ACRYLITE®

ACRYLITE® Resist
Physical Properties for Extruded Sheet

Physical Properties

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

This high optical quality 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® Resist is easily fabricated and machined, including cutting, routing, forming and cementing.

Applications

- Commercial Lighting
- POP Displays
- Store Fixtures
- Glazing
- Sneeze Guards / Social Distancing Applications
- Exhibit and Tradeshows
- Skylights and Daylighting
- General Fabrication

Warranty

ACRYLITE® Resist acrylic sheet comes with a 30-year warranty that allows for little loss of light transmission and yellowness.

Product Specifications

Color	Color Number	Size	Thickness
Colorless	0RA45 GT	48" x 96" 60" x 96" 72" x 96"	060" (1.5mm) .118" (3mm) .236" (6mm)
Colorless	0RA65 GT		

Benefits

Impact Strength

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

Lightweight

ACRYLITE® Resist sheet weighs half as much as glass.

Heat resistance

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

Dimensional Stability

ACRYLITE® Resist 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 un-clamped sheet is subjected to forming temperatures.

Strength & Stresses

The tensile strength 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 73°F (23°C). Continuous loads well below 8,900 psi will lead to stress crazing and eventual failure.

Surface Hardness

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

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Light Transmission

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

Weather Resistance

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

Flammability

ACRYLITE® Resist acrylic is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. This 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. This material is a UL recognized component, UL flammability rating 94HB.

Fabrication

Formability

The forming temperature range is 270°F - 350°F. It softens with temperature increases above 220°F, thus passing through the thermo-elastic 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.

Cutting & Machining

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

Cementing

Common solvent cements or polymerizable cements work well when joining this material 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® Resist Fabrication Manual for detailed information.

Annealing

This 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 two hours); the cool down period should be a minimum of two hours, ending when sheet temperature falls below 140°F.

Chemical Resistance

ACRYLITE® Resist acrylic is resistant to 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)

It's resistant to 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.

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Chemical Stability

The data was gathered at 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. This sheet meets FDA requirements for use in many food contact applications. See the chart of this sheet's resistance to certain chemicals below.

Chemical Resistance **KEY:** **+** 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 W/O 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)

GENERAL	
+	Photographic baths
-	Nail polish

ALKALIS	
+	Caustic potash
+	Soap suds
+	Soda
+	Whitewash

DISINFECTANTS	
+	Bleaching powder paste
+	Bleaching powder solution <20%
-	Carbolic acid
+	Hydrogen peroxide <40%
-	Tincture of iodine 5%

INORGANIC SUBSTANCES	
X	Chromic acid
+	Calcium hypochlorite (bleach)
-	Hydrochloric acid
-	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

INORGANIC SUBSTANCES CONT.	
X	Chromic acid
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ORGANIC SOLVENTS & PLASTICIZERS	
-	Acetone
-	Amyl acetate
-	Aniline
-	Benzaldehyde
-	Benzene
-	Butanol
-	Carbon disulfide
-	Chlorinated hydrocarbons
-	Chlorophenol
-	Cresol
X	Cyclohexane
-	Diacetone alcohol
-	Dibutyl phthalate
+	Diethylene glycol

ORGANIC SOLVENTS & PLASTICIZERS CONT.	
-	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 (MEK)
X	Methanol up to 30%
-	Methanol over 30%
-	Methyl chloride
-	Motor fuel mixture w/ benzene
X	Motor fuel mixture w/o benzene
X	Paraffin
X	Perchlorethylene
-	Phenols
-	Pryidine
+	Tricresylphosphate
+	Triethylamine
-	Toluene
-	Xylene

ACRYLITE® Resist
Physical Properties for Extruded Sheet

Physical Characteristics of ACRYLITE®

Property	ASTM method	ACRYLITE® Premium (0.118“)	ACRYLITE® Resist 45 (0.118“)	ACRYLITE® Resist 65 (0.118“)
Mechnical				
Specific Gravity	D 792	1.19	1.18	1.16
Tensile Strength	D 638	9.7 kpsi (66.8 MPa)	8.6 kpsi (59.2 MPa)	6.7 kpsi (46.2 MPa)
Tensile Elongation, Yield	D 638	3.90%	5.80%	6.60%
Tensile Modulus of Elasticity	D 638	490 kpsi (3375 MPa)	400 kpsi (2755 MPa)	320 kpsi (2204 MPa)
Flexural Strength	D 790	17.0 kpsi (117.1 MPa)	14.7 kpsi (101.3 MPa)	12.0 kpsi (82.7 MPa)
Flexural Modulus of Elasticity	D 790	480 kpsi (3306 MPa)	370 kpsi (2548 MPa)	300 kpsi (2066 MPa)
Rockwell Hardness	D 785	93 M	88 M	70 M
Impact Strength				
Izod Milled Notch	D 256	0.40 ft-lb/in (21.0 J/m)	0.66 ft-lb/in (34.6 J/m)	0.75 ft-lb/in (39.4 J/m)
Charpy (unnotched)	D 5942-97	-	14.1 ft-lb/in (740 J/m)	16.5 ft-lb/in (866 J/m)
Gardner Impact	D 3029	2 in-lb (1 J)	20 in-lb (11 J)	40 in-lb (21 J)
Optical				
Refractive Index	D 542	1.49	1.49	1.49
Gloss 20°	D 523	—	125	140
Light Transmission	D 1003	92%	91.6%	91%

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Impact Strength				
Forming Temperature	—	300°F (149°C)	—	270-350°F (132-177°C)
Deflection Temperature Under Load, 264 psi	D 648	210°F (99°C)	208°F (98°C)	203°F (95°C)
Vicat Softening Point	D 1525	221°F (105°C)	217°F (103°C)	210°F (99°C)
Maximum Recommended Continuous Service Temp.	—	160°F (71°C)	160°F (71°C)	160°F (71°C)
Coefficient of Linear Thermal Expansion	D 696	0.00004 in/in/°F (0.00007 m/m/°C)	0.00004 in/in/°F (0.00007 m/m/°C)	0.000044 in/in/°F (0.00008 m/m/°C)
Self-Ignition Temperature	D 1929	850°F (454°C)	—	750°F (399°C)
Smoke Density	D 2843-99	4.8%@0.250” (6.4 mm)	—	2.2%@0.060” (1.5 mm) 3.8%@0.236” (6.0 mm)
Average Burn Rate	D 635-98	1.0 in/min (25 mm/min) @ 0.125” (3.2 mm)	—	1.4in/min (36 mm/min) @ 0.060” (1.5 mm) 1.0in/min (25 mm/min)@ 0.236” (6.0 mm)
Water Absorption 24 hrs @ 73°C	D 570	0.20%	0.30%	0.30%
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Semi-finished polymethyl methacrylate (PMMA) products from POLYVANTIS are sold on the European, Asian, African and Australian continents under the registered trademark PLEXIGLAS®, in the Americas under the registered trademark ACRYLITE®, both owned by Röhm GmbH, Darmstadt, or its affiliates.

Fire Precautions
ACRYLITE® sheet is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. ACRYLITE® 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.

Compatibility
Like other plastic materials, ACRYLITE® sheet is subject to crazing, cracking or discoloration if brought into contact with incompatible materials. These materials may include cleaners, polishes, adhesives, sealants, gasketing or packaging materials, cutting emulsions, etc. See the Tech Briefs in this series for more information, or contact your ACRYLITE® sheet Distributor for information on a specific product.