

AEROSPACE PRODUCTS



Spartech Polycast

Cell Cast Acrylic

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ISO 9001:2000
FM 76298

OUR COMPANY

Cast acrylic sheet is the ideal material for aircraft transparencies. Spartech Polycast is known, the world over, as a leading producer of cast acrylic sheet for cabin windows, fighter canopies, windscreens, wing-tip lenses, outer laminates and instrument panels for general aviation and military aircraft. Polycast is also recognized as the manufacturer most responsive to the specific needs of its customer. Our range of sizes, thicknesses, colors and research facilities are dedicated to meeting the present and future needs of the demanding aerospace industry.

Spartech Polycast has been manufacturing cast acrylic sheet for over 30 years and is presently the principal supplier of acrylic sheet meeting U.S. Military Material Specifications MIL-P-5425, MIL-P-8184 and MIL-P-25690 to the United States aerospace industry. Spartech Polycast has developed an enhanced crazed-resistant material and MIL-P-8184 has been revised to recognize the improved performance of this material.

POLY 76 (MIL-P-8184) is a crosslinked, preshrunk acrylic with excellent resistance to crazing, solvent attacks and thermal dimensional change. As one of few U.S. Military approved materials for stretched panels (MIL-P-25690), sophisticated applications for both military and commercial aircraft are numerous. Availability in transparent colors enhances the versatility of this product. It meets or exceeds all requirements of MIL-P-8184. Type I and II, Class 1 and 2.

POLY 84 (MIL-P-8184) is a uniquely formulated, crosslinked preshrunk acrylic specifically designed to provide superior craze and solvent resistance for today's changing environment. Improvements such as lower water absorption and increased resistance to acids expands the number of "as cast" applications. Poly 84 also meets or exceeds MIL-P-8184, Type I and II, Class 1 and 2. Its superior craze resistance makes it ideal for monolithic windscreens, outer laminates and canopies. It is also available in transparent colors. It meets or exceeds all requirements of MIL-P-8184. Type I and II, Class 1 and 2.

POLY 2000 (MIL-P-25690) military specification covering stretched acrylic sheet specially designed from Mil-P-8184 base material. It offers enhanced craze properties and increased crack resistance. Material supplied for conformance to this specification is identified as Poly 2000™.

OUR SERVICES

- Here are some of the ways in which Spartech Polycast has made creative, effective and prompt response to the needs of our customers and the aerospace industry in general.
- The development of improved acrylic to meet the fast-changing demands of commercial and military aircraft manufacturers for superior material.
- The production of a horizontally shrunk sheet with residual shrinkage of less than .25% (Mil Spec allows up to 1%). This characteristic allows for forming before fabrication. It is ideal for edgelit panel and radar screen applications.
- Polycast standards consistently surpass the quality levels required by the Mil Spec. Polycasts sheet cleanliness and optical clarity are superior in the industry.
- The development of a sheet with different thicknesses in the center as compared to the edges. This enabled an aircraft manufacturer to design a canopy with strong, frontal impact capabilities yet which is thin enough on top so that a pilot can eject through it.
- The formulation of colors which meet specific percentages of light transmission at final, stretched thickness.
- The development of a strong technical support which is widely known in the aerospace industry for its commitment to technical customer service, whether rendered by mail, phone or in person.

OUR PRODUCTS

POLY A (ASTM D-4802) is our standard unshrunk acrylic manufactured to a visual and optical aircraft specification. It is available in clear as well as transparent colors. Common applications are non-critical glazing for commercial helicopters and sport planes.

POLY FR9 is an interior acrylic material ideal for aircraft applications where low flame spread and low smoke generation are desirable.

POLY 900 is a semi-cross-linked material formulated to meet British specifications DTD-5592.

POLY II (MIL-P-5425) military specification covering heat-resistant, preshrunk, clear, and colored acrylic sheet. Material supplied for conformance for this specification is identified by the name POLY II®. Polycast is qualified to furnish sheets in thickness 0.060-1.000 to meet this specification.

TOLERANCES

POLY II®

POLY 76®

POLY 84®

Standard Thickness ¹		Class A		Class B		Class C	
Inches	Metric	Inches	Metric	Inches	Metric	Inches	Metric
0.030	0.762	±0.012	±0.305				
0.060	1.524	±0.012	±0.305	±0.020	±0.508		
0.080	2.032	±0.012	±0.305	±0.020	±0.508		
0.100	2.540	±0.012	±0.305	±0.020	±0.508		
0.125	3.175	±0.015	±0.381	±0.020	±0.508	±0.030	±0.762
0.150	3.810	±0.017	±0.432	±0.020	±0.508	±0.030	±0.762
0.187	4.750	±0.020	±0.508	±0.023	±0.584	±0.030	±0.762
0.220	5.588	±0.023	±0.584	±0.025	±0.635	±0.030	±0.762
0.250	6.350	±0.025	±0.635	±0.030	±0.762	±0.035	±0.889
0.312	7.925	±0.030	±0.762	±0.035	±0.889	±0.040	±1.016
0.375	9.525	±0.035	±0.889	±0.040	±1.016	±0.045	±1.143
0.417							
0.500	12.700	±0.040	±1.016	±0.045	±1.143	±0.050	±1.270
0.625	15.875	±0.050	±1.270	±0.050	±1.270	±0.060	±1.524
0.750	19.050	±0.050	±1.270	±0.050	±1.270	±0.065	±1.651
0.875	22.225	±0.050	±1.270	±0.050	±1.270	±0.070	±1.778
1.000	25.400	±0.050	±1.270	±0.050	±1.270	±0.075	±1.905
1.250	31.750	±0.063	±1.600	±0.063	±1.600	±0.094	±2.388
1.500	38.100	±0.075	±1.905	±0.075	±1.905	±0.112	±2.845
1.750							
2.000	50.800	±0.100	±2.540	±0.100	±2.540	±0.131	±3.327
2.250	57.150	±0.113	±2.870	±0.113	±2.870	±0.168	±4.267
2.500	63.500	±0.126	±3.200	±0.126	±3.200	±0.180	±4.572
3.000	76.200	±0.146	±3.708	±0.146	±3.708	±0.204	±5.182
3.500	88.900	±0.159	±4.039	±0.159	±4.039	±0.219	±5.563
4.000							

Overages

All sheet supplied net trim (with no overages).

Untrimmed Sheet

Untrimmed sheets are available. No guarantee is given as to the additional area obtained by ordering untrimmed sheet.

¹Intermediate thickness are available.

SIZE AND THICKNESS

POLY II® UVA (MIL-PRF-5425)

Clear

- Standard Items:** Standard items may be ordered in standard packages (cases and pallets) in quantities listed on inside back cover.
- Non-standard Items:** Contact Inside Sales for availability. Also contact Inside Sales for items which do not appear on chart.

Color

POLY II is available in most colors, manufactured in accordance with MIL-P-5425 insofar as the specification Sales for further information.

SIZES	Tolerance Class	Thicknesses ¹																
		.030	.060	.080	.100	.125	.150	.187	.220	.250	.312	.375	.500	.625	.750	.875	1.000	
36 x 48	A	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
36 x 60	*		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
36 x 72	*		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
40 x 50	A	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
48 x 48	*		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
48 x 60	*		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
48 x 72	B		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
48 x 96	C					■	■	■	■	■	■	■	■	■	■	■	■	■
60 x 72	B					■	■	■	■	■	■	■	■	■	■	■	■	■
60 x 96	C					■	■	■	■	■	■	■	■	■	■	■	■	■
72 x 72	C					■	■	■	■	■	■	■	■	■	■	■	■	■
72 x 96	C					■	■	■	■	■	■	■	■	■	■	■	■	■

*Available as cutdowns from larger sizes. Tolerance of larger size prevails.

POLY II® UVT (MIL-PRF-5425) – Standard in 48 x 96 .125 and .250 only. All other sizes & thicknesses are on a min-max basis.

POLY 76® (MIL-PRF-8184, Type I and II, Class I)

POLY 84® (MIL-PRF-8184, Type I and II, Class 2)

Clear

- Standard Items:** Standard items may be ordered in standard packages (cases and pallets) listed on inside back cover.
- Non-standard Items:** Contact Inside Sales for availability and for items which do not appear on chart.

Color

Available in most colors, manufactured in accordance with MIL-PRF-8184 insofar as the specification is applicable. Please contact Inside Sales for further information.

SIZES	Tolerance Class	Thicknesses ¹											
		.060	.080	.100	.125	.150	.187	.220	.250	.312	.375	.500	.625 & above
36 x 48	A	■	■	■	■	■	■	■	■	■	■	■	□
36 x 60	*	□	□	□	□	□	□	□	□	□	□	□	□
36 x 72	*	□	□	□	□	□	□	□	□	□	□	□	□
40 x 50	A	□	□	□	■	■	■	■	■	■	■	■	■
48 x 48	*				■	■	■	■	■	■	■	■	■
48 x 60	*	□	□	□	■	■	■	■	■	■	■	■	■
48 x 72	B	□	□	□	■	■	■	■	■	■	■	■	■
48 x 96	C				■	■	■	■	■	■	■	■	■
60 x 72	B				■	■	■	■	■	■	■	■	■
60 x 96	C				■	■	■	■	■	■	■	■	■
72 x 72	C				■	■	■	■	■	■	■	■	■
72 x 96	C				□	□	□	□	□	□	□	□	□

¹Intermediate thicknesses are available with special ordering requirements.

*Available as cutdowns from larger sizes. Tolerance of larger size prevails.

APPROVALS AND SPECIFICATIONS

	U.S	GREAT BRITAIN	GERMANY
POLY A	AMTM D-4802 AMS-L-P391		
POLY II®	MIL-PRF-5425		Exceeds WL5.1412
POLY 76® Type I or II, Class 1	MIL-PRF-8184	Exceeds DTD 5592	Exceeds W25.1415
POLY 84® Type I or II, Class 2	MIL-PRF-8184	Exceeds DTD 5592	Exceeds WL5.1415
POLY 900®		Exceeds DTD 5592	

PROPERTIES



Typical Properties (.250" unless noted)

			Polycast	Poly FR9 (.060")	Poly 900 (DTD-5592-UK)	Poly II (Mil-P-5425)	Poly 84 (Mil-P-8184)	Poly 76 (Mil-P-8184)	Poly 2000 (Mil-P-25690; Class I)	Poly 2000 (Mil-P-25690; Class 2)
Mechanical Properties										
	Test Method	Units								
Specific Gravity	ASTM-D-792		1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
Tensile Strength	ASTM-D-638									
Yield		psi	11,250	>10,500	11,250	11,250	11,250	11,250	12,100	12,100
Elongation, Rupture		%	6.4	4.5	6.2	6.4	4.0	4.0		
Modulus of Elasticity		psi	450,000	450,000						
Flexural Strength	ASTM-D-790									
(Rupture)		psi	15,250		15,250	15,250	15,250	15,250		
Modulus of Elasticity		psi	475,000		475,000	475,000	475,000	475,000		
Compressive Strength	ASTM-D-695									
(Yield)		psi	18,000		18,000	18,000	18,000	18,000		
Modulus of Elasticity		psi	440,000		440,000	440,000	440,000	440,000		
Compressive Deformation (Under Load)	ASTM-D-621									
4000 PSI 122F, 24hr		%	0.75		0.75	0.75	0.75	0.75		
Shear Strength	ASTM-D-732		9,000		9,000	9,000	9,000	9,000	3,700	3,700
Impact Strength										
Izod Milled Notch	ASTM-D-256	ft. lbs/in. of notch	0.375*							
Falling Steel Ball, 0.5lb. (Breakage drop height (ft.))			18							
Rockwell Hardness	ASTM-D-785		M98*	M96*	M98*	M98*	M98*	M98*		
Barcol Hardness	ASTM-D-2583		50*		50*	50*	50*	50*		
Residual Shrinkage (Internal Strain)	ASTM-D-4802									
Polycast		%	2.2							
Polycast Mil Spec		%		<1	2.2	<1	<1	<1		
Optical Properties										
Refractive Index	ASTM-D-542		1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Luminous Transmittance (As Cast)	ASTM-D-1003									
Total		%	92	92	92	92	92	92		
Haze		%	<0.5	<0.5	<0.5	<0.5	<0.75	<0.75	91	91
Yellowness Index	ASTM-D-1925		0.5						<1.5	<1.5
After 1000 hrs. Accelerated Weathering	ASTM-D-1449									
Total		%	92		92	92	91	91	90	90
Haze		%	<0.5		<0.5	<0.5	<0.75	<0.75	<3.0	<3.0
Effect Of Accelerated Weathering-On Appearance	ASTM-D-1449									
Crazing / Discoloration / Warping			none		none	none	none	none		
Ultraviolet Transmission @ 320nm		%	0	0	0	0				
Craze Resistance	Mil-P-8184	psi								
DRY	IPA		2,000		2,100	2,100	3,225	3,100	3,700	4,300
	Lacquer Thinner		1,000		1,350	1,100	3,030	3,150	3,300	3,600
	Sulfuric Acid		0		NA	0	1,550	1,285		
WET	IPA		500		1,460	1,000	2,775	2,440	2,750	3,600
	Lacquer Thinner		0		1,200	0	2,700	2,450	2,650	3,000
	Sulfuric Acid		0		NA	0	1,020	500		
Thermal Properties										
Hot Forming Temperature			320 **		320 **	320 **	320 **	320 **	218**	218**
Deflection Temperature under load										
(Heat Distortion Temp.)	ASTM-D-648									
66 psi		deg. Fahrenheit	230*							
264 psi		deg. Fahrenheit	203*		230*	216*	221*	234*		
Maximum Recommended Continuous Service Temp.			180		180	180	180	180		
Minimum Recommended Continuous Service Temp.		deg. Fahrenheit								
[lowest temp. tested for bullet-resistance]		deg. Fahrenheit								
Coefficient of Linear Thermal Expansion		deg. Fahrenheit	0.000042		0.000042	0.000042	0.000042	0.000042	0.000042	0.000042
Coefficient of Thermal Conductivity	ASTM-D-696		1.3		1.3	1.3	1.3	1.3	1.3	1.3
Thermal Relaxation	Cento-Fitch ⁴									
@ 230 deg. F		in./in./deg. F							3.3	3.3
@ 293 deg. F	Mil-P-25690	BTU/(Hr.)(Sq.Ft)							45	45
Water Absorption	Mil-P-25690	(deg. F/in.)	0.65		0.65	0.65	1.6	2.6	2.6	1.6
	26 day immersion		0.2		0.2	0.2	0.2	0.2	0.2	0.2
Flammability (Burning Rate) UL94HB		%	1.2*		1.2*	1.2*	0.8*	0.8*		
Self-ignition Temperature	ASTM-D-635	%	830*	0.65		830*				
Specific Heat @ 77°F	ASTM-D-1929	%	0.35	0.2	0.35	0.35	0.35	0.35	0.35	0.35
	DuPont 900	%	27**	<0.3		27**				
Smoke Density	(Therm. An. Cal.) ⁴	in./min.							2,900	2,900
Crack Propagation (Received at STD Conditions)	ASTM-D-2843	deg. Fahrenheit		0.35						
	Mil-P-25690	BTU/(Lb.)(deg. F)		Max:13%;						
		%		Rating:23.2%						
		lbs/in 3/2								

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