

# 3form™ Chroma Technical Data Sheet



3form Chroma offers unique aesthetics and performance for both horizontal surfaces and lighting applications. The product clarity offers designers the ability to create beautiful edge-lit pieces. Available in thick gauge formats, 3form Chroma utilizes advanced coloring technology to take color to new "sights".

## Product Description

3form Chroma is produced from optical grade engineered resin. Chroma is available in thick-gauge formats which lends itself well for use in many horizontal applications. Chroma is a highly functional material that brings impact when color is introduced. Chroma is produced with brilliant colors that can be layered (up to 3 colors) to create an enormous range of hues, opacities and amazing effects. The surface of Chroma features a durable renewable matte texture that can be easily refinished throughout its lifetime. On request Chroma incorporates 40% pre-consumer recycled content without compromising its amazing clarity.

In exterior Chroma is suitable for use as signage, lighting, awnings, tables or canopies. Use Chroma to bring amazing color and design to your exterior applications.

### FEATURES AND BENEFITS

- Surface is able to be completely refinished to maintain product “newness”
- Great for edge lighting – tremendous optical properties and high light transmission
- Rigid - stable and sturdy material for horizontal applications
- Qualifies for 3form Reclaim – keeping end-of-life material out of landfills
- Combine up to five colors to create any color imaginable

### AVAILABLE COLORS

3form Chroma comes in a variety of translucent warm and cool colors. Colors can be made opaque with the addition of the color - White Out.

(Visit [www.3form.eu](http://www.3form.eu) for the complete list of available color options.)

### CHROMA REFLECT

3form Chroma Reflect pairs beautiful 3form colors with a reflective opaque mirror. The result is a breathtaking panel that glows and radiates color like you’ve never seen. Chroma Reflect panels are 1-sided and opaque. Chroma Reflect can only be paired with one Chroma color. The back finish of Chroma Reflect is matt. Chroma Reflect adds an extra 3 mm (1/8") to the standard thickness of Chroma panels. Additionally, Chroma Reflect is not suitable for exterior use and requires special fabrication techniques.

### TEXTURES/PATTERNS/FINISHES

All Chroma sheets come standard with a Renewable matte finish on the front face that allows the product to be continually rejuvenated if ever desired or necessary during the service life of the material. The back side of 3form Chroma in translucent colors is finished with a matte finish, but this side should not be renewed.

Chroma Clear comes standard with renewable matte surfaces on front and back.

Chroma panels can be ordered with an optional Renewable Matte Back Finish, that allows refinishing of both sides of the panel. The Renewable Matte Back Finish increases the thickness by an extra 1.5 mm (1/16”).

Chroma panels that are opaque by using "White Out" (unless specified differently) are finished with a gloss backside texture to allow for more versatility during fabrication.

### PANEL SIZES AND TOLERANCES

All dimensions and squareness (standard or custom) are subject to a to a 3.1 mm (1/8”) tolerance.

Chroma is available in 12.7 mm (1/2 inch), 25.4 mm (1 inch) and 50.8 mm (2 inch) thicknesses.

## PANEL SIZE TABLE

### Nominal gauge

12.7 mm (1/2")  
25.4 mm (1")  
50.8 mm (2")

### Panel dimensions

1219 x 2438 mm (48" x 96"), 1219 x 3048 mm (48" x 120")  
1219 x 2438 mm (48" x 96"), 1219 x 3048 mm (48" x 120")  
1219 x 2438 mm (48" x 96")

Gauge tolerances are an inherent part of working with resin. Given the unique manufacturing process for 3form Chroma, a given gauge is subject to a +/- 10% thickness tolerance. Thickness tolerance readings are based on measurements along both long edges of each panel.

## PANEL SIZE TABLE

### STANDARD CHROMA PANELS:

#### Gauge\*

12.7 mm (1/2")  
25.4 mm (1")  
50.8 mm (2")

#### Minimum allowance

11.4 mm (0.450")  
22.9 mm (0.900")  
45.7 mm (1.800")

#### Maximum allowance

14.9 mm (0.585")  
27.9 mm (1.100")  
55.9 mm (2.200")

### REFLECT AND PANELS WITH RENEWABLE MATT BACK FINISH:

#### Gauge\*

15.8 mm (5/8")  
28.5 mm (1-1/8")  
53.9 mm (2-1/8")

#### Minimum allowance

13.1 mm (0.515")  
24.5 mm (0.965")  
47.4 mm (1.865")

#### Maximum allowance

18.0 mm (0.710")  
31.1 mm (1.225")  
59.1 mm (2.325")

\*Chroma Reflect adds 3mm (1/8") and Chroma renewable matte back finish materials add 1.5 mm (1/16") to overall thickness.

## FLATNESS TOLERANCE

Chroma panels shall not have distortion in the form of a wrinkle, twist or scallop along the perimeter of the sheet. Additionally, Chroma panels shall not have distortion in the form of a compound curve or "S" shape. Overall warp in the form of a simple curve (bow warp) extending across the sheet is permitted to a maximum of 6.3 mm (1/4") for each 1.2 m (48"), 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

Chroma panels have been independently tested in accordance with EN 13501-1:2007+A1:2009  
Reaction to fire classification: E

## PANEL WEIGHT

### Thickness

12.7 mm (1/2")  
25.4 mm (1")  
50.8 mm (2")

### Weight flux

15.1 kg/m<sup>2</sup> (3.1 lb/ft<sup>2</sup>)  
30.2 kg/m<sup>2</sup> (6.2 lb/ft<sup>2</sup>)  
60.5 kg/m<sup>2</sup> (12.4 lb/ft<sup>2</sup>)

## EXPANSION/CONTRACTION ALLOWANCES

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

*Longest length of panel (mm) x temperature change of the sheet (°C x 1,8 + 32) x 0,00004 = Amount of Linear Expansion/contraction (mm)*

## Example

A 1219mm x 2438 mm panel that experiences a 10°C temperature change will expand/contract:  $2438 \text{ mm} \times (10 \text{ degrees} \times 1,8 + 32) \times 0.00004 = 4,876 \text{ mm}$

Installers should take extra precautions if installation is occurring before the HVAC systems are operational. 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 Chroma

## ETCHING

3form Chroma may be etched with two different finishing options to produce patterns, text, or anything imaginable. When etching two different surface finishes may be specified: Polished and Renewable matte. Following are some limitations to the etching process:

Chroma exterior applications are not able to accept etching as the etching process creates part stress that could induce crazing.

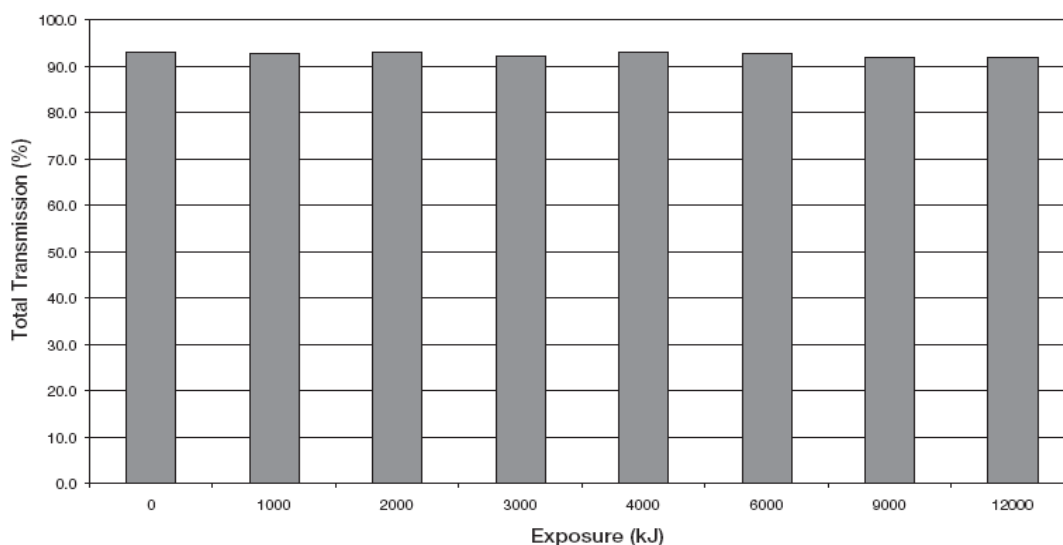
ONLY 12.7 mm – 50.8 mm (1/2"–2") Chroma may be etched.

- Limited to 3 mm (1/8") deep
- Etch must be greater than 12.7 mm (1/2") wide

## UV EXPOSURE PERFORMANCE

Chroma is an excellent choice for exterior applications. The chart demonstrates that the change in light transmission remains unchanged. (12,000 kJ of exposure represents approximately 10 years of outdoor exposure in Florida)

3form Chroma Color Stability - Light Transmission  
(Xenon Arc Accelerated Exposure Testing)



NOTE: Chroma Reflect and some colors cannot be used in exterior applications. Should your application be for exterior use, please notify your 3form Sales Representative.

## **USAGE LIMITATIONS**

3form Chroma should never come in direct contact with metal fasteners. Non-metallic\* gaskets, washers, and tubing are to be utilized in conjunction with mechanical connections such as point supports and frames.

\*Gaskets, washers and tubing must be produced with a non-plasticized material. Suitable materials include: neoprene, teflon, nylon, silicone.

## **DEFLECTION**

3form Chroma will exhibit different amounts of deflection given a variety of factors: fastening techniques, loads, gauges and panel dimensions to list a few. Your 3form representative can assist you with general deflection guidelines for your application using the Chroma Deflection charts. If your application has specific engineering requirements, please contact our architectural department.

## **HEAT FORMING/ COLD BENDING**

3form Chroma can be heated and formed to produce simple or even complex curves and shapes. The table below lists the minimum inner radius for a heat formed shape.

<b>Thickness</b>	<b>Minimum heatforming radius</b>
12.7 mm (1/2")	101.6 mm (4")
25.4 mm (1")	103.2 mm (8")
50.8 mm (2")	104.8 mm (12")

The optimal forming temperature ranges from 150°–165°C (300°–330°F). Large and complex forming geometries should be specified to be produced by the 3form Fabrication experts.

Though 3form Chroma is commonly used in flat or heat curved applications, the polymeric nature of the material allows a minimal amount of cold bending for a given panel. Cold bending is not possible on 25 mm (1") and 50 mm (2") gauges. The table below shows the minimum suggested radius for 3form Chroma at given gauge:

<b>Thickness</b>	<b>Minimum bend radius</b>
12.7 mm (1/2")	5715 mm (225")

## **EDGE FINISHING**

Edges of 3form Chroma 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.

## **FABRICATION LIMITATIONS**

Chroma Reflect requires special consideration during fabrication. When cutting panels using table saws or panel saws where the blade is situated below the panel, the back side (Reflect side) of the panel needs to be facing UP. The back side of the panel should be facing down if it is being cut by a circular saw or a panel saw where the blade is above the panel. Chroma reflect panels can be cut with a CNC router or a plunge router. Chroma Reflect MUST be scored with a 1.5 mm (1/16") or 3.1 mm (1/8") blade or tool before routing. All CNC cutting must be done from the back side. Chroma Reflect panels CAN NOT be cut with a jig saw or reciprocating saw.

## **REFINISHING**

One of the unique benefits of 3form Chroma is its ability to be refinished. If 3form Chroma needs to be refinished for any reason, the panels may be renewed by sanding. Begin by dry sanding with a course grit paper (100 or 150 grit) to remove blemishes/scratches. Continue sanding with gradually finer grit papers until the surface is smooth and level and the blemish/scratches are removed.

Complete the refinishing process by sanding with a 220 grit paper to attain a matte finish. Only the primary surface (non-colored side) is refinishable.

Even finer grit papers may be used to attain a satin or semi-polished appearance. With papers greater than 400 grit, wet sanding (with water) should be employed.

Be sure to keep sanders in motion at all times when refinishing surfaces or edges. Only use light pressure with power sanders in order to maintain evenness and avoid overheating of the sheet surface.

### **SOUND TRANSMISSION CLASS (STC) VALUES FOR CHROMA**

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

<b>Thickness</b>	<b>STC values</b>
12.7 mm (1/2")	32
25.4 mm (1")	36

### **THERMAL INSULATION VALUES FOR CHROMA**

Insulation values are a function of both the convective properties (U-Values and shading coefficients) and the conductive properties (thermal conductivity)

<b>Chroma Renew/Renew Thickness</b>	<b>Winter U-value (W/M2-°C)</b>	<b>Summer U-value (W/M2-°C)</b>
12.7 mm (1/2")	4.66	4.6
25.4 mm (1")	3.69	3.69
50.8 mm (2")	NOT TESTED	NOT TESTED

## Select Mechanical and Physical Properties

PROPERTY	ASTM METHOD	TYPICAL VALUES	
		US CUSTOM	METRIC
<b>GENERAL</b>			
Density	D1505	1.19 g/cm <sup>3</sup>	1.19 x 10 <sup>-3</sup> kg/cm <sup>3</sup>
Water Absorption	D579 24hrs @ 73°F	0.2%	0.2%
<b>MECHANICAL</b>			
Tensile Strength	D638	10,000 psi	69 MPa
Elongation at Rupture	D638	4.5%	4.5%
Tensile Modulus	D638	400,000 psi	2800 MPa
Flexural Strength (rupture)	D790	17,000 psi	117 MPa
Flexural Modulus	D790	480,000 psi	3300 MPa
<b>MECHANICAL</b>			
Compressive Strength (yield)	D695	17,000 psi	117 MPa
Compressive Deformation	D621 4000 psi, 122°F, 24 hours)	≤0.85%	
Shear Ultimate Strength	D732	10,000 psi	703 kg/cm <sup>2</sup>
Impact Strength (charpy method)	D256 notched	2.1 lbf*in/in	0.9 kgf*cm/cm
	D256 un-notched	7 lbf*in/in	3.17 kgf*cm/cm
Izod Impact Strength	D256 notched	≤0.25 ft-lb/in	≤13.3 J/m
Rockwell Hardness	D785	M-93	M-93
Barcol Hardness	D2583	48	48
Residual Shrinkage (internal strain)	D702	2%	2%
<b>OPTICAL</b>			
Refractive Index	D542	1.49	1.49
Light Transmission (total)	D1003	92%	92%
Haze	D1003	<1%	<1%
<b>THERMAL</b>			
Max Continuous Use Temperature		180°F	82°C
Deflection Temperature	D648 @ 264 psi	90°C	195°F
Vicat Softening Point	D1525	239°F	115°C
Forming Temperature		300-330°F	149-157°C
Coefficient of Thermal Conductivity (k-factor)	oenco-fitch	1.3 btu/(hr)ft <sup>2</sup> (°F)	0.19 w/m <sup>2</sup> K
Coefficient of Thermal Expansion	D696 @ 60°F (16°C)	4.0 x 10 <sup>-5</sup> (in/in/°F)	7.2 x 10 <sup>-5</sup> (mm/mm/°C)

## Chemical Resistance to select compounds

### **7 DAY FULL IMMERSION TESTING AT 23°C (73°F)**

Polymer materials are affected by chemicals in different ways. Changes in performance or appearance when exposed to chemicals can be attributed to fabrication methods, exposure conditions, concentration of chemical substances or exposure duration. Such factors can even influence the final effect on substances that 3form Chroma 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 table provides indicative performance of the chemical resistance characteristics of clear 3form Chroma panels. The following codes are used to describe the chemical resistance characteristics:

#### **R = Resistant**

3form Chroma is able to withstand the identified compound for long exposure periods. (7 days, full immersion)

#### **LR = Limited Resistance**

3form Chroma 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.

#### **N = Not Resistant**

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

CHEMICAL	CODE	CHEMICAL	CODE
acetic acid (5%)	R	ammonium hydrozide (conc.)	R
acetic acid (glacial)	N	aniline	N
acetic anhydride	LR	battery Acid	R
acetone	N	benzaldehyde	N
acrylic paints and lacquers	LR	benzene	N
ammonia (aqueous solution)	R	bituminous emulsion	N
ammonium chloride (saturated)	R	bromine	N
ammonium hydroxide (10%) <sup>14</sup>	R	butanol	LR
butyl acetate	N	glycol	R
calcium chloride (saturated)	R	heptane	R
calcium hypochlorite	R	hexane	R
carbon tetrachloride	N	hot bitumen	LR
cement	R	hydrochloric acid	R
chlorine water	LR	hydrofluoric acid (40%)	N
chloroform	N	hydrogen peroxide (3%)	R
chromic acid (40%)	N	hydrogen peroxide (28%)	N
citric acid (10%)	R	iso octane	R
cottonseed oil (edible)	R	isopropyl alcohol	N
detergent solution	R	kerosene	R
diesel oil	R	lacquer thinner	N
diethyl ether	N	lactic acid (80%)	LR
dimethyl formamide	N	methane	R
dioctyle formamide	N	methyl alcohol (50%)	LR
ethyl acetate	N	methyl alcohol (100%)	N
ethyl alcohol (50%)	LR	methyl ethyl ketone (MEK)	N
ethyl alcohol (95%)	N	methylene chloride	N
ethyl dichloride	N	mineral oil	R
ethylene glycol	R	mortar	R
2-ethylhexyl sebacate	R	motor fuel (benzene-free)	R
formaldehyde (40%)	R	motor fuel (with benzene)	N
formic acid (2%)	R	muratic acid (20%)	R
formic acid (40%)	LR	nitric acid (10%)	R
gasoline (regular, leaded)	LR	nitric acid (40%)	LR
glycerine	R	nitric acid (conc.)	N
glycerol	R	oil paints (pure)	R
olive oil	R	sodium hydroxide (60%)	R
oxygen	R	stearic acid	R
ozone	R	sulfuric acid (3%)	R
phenol solution (5%)	N	sulfuric acid (30%)	R
phosphoric acid (10%)	R	sulfuric acid (conc.)	N
plaster of paris	R	thinners (general)	N
soap solution (Ivory)	R	toluene	N
sodium carbonate (2%)	R	trichloroethylene	N
sodium carbonate (20%)	R	turpentine	LR
sodium chloride (10%)	R	urine	R
sodium hydroxide (1%)	R	water (distilled)	R
sodium hydroxide (10%)	R	xylene	N

## Cleaning Instructions

3form Chroma, like all thermoplastic materials should be cleaned periodically. A regular cleaning program will help to maintain the aesthetics and life of the material. 3form recommends to use plastic cleaners. These products are specifically for use on plastics and help panels to resist finger-marking and static.

Rinse or wipe the sheet with lukewarm water. Remove dust and dirt from 3form Chroma with a damp, soft cloth or sponge and a solution of mild soap and/or liquid detergent in water. Rinse or wipe the 3form Chroma again thoroughly with lukewarm water. After all cleaning steps, be sure to 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 3form Chroma. Also avoid scouring compounds, gasoline, benzene, acetone, carbon tetrachloride, certain deicing fluids, lacquer thinner or other strong solvents.

### **DO NOT:**

- Use squeegees or scrapers as they may scratch the sheet
- Use scouring compounds or solvents such as: acetone, gasoline, benzene, carbon tetrachloride, or lacquer thinner to clean the sheet.
- Use abrasives or highline alkaline cleaners
- Use a dry cloth or a cloth of synthetic fiber such as rayon or polyester as they may scratch the sheet.

### **DO:**

- Use warm water, mild detergent and a soft cloth or chamois
- Rinse surface thoroughly after cleaning with lukewarm water
- Blot dry with slightly damp, soft cloth or chamois

### **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.