ASTM D1003	%	92
Haze (3mm transparent sheet)	ASTM D1003	%	< 1
THERMAL			
Vicat Softening Temperature (50N)	ISO 306	°C	105
Heat Deflection Temperature (1.82 MPa)	ISO 75-1	°C	95
Coefficient of Linear Thermal Expansion	DIN 53483	µm/m°C	65
Thermal Conductivity	ASTM C177	W/mK	0.19
Maximum Continuous Service Temperature	-	°C	70
Maximum Short Time Service Temperature	-	°C	90
Minimum Temperature	-	°C	-40
ELECTRICAL			
Dielectric Strength	DIN 53481	kV/mm	20-25
Dielectric Constant (50Hz)	DIN 53483	-	3.7
Dissipation Factor tanδ (1 MHz)	DIN 53483	-	0.04
Surface Resistivity	IEC 60093	Ohm	>10^{14}
Volume Resistivity	IEC 60093	Ohm.cm	>10^{15}

OPTIX XT SUPER – EXTRUDED HIGH IMPACT ACRYLIC SHEET

PROPERTIES	METHOD	UNITS	S25 (R7700)	S30 (R7400)	S50 (R7500)	S75 (R7800)	S100 (R7600)
PHYSICAL							
Density	ISO 1183	g/cm³	1.19	1.19	1.18	1.17	1.16
Water Absorption	ISO 62 (1)	%	0.3	0.3	0.3	0.3	0.3
MECHANICAL							
Tensile Strength	ISO 527-2	MPa	57	54	50	45	40
Elongation at Break	ISO 527-2	%	22	26	30	35	40
Tensile Modulus	ISO 527-2	MPa	2450	2275	2100	1900	1700
Flexural Strength	ISO 178	MPa	88	84	79	71	62
Flexural Modulus	ISO 178	MPa	2470	2285	2100	1950	1800
Rockwell Hardness (M scale)	ISO 6508-1	HRM	77	73	68	56	44
Impact Resistance (Charpy unnotched)	ISO 179/1fu	kJ/m²	51	59	67	71.5	76
Impact Resistance (Charpy notched)	ISO 179/1eA	kJ/m²	4.3	5.3	6.2	6.9	7.6
Impact Resistance (Izod notched)	ISO 180/1A	kJ/m²	4	4.5	5	5.6	6.3
OPTICAL							
Refractive Index	ISO 489	-	1.49	1.49	1.49	1.49	1.49
Light Transmission (3mm transparent sheet)	ASTM D1003	%	92	92	92	92	92
Haze (3mm transparent sheet)	ASTM D1003	%	< 2.7	< 2.7	< 2.7	< 2.7	< 2.7
THERMAL							
Vicat Softening Temperature (50N)	ISO 306	°C	99	98	97	94	90
Heat Deflection Temperature (1.82 MPa)	ISO 75-1	°C	92	91	90	85	83
Coefficient of Linear Thermal Expansion	DIN 53483	µm/m°C	70	80	100	105	110
Maximum Continuous Service Temperature	-	°C	65	63	63	62	62
Maximum Short Time Service Temperature	-	°C	86	83	81	76	74
Minimum Temperature	-	°C	-20	-20	-20	-20	-20

DIMENSIONS

THICKNESS, mm	WIDTH, mm	LENGTH, mm
0.70 – 30.0	1000, 1220 and 2050	600 – 6000

Sheets are also available cut to size, according to customer requirements.

DIMENSION TOLERANCES

THICKNESS TOLERANCES		WIDTH AND LENGTH TOLERANCES		DIAGONALS TOLERANCES, mm	FLATNESS TOLERANCES
SHEET THICKNESS, mm	THICKNESS, %	WIDTH AND LENGTH, mm	TOLERANCES, mm		
<1.5	± 8	Up to 1000	+3 / -0	Sheet cut in production: Length ≤ 4000 mm: ≤ 2 mm Length > 4000 mm: ≤ 4 mm Cut To Size: ≤ 0.5 mm	Max allowed bowing - 0.5% from linear dimensions. Max allowed bowing across the width of the sheet - ≤ 5 mm per meter of width. Max allowed bowing along the length of the sheet- ≥ 5 mm per meter of length
≥ 1.5, < 3.0	± 10	From 1001 to 2000	+6 / -0		
≥ 3.0, < 20.0	± 5	From 2001 to 3000	+9 / -0		
≥ 20.0	± 10	3001 and over	+0.3% / -0		

* The specified tolerances apply to measurements taken at 23–25 °C

COLORS

OPTIX XT sheet is naturally colorless and exceptionally clear, however pigments can be added to obtain a wide range of tints and colors. OPTIX XT colored sheet maintain the same light transmission percentages regardless of thickness (except for opals and diffusers). For a list of updated colors, please contact PLASKOLITE Technical Support.

DEFINITIONS

SHRINKAGE

After heating, the acrylic extruded sheet will shrink during the cooling process. The shrinkage is higher in the extrusion direction. This characteristic of OPTIX XT should be taken into account when planning the final dimensions.

SHEET THICKNESS, mm	STANDARD GRADE		SPECIAL GRADES *	
	SHRINKAGE M.D** %	SHRINKAGE T.D** %	SHRINKAGE M.D** %	SHRINKAGE T.D** %
≥ 1.80, < 2.30	6 – 7	0.5	3 – 4	0.5
≥ 2.30, < 3.50	5 – 6	0.5	2 – 3	0.5
≥ 3.50, < 4.00	3 – 4	0.5	1 - 2	0.5
≥ 4.00, < 6.00	2 – 3	0.5	0 – 1	0.5
≥ 6.00	2	0.5	0 - 1	0.5

* *For example Sky Domes grades for use in thermoforming, which are produced upon special request for shrinkage conditions.*

** *M.D. – Machine (extrusion) direction*
T.D. – Transverse (perpendicular to extrusion) direction

FIRE TEST PERFORMANCE

PMMA is a combustible material and will burn if ignited, however, unlike other polymers, does not produce toxic or corrosive gases and produces very little smoke which is an important safety benefit. OPTIX XT extruded acrylic sheet is classified:

- HB according to UL94
- E according to UNE-EN ISO 13501

NOISE REDUCTION

OPTIX XT sheet is used widely as noise-reduction barriers along roads and highways. For more information, see OPTIX XT Acoustic Walls Guidebook.

CHEMICAL RESISTANCE

OPTIX XT sheet has good resistance to water, alkalis, aqueous inorganic salt solutions and most common dilute acids. Some substances do not have any effect on OPTIX XT however some can cause staining, swelling, crazing, weakening or even complete dissolving of the material. Please contact PLASKOLITE Technical Support for information regarding special applications.

* *Note: Any substance that comes with contact with PMMA should be checked for compatibility.*

ENVIRONMENTAL STRESS CRACKING

Environmental Stress Cracking (ESC) is a result of the combination of stress and chemical exposure. The level of stress needed for ESC is lower than the normal failure mechanical stress of PMMA in a chemical-free environment. Stresses can be created during fabrication and forming and can be controlled by an annealing process. Stresses can also be created by improper installation. Cold bended sheets under permanent induced stress or sheets under periodic stress (fatigue) are also susceptible to ESC.

GENERAL GUIDELINES

STORAGE

- OPTIX XT is a rigid sheet, incorrect handling can cause breakage, leaving sharp edges.
- OPTIX XT sheet must be stored with its original protective masking in a cool, dry and well-ventilated room, away from direct sunlight, excessive humidity, rain or solvent vapors.
- OPTIX XT sheet is best stored horizontally on their delivery pallets. Pay attention to avoiding pressure on the unsupported areas. Never leave sheet or pallets uncovered.

PROTECTIVE FILM

Both surfaces of OPTIX XT sheet is protected by a fully recyclable polyethylene (PE) film. Keep this film in position as long as possible and remove only and immediately after installation.

There are two kinds of protective film for the sheet:

- Universal film that is suitable for machining
- Easy-removal film that is suitable for sheet where the film will be removed before processing. This type of film is not suitable if machining of the sheet is required to be done with the protective film on the sheet.

Both of the above types of film are suitable for thermoforming and laser cutting. Printed film must be removed before thermoforming in order to avoid transfer of the printing ink to the surface.

CLEANING AND MAINTENANCE

OPTIX XT sheet is produced in clean-room environment and does not need to be cleaned before use. However, cleaning may be needed after fabrication, before sensitive processes such as vacuum metallization, printing, or for maintenance during use.

If OPTIX XT sheet needs to be cleaned, wash the surface with clean fresh water with a mild soap. In order to verify that the soap you are using is compatible with PMMA test a hidden area before cleaning. Use a clean soft cloth or sponge and rinse well. Do not scrub or use brushes. Dry with a soft cloth. The use of window cleaning fluids or solvents such as alcohols, turpentine, acetone, etc., can cause damage to the sheet.

ENVIRONMENTAL ADVANTAGES

OPTIX XT sheet is environmentally friendly. LCA (Life Cycle Assessment) and eco profiles of PMMA sheet production show a low impact on the environment. The outstanding chemical stability and long-time resistance to aging and weathering of OPTIX XT sheet often ensures a long service time. Both sheet and polyethylene protective layers are fully recyclable. They do not contain any toxic materials, halogens or heavy metals, which may cause environmental damage or health risks. OPTIX XT sheet does not contain Bisphenol-A. Ozone Depleting Substances (ODP) are not used in the manufacturing of OPTIX XT sheet and they do not release pollutant substances into the environment. They do not produce toxic or corrosive gases when burning, and fires can be extinguished with water.

OPTIX XT scrap is not classified as hazardous waste small amounts can be disposed as household refuse. Large quantities should be disposed by recycling.

RE-WORKING

- HANDLING
  Machining, Assembling, Forming, Glazing and Signage Installation recommendations can be found in the OPTIX XT Guidebook.
- COLD BENDING
  Unlike thermoforming, cold-bended OPTIX XT will not keep its form unless installed into a frame. The sheet must be with perfect edges to avoid breakage during bending. The radius of the bend should not be below the minimum value in order to avoid high permanent stress, which can eventually cause small cracks or even break the sheet. Minimum recommended bend radius is 300 times the thickness of the sheet.

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