



# *Aerospace Acrylic Sheet Products*

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**Acrylite<sup>®</sup> GMU**  
ACRYLIC SHEET

**Acrylite<sup>®</sup> 249**  
ACRYLIC SHEET

**Acrylite<sup>®</sup> GMS**  
ACRYLIC SHEET





## Introduction

Aircraft glazing was one of the first applications for cast acrylic sheet. Acrylic is lightweight, resistant to thermal shock and has excellent optical clarity and mechanical properties. In the 1960's, CYRO's parent company, Röhm GmbH of Germany introduced its aircraft grade acrylic sheet. Since then, Röhm and CYRO have successfully marketed this product for both military and commercial aircraft applications. ACRYLITE<sup>®</sup> 249 acrylic sheet, manufactured by CYRO, is identical in all physical properties to the sheet manufactured by Röhm. It meets the requirement MIL-P-8184 F (Type I, Class 2).

ACRYLITE 249 sheet is a cross linked cast acrylic sheet with increased resistance to crazing and solvent attack, as well as improved dimensional stability after heating. CYRO also manufactures ACRYLITE GMS (MIL-P-5425E) for use in the aerospace industry. CYRO also offers ACRYLITE GMU sheet for aviation applications where military specifications are not required.

# Acrylite<sup>®</sup> GMU

ACRYLIC SHEET

## DESCRIPTION

**ACRYLITE GMU** acrylic sheet is a cell cast acrylic sheet designed for general aviation applications and is superior to standard cell cast acrylics in both optical quality and thickness tolerance. **ACRYLITE GMU** sheet is manufactured in the same equipment used for aerospace acrylic sheet products, and is subjected to the same exacting optical inspection as products manufactured to meet MIL P-8184F and MIL P-5425E.

## APPLICATIONS

**ACRYLITE GMU** sheet is the ideal choice for fabricators who need sheet that meets the rigorous optical requirements of MIL P-8184F and MIL P-5425E, but at a more economical cost. It is ideal for many non-military aircraft applications.

## FABRICATION

Fabrication techniques used on standard cell cast acrylic sheet will be appropriate for **ACRYLITE GMU** sheet. When drape forming **ACRYLITE GMU** sheet, excellent results can be achieved if the sheet is heated evenly between 300°F and 320°F. For pressure forming or vacuum forming operations, temperatures of 340°F to 380°F are recommended.

## PROPERTIES

The table below shows typical values for 0.118-inch thick **ACRYLITE GMU** sheet. Some values will change with thickness.

TEST	METHOD	TYPICAL VALUES*
TENSILE STRENGTH	ASTM D-638	10,000 psi
FLEXURAL STRENGTH	ASTM D-790	16,500 psi
ROCKWELL HARDNESS	ASTM D-785	M 94
ELONGATION	ASTM D-638	4.2 %
LIGHT TRANSMISSION	ASTM D-1003	92 %
FLAMMABILITY	ASTM D-635	1.8 inch/min
DEFLECTION TEMPERATURE (264 psi)	ASTM D-648	115 C
SPECIFIC GRAVITY	ASTM D-792	1.19
THERMAL EXPANSION	ASTM D-696	0.000061 in/in·C
WATER ABSORPTION (21hr)	ASTM D-570	0.80 %

\* Not for specification purposes



**John A. Raffo**  
Manager  
Materials & Process Technology  
Sierracin/Sylmar Copy

*"I've visited CYRO's facilities and was impressed by their process and tolerance control systems and the overall quality of their products."*



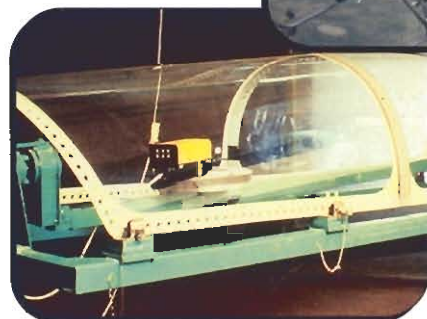
**Klaus Ewald**  
Aircraft Engineering Dept.  
Lufthansa German Airlines

*"Lufthansa has been purchasing cabin windows in Europe made from 249 material manufactured by Röhm GmbH for years. It has consistently outperformed other materials."*



**Ben Campbell**  
President  
Plastics Center

*"CYRO is a well financed aggressive marketer. I'm happy to see them re-entering the manufacture and distribution of MIL-SPEC acrylic."*



# Acrylite® 249

ACRYLIC SHEET

# Acrylite® GMS

ACRYLIC SHEET

## DESCRIPTION

**ACRYLITE 249** aerospace-grade, cross-linked acrylic sheet is certified to meet or exceed Military Specification MIL P-8184F as a Type II, Class 2 material. This specification requires optical quality cast acrylic sheet that is superior to conventional acrylic sheet in craze resistance, heat resistance, and water absorption.

## APPLICATIONS

**ACRYLITE 249** sheet is used in a wide variety of aerospace and ground vehicle transparencies in monolithic or laminated form.

## FABRICATION

Most fabrication techniques used with conventional acrylic sheet materials can also be followed when fabricating **ACRYLITE 249** sheet, however, slight technique modification is required. For details on all fabrication techniques, call CYRO Industries Technical Service Center.

## PROPERTIES

Typical property values are shown below for 0.500 inch thick **ACRYLITE 249** sheet. Some values will change with thickness.

TEST	METHOD	TYPICAL VALUES*
ANGULAR DEVIATION	ASTM D-637	3 minutes
CRAZE RESISTANCE	MIL P-8184F	Dry Wet
Isopropanol		3150 psi 2300 psi
Toluene/Isobutyl Acetate		2100 psi 1610 psi
TENSILE STRENGTH	ASTM D-638	11,650 psi
ELONGATION	ASTM D-638	4.4 %
FLAMMABILITY	ASTM D-635	0.83 inch/min
DEFLECTION TEMPERATURE (264 psi)	ASTM D-648	112 C
INTERNAL STRAIN	MIL P-8184F	0.3%
RESISTANCE TO WEATHERING (10 days accelerated)	MIL P-8184F and ASTM D-1003	Before After
LIGHT TRANSMISSION		92.6 % 92.5 %
HAZE		0.3% 0.7%
SPECIFIC GRAVITY	ASTM D-792	1.19
THERMAL EXPANSION	ASTM D-696	0.000056 in/in-C
WATER ABSORPTION (24hr)	ASTM D-570	0.13%

\* Not for specification purposes

## DESCRIPTION

**ACRYLITE GMS** aerospace acrylic sheet is manufactured to meet or exceed the requirements of military specification MIL P-5425E. **ACRYLITE GMS** sheet is manufactured using equipment that is reserved for aerospace acrylic products. It is subjected to a preshrink cycle, and undergoes an optical inspection which is among the most critical in the industry.

## FABRICATION

Any fabrication technique that is appropriate for standard cell cast acrylics will be equally appropriate for **ACRYLITE GMS** sheet. When drape forming **ACRYLITE GMS** sheet, excellent results can be achieved if the sheet is heated evenly between 300°F and 320°F. For pressure forming or vacuum forming operations, temperatures of 340°F to 380°F are recommended.

## APPLICATIONS

**ACRYLITE GMS** sheet is used in aerospace transparent enclosures in monolithic or laminated form. Current applications for **ACRYLITE GMS** sheet include instrument panels, wingtip lenses, dust covers, helicopter bubbles, and aircraft canopies.

## PROPERTIES

This table below shows typical values for 0.0250 inch thick **ACRYLITE GMS** sheet. Some values will change with thickness.

TEST	METHOD	TYPICAL VALUES*
ANGULAR DEVIATION	ASTM D-637	<3 minutes
TENSILE STRENGTH	ASTM D-638	11,000 psi
ELONGATION	ASTM D-638	5.7%
FLAMMABILITY	ASTM D-635	1.25 inch/min
DEFLECTION TEMPERATURE (264 psi)	ASTM D-648	115 C
INTERNAL STRAIN	MIL P-5425E	<1%
RESISTANCE TO WEATHERING (10 days accelerated)	MIL P-5425E and ASTM D-1003	Before After
LIGHT TRANSMISSION		92.6% 92.3%
HAZE		0.40% 0.40%
SPECIFIC GRAVITY	ASTM D-792	1.19
THERMAL EXPANSION	ASTM D-696	0.000051 in/in-C
WATER ABSORPTION (24 hr)	ASTM D-570	0.33%

\*Not for specification purposes

## Tolerances

	Standard Thickness	Class A	Class B	Class C
<b>MIL-P-8184</b> <b>MIL-P-5425</b>	.060	±.012	±.020	
	.080	±.012	±.020	
	.100	±.012	±.020	
	.125	±.015	±.020	±.030
	.150	±.017	±.020	±.030
	.187	±.020	±.023	±.030
	.220	±.023	±.025	±.030
	.250	±.025	±.030	±.035
	.312	±.030	±.035	±.040
	.375	±.035	±.040	±.045
	.500	±.040	±.045	±.050
	.625	±.050	±.050	±.055
	.750	±.050	±.050	±.060
	.875	±.050	±.050	±.070
	1.000	±.050	±.050	±.075
	1.250	±.063	±.063	±.085
1.500	±.075	±.075	±.112	
2.000	±.100	±.100	±.150	

## CYRO LOCATIONS

### Headquarters:

Rockaway, N J 07866 100 Enterprise Drive 800-631-5384 973-442-6000

### Sales Offices:

#### Eastern Region

Rockaway, N J 07866 100 Enterprise Drive 973-442-6000

#### South Central Region

Plano, TX 75074 101 East Park Boulevard Suite 1039 972-424-6830

#### Western Region

San Ramon, Ca 34583 3180 Crow Canyon Place Suite 240 925-866-9300

#### Technical Center

Orange, CT 06477 25 Executive Boulevard 203-795-6081

#### In Canada

CYRO Canada Inc. 6285 Northam Drive Suite 100 Mississauga Ontario L4V 1X5

#### Canada Sales Office

905-677-1388 800-268-4743

#### Canada Technical Center

905-677-1388

#### International Sales:

Rockaway, N J 07866 100 Enterprise Drive Fax: 973-442-6083

All recommendations made herein are believed to be reliable; however, such recommendations are made without charge and without warranty, and on the express understanding that CYRO Industries assumes no obligations in connection with any such recommendations.

#### FIRE PRECAUTIONS:

ACRYLITE acrylic sheet and CYROLON polycarbonate sheet products are combustible thermoplastics. Precautions should be taken to protect these materials from flames and high heat sources. Both products usually burn 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 present and toxic carbon monoxide will be formed, as it will from other common combustible materials. We urge good judgment in the use of these versatile materials.

For details on fabrication techniques, contact CYRO Industries Technical Service Center at 203-795-6081

FOR THE NAME OF YOUR LOCAL AUTHORIZED DISTRIBUTOR

CALL TOLL FREE 1-800-631-5384 or contact the nearest CYRO sales office.

