

# Acrylite Plus<sup>®</sup>

A C R Y L I C S H E E T

*a whole new animal*



PHYSICAL  
PROPERTIES



TM



Continuously manufactured ACRYLITE PLUS® acrylic sheet is a versatile, thermoplastic material developed for the retail display and glazing markets as well as other markets requiring strength, appearance and weatherability.

High optical quality ACRYLITE PLUS sheet provides the beautiful look of acrylic with much greater impact strength for durability during manufacturing, shipping, and in-store use. Rigid, tough, and lightweight, ACRYLITE PLUS sheet is easily fabricated and machined, including cutting, routing, forming, and cementing.

ACRYLITE PLUS sheet is ideal for use in:

- P-O-P Displays
- Store Fixtures
- Glazing
- General Fabrication

## Availability

ACRYLITE PLUS sheet is available in colorless and glass green. It is manufactured in standard sheet size 48" x 96". Colorless sheet is available in thicknesses of 1.5 mm (0.060") to 6.0 mm (0.236"); glass green is available in thicknesses of 2.0 mm (0.080") to 6.0 mm (0.236"). Custom sizes are available on request. All sheets are protected with 3 mil thick polyethylene film masking.

## Impact Strength

Superior performance ACRYLITE PLUS sheet has many times the impact strength of glass and standard acrylic sheet. (Testing per ASTM D 3029).

## Light Weight

ACRYLITE PLUS sheet weighs half as much as glass.

## Surface Hardness

With a greater surface hardness than polyesters, ACRYLITE PLUS sheet helps to reduce damage during fabrication and extends service life.

**Acrylite Plus**  
ACRYLITE SHEET  
*a whole new animal*



## Dimensional Stability

ACRYLITE PLUS sheet will expand or contract when exposed to temperature or humidity change. The material's post-forming stability is excellent, however, shrinkage will occur when an unclamped sheet is subjected to forming temperatures.

## Strength & Stresses

The tensile strength of ACRYLITE PLUS sheet is 8,900 psi at room temperature (ASTM D 638). For applications subject to continuous loadings, the design should allow for a load that will not exceed 600 psi at 23°C (73°F). Continuous loads well below 8,900 psi will lead to stress crazing and eventual failure.

## Heat resistance

ACRYLITE PLUS sheet keeps its rigid shape up to 160°F. When subjected to temperatures below 32°F and higher than 100°F, ACRYLITE PLUS sheet begins to appear hazy. Once the sheet equalizes (between 60-80°F) it returns to its original, high light transmitting clarity.

## Light Transmission

Colorless ACRYLITE PLUS sheet's light transmittance is greater than 91% (1/8" thickness). It retains high light transmitting properties for many years.

## Formability

ACRYLITE PLUS sheets' forming temperature range is 270°F - 350°F. ACRYLITE PLUS sheet softens with temperature increases above 220°F, thus passing through the thermoelastic to the thermoplastic state. This change is gradual, rather than sharply defined. Because this change is gradual, certain procedures should be considered during thermoforming. If the sheet is to be hung in an oven, a continuous clamp rather than several individual clamps must be used, preventing permanent deformation of the sheet between clamps. If the sheet is heated by infrared heaters supported in a horizontal frame, control of the heaters positioned over the center of the sheet will prevent over heating the center of the sheet, which could cause an excessive amount of sagging.

Shrinkage occurs in the machine direction when heating is performed without clamping. The shrinkage range is 3-5%, depending on thickness and forming temperature. Expansion can be expected in the cross machine direction. This will range from 0-2.2%, again depending on thickness and forming temperature.

## Chemical Resistance

ACRYLITE PLUS sheet resists many chemicals, some of which include:

- Solutions of inorganic alkalis
- Diluted acids
- Aliphatic hydrocarbons

It is attacked, in varying degrees by, but not limited to:

- Aromatic solvents  
(i.e. benzene and toluene)
- Alcohols
- Chlorinated hydrocarbons  
(i.e. methylene chloride)
- Lacquer thinners  
(esters, ketones and ethers)

ACRYLITE PLUS sheet meets FDA requirements for use in many food contact applications.

See chart of ACRYLITE PLUS sheet resistance to certain chemicals on pages 6-7.

## Cutting & Machining

ACRYLITE PLUS sheet is cut and shaped using all of the same machining operations used with standard acrylic sheet. (i.e. cutting, routing, drilling, etc.).

## Cementing

Common solvent cements or polymerizable cements work well when joining ACRYLITE PLUS sheet to itself or other acrylic sheet products. Care must be taken to provide a sheet edge that is machined properly and contains low stress. A generous amount of cement should be applied along the entire length of pieces being joined, taking care to ensure the cement fills the entire area between the pieces.

Please refer to the "ACRYLITE PLUS Sheet Fabrication Manual" for detailed information.

## Annealing

ACRYLITE PLUS sheet may be annealed at 180°F with the heating and cooling times dependent on sheet thickness. An approximate guideline is: annealing time in hours is equal to the sheet thickness in millimeters (to a minimum of 2 hrs); the cool down period should be a minimum of 2 hours, ending when sheet temperature falls below 140°F.

## Weather Resistance

ACRYLITE PLUS sheet is manufactured from a weatherable acrylic polymer. It can be used outdoors for many years with little loss of impact strength or its acrylic-like appearance.

## Flammability

ACRYLITE PLUS sheet is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. ACRYLITE PLUS sheet usually burns rapidly to completion if not extinguished. The products of combustion, if sufficient air is present, are carbon dioxide and water. However, in many fires, sufficient air will not be available and toxic carbon monoxide will be formed, as it will when other common combustible materials are burned. We urge good judgement in the use of this versatile material and recommend that building codes be followed carefully to assure it is used properly.

ACRYLITE PLUS sheet is a UL recognized component, UL flammability rating 94HB.



TM

**PROPERTY**
**ASTM METHOD**
**TYPICAL VALUE  
(3.0 MM THICKNESS)**
**Mechanical**

Specific Gravity	D 792	1.16
Tensile Strength	D 638	8,900 psi (61.3 MPa)
Tensile Elongation, Yield	D 638	4.8%
Tensile Modulus of Elasticity	D 638	350,000 psi (2410 MPa)
Flexural Strength	D 790	14,500 psi (99 MPa)
Flexural Modulus of Elasticity	D 790	330,000 psi (2270 MPa)
Rockwell Hardness	D 785	70 "M" Scale
Impact Strength Izod Milled Notch	D 256	0.75 ft. lbs/in of notch (40J/m of notch)
Charpy (unnotched)	D 256	12.1 ft. lbs/in (635J/m of notch)
Gardner impact	D 3029	40 in-lbs (21J)

**Optical**

Refractive Index	D 542	1.49
Gloss 20°	D 523	140
Light Transmission	D 1003	91%

**Thermal**

Forming Temperature	--	270-350°F (132-177°C)
Deflection Temperature Under Load, 264 psi	D 648	196°F (91°C)
Vicat Softening Point	D 1525	226°F (108°C)
Maximum Recommended Continuous Service Temperature	--	160°F (71°C)
Coefficient of Linear Thermal Expansion	D 696	0.00004 in/in/°F 0.000072 m/m/°C
Self Ignition Temperature	D 1929	750°C (399°C)
Smoke Density	D 2843-99	2.2% at 1.5 mm (0.060 in) 3.8% at 6.0 mm (0.236 in)
Average Burn Rate	D 635-98	1.4 in/min (35 mm/min) at 1.5 mm (0.060 in) 1.0 in/min (25 mm/min) at 6.0 mm (0.236 in)

**Water Absorption**

24 hrs. @ 73°C	D 570	0.3%
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Typical values not intended for design purposes.

# Chemical Resistance

ACRYLITE PLUS sheet resists most chemicals in normal use with resistance to fatty and oily products. There is no measurable permeation or adverse effect on the material in contact with oils and aliphatic hydrocarbon-based products.

# Chemical Stability

This data was realized at test temperature 68°F. (20°C) and 50% relative humidity. Results vary depending on the temperature and moisture content of the material. In practice, resistance is dependent on internal and external stresses as well as the method of fabrication. We recommend appropriate testing.

- + Resistant
- x Limited Resistance
- Non-resistant

## Drinks and Edible Liquids

- + Beer, wine, fruit juices
- + Coffee, tea
- x Cooking oil
- x Liqueurs, see ethyl alcohol
- + Milk, chocolate
- + Vinegar
- + Water, mineral water

## Spices

- + Aniseed, bay leaves, nutmeg
- Cloves
- + Pepper, cinnamon, onions

## Greases & Oils Without Additives

- + Animal
- + Mineral
- + Vegetable

## Paints, Waxes, Etc.

- x Acrylic paints
- Cellulose paints
- Paint thinners
- + Pure-oil paints
- x Wax polish

## Gases

- + Ammonia
- x Bromine
- + Carbon dioxide
- x Chlorine
- + Methane
- + Natural gas
- + Nitrogen dioxide
- + Nitrogen monoxide
- Sulfur dioxide (dry)



## Alkalis

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- + Caustic potash
- + Soap suds
- + Soda
- + Whitewash

## Disinfectants

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- + Bleaching powder paste
- + Bleaching powder solution up to 20%
- Carbolic acid
- + Hydrogen peroxide, up to 40%
- Tincture of iodine, 5%

## Inorganic Substances

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- x Chromic acid
- + Calcium hypochlorite
- Hydrochloric acid
- x Hydrofluoric acid, up to 20%
- + Nitric acid, up to 20%
- x Nitric acid, 20 to 70%
- + Phosphoric acid, up to 20%
- + Sulfuric acid, up to 30%
- x Sulfurous acid, concentrated
- + Sulfurous acid, up to 5%
- Sulfur dioxide, liquid

## Organic Solvents & Plasticizers

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- Acetone
- Amyl acetate
- Aniline
- Benzaldehyde
- Benzene
- Butanol
- Carbon disulfide
- Chlorinated hydrocarbons
- Chlorophenol
- Cresol

## Organic Solvents & Plasticizers Continued

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- x Cyclohexane
- Diacetone alcohol
- Dibutyl phthalate
- + Diethylene glycol
- Dioxane
- Ether
- Ethyl acetate
- x Ethyl alcohol, up to 30%
- Ethyl alcohol, over 30%
- Ethyl bromide
- Ethyl butyrate
- Ethylene bromide
- x Ethylene glycol
- + Heptane
- + Hexane
- x Isopropyl alcohol
- Lactic acid butyl ester
- Methyl ethyl ketone
- x Methanol, up to 30%
- Methanol, over 30%
- Methyl chloride
- Motor fuel mixture, with benzene
- x Motor fuel mixture without benzene
- x Paraffin
- x Perchlorethylene
- Phenols
- Pryidine
- + Tricresyl phosphate
- + Triethyl amine
- Toluene
- Xylene

## General

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- + Photographic baths
- Nail polish

For the name of your local Authorized Distributor visit [www.cyro.com](http://www.cyro.com),  
or call 800-631-5384.



Visit the TechKnowledge Center at  
[www.cyro.com](http://www.cyro.com).

Visitors have immediate access to frequently asked questions, technical information, fabrication tips, physical properties, and hundreds of other facts about acrylics from North America's leading acrylic-based sheet manufacturer.



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