

PRODUCT SPECIFICATIONS: KODA XT Polycarbonate Panels



Product Description

3form Koda XT offers color, durability and design freedom for the most extreme environments and applications. These panels exhibit the highest performance of any engineered resin panels. Color, finish, and translucency coupled with endless shaping options, Koda XT is the perfect medium for your exterior architectural application.

A product line developed specifically for exterior projects, Koda XT has the added benefits of being constructed from polycarbonate, which is both environmentally responsible and high-performing.

FEATURES AND BENEFITS

- Form and shape to create eye-catching installations
- Extremely tough, allowing for easy fabrication and maximum installed durability
- Extremely versatile, enabling designers to achieve full design potential
- Lightweight, half the density of glass, making for easier installation and reducing structural support requirements
- Good chemical resistance, reducing potential harm incurred by cleaning agents

AVAILABLE COLORS

STANDARD

Crystal Clear Glass Green

C3 COLOR SYSTEM

3form Koda XT can be combined with any of the C3 colors in as few as one panel. Use the C3 Color Matching System to create over 10,000 colors.

CUSTOM COLORS

Koda XT can be customized to match nearly any translucent or transparent color (minimums may apply).

TEXTURES/PATTERNS/FINISHES

Koda XT comes standard with a polished front and back finish.

3form provides the option of substituting between 4 optional finishes. In most cases, you can even pick different front and back finishes. Finishes include:

- **Patent** - A high gloss finish with highest light transmission
- **Patina** - A non-glare finish with smooth appearance
- **Sandstone** - A durable finish with subtle texture
- **Stucco** - A durable finish with a pebbled texture
- **Vellum** - A random brushed finish similar to 3form renewable matte

PANEL SIZES AND TOLERANCES

3form Koda XT panels are offered in standard 4' x 8' (1.2 m x 2.4 m) and 4'x10' (1.2m x 3.0m) sizes. Custom lengths and widths up to 12' long and 6' wide are possible. All dimensions and squareness (standard with custom) are subject to a 3/16" (4.7 mm) tolerance.

Standard thickness of Koda XT is 1/2" (12.7 mm) and 1/4" (6.3 mm).

*1/4" Koda XT is only available in Crystal Clear.

STANDARD COLORS

NOMINAL THICKNESS GAUGE	MINIMUM ALLOWANCE GAUGE	MAXIMUM ALLOWANCE GAUGE
1/2" (12.7 mm)	0.427" (10.85 mm)	0.500" (12.7 mm)
1/4" (6.3 mm)	0.212" (5.38 mm)	0.260" (6.6 mm)

C3 COLOR SYSTEM & CUSTOM COLORS

NOMINAL THICKNESS GAUGE	MINIMUM ALLOWANCE GAUGE	MAXIMUM ALLOWANCE GAUGE
1/2" (12.7 mm)	0.451 (11.45 mm)	0.585 (14.86 mm)

Sheet tolerance readings are based on an average of several measurements along both long edges of each panel. These measurements are taken 2-3 inches (50-75 mm) from the edges of the panel.

Custom gauges of Koda XT are possible. Your 3form Sales Representative can assist you with questions regarding custom gauges for your application.

FLATNESS TOLERANCE

Koda XT panels shall not have distortion in the form of a wrinkle, twist or scallop along the perimeter of the sheet. Overall warp extending across the sheet is permitted to a maximum of 9/32" (7.1 mm) for each 48" (1.2 m) or fraction thereof. Panel is to be measured when laying horizontally under its own weight on a flat continuous surface.

Specifications

FLAMMABILITY & SMOKE TEST RESULTS -

BUILDING CODE APPROVALS

Koda XT panels have been independently tested and meet the criteria for approved interior finishes and light transmitting resin materials as described in the 2009 International Building Code®.

TEST	3FORM KODA XT	RESULT
ASTM D 2843 Smoke Density	48.9	PASS Below 75
ASTM D 635 Flame Spread	Self extinguishing	PASS CC1
ASTM D 1929 Self-ignition Temperature	1004°F	PASS Greater than 650°F
ASTM E84-03 Flame Spread, 1/4" thickness Smoke Developed	65 450	Class B: 26-75 Class B: ≤450
ASTM E84-03 Flame Spread, 1/2" thickness Smoke Developed	55 400	Class B: 26-75 Class B: ≤450
CAN/ULC 102.2 Flame Spread, 1/2" thickness Smoke Developed	37 280	N/A N/A

PANEL WEIGHT

THICKNESS (INCHES)	WEIGHT FLUX (LB/FT²)
1/2" (12.7 mm)	3.1 lb/ft² (15.1 kg/m²)
1/4" (6.3 mm)	1.5 lb/ft² (7.31 kg/m²)

EXPANSION/CONTRACTION ALLOWANCES

Like all resin products, 3form Koda XT will expand and contract normally with fluctuations in temperature. The following formula provides allowances that should be made in framed or fitted applications:

- Longest length of panel (inches) x temperature change of the sheet (°F) x 0.00004 = Amount of Linear Expansion/Contraction (inches)

example:

- 48" x 96" panel that experiences a 100°F temperature change will expand/contract: 96 inches x 100 degrees°F x 0.00004 in/in °F = 0.384 inches (expansion)

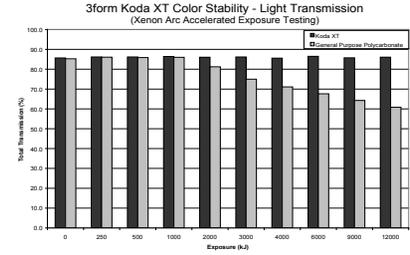
Allowances should also be made in the following situations:

- Fastening points
- Channel depths in frames
- Holes for standoffs and other hardware
- Meeting points for multiple sheets of 3form Koda XT

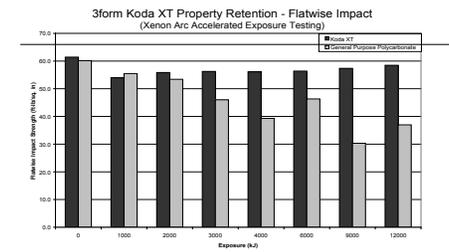
ULTRAVIOLET EXPOSURE PERFORMANCE

3form Koda XT panels incorporate ultraviolet stabilization technologies that are proven to maintain aesthetics and performance. The following charts provide an overview of the effectiveness of the UV stabilization technology that is incorporated with 3form Koda XT panels.

One important characteristic of a materials performance is the ability to maintain consistent aesthetics. The following chart demonstrates the performance of both Koda XT and unstabilized polycarbonate in terms of maintaining consistent light transmission. It is shown that the 3form Koda XT with UV stabilization exhibits excellent performance following 12,000 kJ of exposure (representing approximately 10-years outdoor Florida exposure).



Another important factor to consider is the ability of a material to maintain its physical integrity after exposure to solar radiation. The following chart shows how the impact strength is maintained after 12,000 kJ of accelerated exposure of Koda XT.



DEFLECTION

3form Koda XT will exhibit different amounts of deflection given a variety of factors; fastening techniques, loads, panel thickness and panel dimensions to list a few. The 3form Technical Help desk can assist you with general deflection guidelines for your application with the Koda XT Deflection Charts technical white paper. If your application has specific engineering requirements, please contact the 3form Product Technology team for additional direction.

HEAT FORMING/COLD BENDING

3form Koda XT C3 cannot be heat formed. Only the standard colors (Crystal Clear, Glass Green) of Koda XT are able to be heat formed.

3form Koda XT can be cold bent for simple bends and curved areas. As a rule, a minimum radius of 1000 times thickness is acceptable for Koda XT.

KODA XT THICKNESS	MINIMUM COLD BEND RADIUS
1/2" (12.7 mm)	500" (1270 mm)
1/4" (6.3 mm)	250" (635 mm)

EDGE FINISHING

Edges of 3form Koda XT panels are able to be machined or routed into a variety of different forms. In addition to a straight edge, edges may accept beveling, rounding, etc. Additional finishing, such as sanding or polishing, can also be provided to some edges.

SOUND TRANSMISSION CLASS (STC) VALUES FOR KODA XT

Measurement protocol: ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

KODA XT THICKNESS	STC VALUES
1/2" (0.500")	34

Selected Mechanical and Physical Properties for 3form Koda XT

	TYPICAL VALUE				
	0.118" (3 MM)		0.236" (6 MM)		
PROPERTY*	ASTM METHOD	SI	U.S.	SI	U.S.
GENERAL					
Density	D 1505	1,200 kg/m ³	0.043 lb/in ³	1,200 kg/m ³	0.043 lb/in ³
Water Absorption	D 570 23°C (73°F), 24h immersion	0.15%	0.15%	--	--
MECHANICAL					
Tensile Stress @ Yield	D 638	82 MPa	9,000 psi	--	--
Tensile Stress @ Break	D 638	65.5 MPa	9,500 psi	--	--
Elongation	D 638	110%	110%	--	--
Tensile Modulus	D 638	2,344 MPa	340,000 psi	--	--
Flexural Modulus	D 790	2,380 MPa	345,000 psi	--	--
Flexural Strength	D 790	93 MPa	13,500 psi	--	--
Compressive Strength	D 695	86 MPa	12,500 psi	--	--
Compressive Modulus	D 695	2,380 MPa	345,000 psi	--	--
Shear Strength, Ultimate	D 732	69 MPa	10,000psi	--	--
Shear Strength, Yield	D 732	41 MPa	6,000 psi	--	--
Shear Modulus	D 732	786 MPa	114,000 psi	--	--
Rockwell Hardness	D 785	M70/R11B	M70/R11B	--	--
Safety Glazing	ANSI 97.1	PASS		PASS	
Izod Impact Strength, Notched	D 256 @ 32°F	747 J/m	14 ft-lb/in	62 J/m	1.2 ft-lb/in
Impact Strength, Unnotched	D 4812 @ 32°F	3,202 J/m No Failure	60 ft-lb/in No Failure	--	--
Impact Resistance—Puncture, Energy @ Max. Load	D 3763 @ 32°F	>61 J	>45 ft-lb		
Miami-Dade Notice of Acceptance (NOA)				NOA No. 12-0120.01	
THERMAL					
Continuous Max Use Temperature - Standard and Custom Colors	--	132°C	270°F	132°C	270°F
Continuous Max Use Temperature - C3 Colors	--	93°C	200°F	93°C	200°F
Heat Deflection Temperature	D648 @ 66psi	137.7°C	280°F		
Forming Temperature	--	163-182°C	325-360°F	163-182°C	325-360°F
Thermal Conductivity	ASTM C 177	0.195 W/m ² K	1.35 Btu-in/hr-ft ² -°F	0.195 W/m ² K	1.35 Btu-in/hr-ft ² -°F
Coefficient of Thermal Expansion	ASTM D 696	6.75 x 10 ⁻⁵ in/in/°F	3.75 x 10 ⁻⁵ in/in/°F	6.75 x 10 ⁻⁵ in/in/°C	3.75 x 10 ⁻⁵ in/in/°F

* Unless noted otherwise, all tests are run @ 23°C (73°F) and 50% relative humidity, using specimens machined from extruded sheeting with a thickness as indicated.

**Nonbreak as defined in ASTM D 4812 using specimens having a thickness as indicated. Properties

Chemical Resistance of 3form Koda XT to Select Compounds

6 DAY FULL IMMERSION TESTING @ 73°F (23°C)

Polymer materials are affected by chemicals in different ways. Changes in performance or appearance can be attributed to fabrication methods, exposure conditions, concentration of chemical substances or exposure duration. Such factors can even influence the final effect of substances that 3form Koda XT is considered "Resistant" to under test conditions. Further details are explained below:

FABRICATION

Stresses generated from sanding, grinding, drilling, polishing, machining, sawing and/or forming (hot or cold).

EXPOSURE

Exposure duration, stresses imparted during the application life-cycle due to loads, temperature changes, heat, environments, etc.

APPLICATION OF CHEMICALS

Application from contact, rubbing, wiping, spraying, soaking, etc. Also having an effect is the relative concentration of the chemical in question.

The following data is based on complete immersion of Koda XT in the chemical or reagent shown. Samples remained immersed and were stored at 23°C (73°F) for a period of six days. Following the test period the samples were removed from immersion and inspected. This table represents the changes in appearance of the immersed samples over the testing period.

The following table provides indicative performance of the chemical resistance characteristics of Koda XT. The following codes are used to describe the chemical resistance characteristics:

R = RESISTANT

3form Koda XT is able to withstand the identified compound for long exposure periods (6 days, full immersion)

LR = LIMITED RESISTANCE

3form Koda XT is only resistant when in contact with this compound for short periods at room temperature. It is advised that further determination of the effect of the substance be further tested in your particular application.

NR = NOT RESISTANT

3form Koda XT is not resistant to the compound. The material will swell, craze, haze, dissolve or experience some physical change when exposed to this substance.

REAGENT	RESULT	REAGENT	RESULT
Acetic Acid, 10% in water	R	Acetone	NR
Ammonia, 0.1% in water	NR	Ammonium nitrate, 10% in water	R
Benzene	NR	Benzine (no aromatic hydrocarbons)	R
Butyl Acetate	NR	Carbon tetrachloride	NR
Chloroform	NR	Citric Acid, 10% in water	R
Dibutyl phthalate	NR	Diethyl ether	NR
Dimethyl formamide	NR	Diethyl phthalate	NR
Dioxane	NR	Ethanol, 100%	R
Ethyl Acetate	NR	Ethylene chloride	NR
Ethylene glycol, 1:1 with water	R	Glycerin	NR
Hexane	R	Hydrochloric Acid, 10% in water	R
Hydrogen Peroxide, 30% in water	R	Iron (III) chloride, saturated solution	R
Isocetate (2,2,4-trimethyl pentane)	R	Isopropanol (pure)	R
Methanol	NR	Methyl Ethyl Ketone	NR
Methylamine	NR	Methylene chloride	NR

REAGENT	RESULT	REAGENT	RESULT
Nitric Acid, 10% in water	R	n-propanol	NR
Ozone, 1% in air	NR	Paraffin, paraffin oil, free from aromatic hydrocarbons	R
Phosphoric acid, 1% in water	R	Propane	R
Silicone Oil	R	Sodium Carbonate, 10% in water	R
Sodium Chloride, 10%	R	Sodium Hydroxide, 1%	NR
Sodium Nitrate, 10% in water	R	Styrene	NR
Sulfuric Acid, 10% in water	R	Tetrachloroethane	NR
Tetrachloroethylene	NR	Trichloroethylene	NR
Tricresyl Phosphate	NR	Triethylene Glycol	R
Xylene	NR		

Cleaning Instructions

3form Koda XT, like all thermoplastic resin materials, should be cleaned periodically. A regular, quarterly cleaning program will dramatically help prevent noticeable weathering and dirt build-up.

Rinse the sheets with lukewarm water. Remove dust and dirt from Koda XT with a soft cloth or sponge and a solution of mild soap and/or liquid detergent in water. A 50:50 solution of isopropyl alcohol and water also works well. Rinse thoroughly with lukewarm water.

Always use a soft, damp cloth to blot dry. Rubbing with a dry cloth can scratch the material and create a static charge. Never use scrapers or squeegees on Koda XT. Also avoid scouring compounds, gasoline, benzene, acetone, carbon tetrachloride, certain deicing fluids, lacquer thinner or other strong solvents.

DO NOT:

- Use a squeegee.
- Strong solvents, highly alkaline or abrasive cleaning agents.
- Clean in hot sun or elevated temperatures.
- Rub with a dry cloth.

PRESSURE WASHING

Pressure washing can also be an effective way to remove miscellaneous debris from surfaces of 3form Koda XT installations.

Pre-soak panels with a light water spray to loosen and remove incidental surface debris.

It is recommended that the water pressure for cleaning Koda XT panels be 1,500 psi or less. 3form Koda XT is a tough material but can be damaged if high pressure is concentrated in a single position too long. Use a gradual sweeping motion over the application. Never concentrate water spray in a single position. Pressure nozzle should never be positioned closer than 8" (203 mm) from the panel surface.

Always test a portion of the sheet first before spraying. If test piece shows any sign of material fatigue, abrasion or delamination – discontinue pressure washing and proceed with manual cleaning instructions as described above.

Coated or painted parts are not suitable for pressure washing as finish may be stripped off. Pressure washing is not suitable for Koda XT panels that have been seamed or sealed. If using detergent, use mild detergents only. Rinse sheet with light water spray after washing.

DO NOT:

- Concentrate spray in single position.

- Use more than 1,500 psi pressure.
- Position pressure nozzle closer than 8" (203 mm) from panel.
- Proceed with pressure washing if test piece shows detrimental effects to panel.
- Pressure wash Koda XT panels that have been painted or coated to maintain coating integrity.

If debris or dirt is not removed by pressure washing attempt to clean with manual procedures described in preceding section.

IMPORTANT

If a cleaning material is found to be incompatible in a short-term test, it will usually be found to be incompatible in the field. The converse, however, is not always true. Favorable performance is no guarantee that actual end-use conditions have been duplicated. Therefore, these results should be used as a guide only and it is recommended that the user test the products under actual end-use conditions.

For more information, please visit 3-form.com or call 877-649-2670.