SPARTECH
CUSTOM SHEET & ROLLSTOCK

Cell Cast Acrylic

Solutions for Aerospace

Delivering aircraft transparencies for the demanding aerospace industry.

Polycast® cell cast acrylic has been manufactured and trusted by the aerospace industry for over 40 years. We offer different formulations designed to address the specific performance needs of various aircraft transparencies. That includes optical clarity and sheet cleanliness, unrivaled in the industry.

We consistently surpass stringent industry standards and demands, including the strict quality levels required by Military Material Specifications. Today, in supplying the Polycast® brand of materials, we are the principal supplier to the United States aerospace industry of acrylic sheet meeting U.S. Military Material Specifications MIL-PRF-5425, MIL-PRF-8184, and MIL-PRF-25690.

A comprehensive and experienced team of Spartech material engineers, technicians and sales & service representatives is available to help you determine the best Polycast® acrylic solution for your needs.

OUR AEROSPACE SOLUTIONS

POLY A is our standard unshrunk acrylic. It is manufactured to a visual and optical aircraft specification **(ASTM D4802)** and is available in clear as well as transparent colors. Common applications are non-critical glazing for commercial helicopters and sport planes.

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

POLY II is our heat-resistant, preshrunk, clear and colored acrylic sheet formulated to meet military specification **MIL-PRF-5425**. We are qualified to furnish sheets in thicknesses 0.060”–1.000” to meet this specification.

POLY 76 is a crosslinked, preshrunk acrylic with excellent resistance to crazing, solvent attacks and dimensional change. As one of the few materials approved by the U.S. Military for use as stretched panels (**MIL-PRF-25690**), Poly 76 has numerous sophisticated applications for both military and commercial aircraft. It is also available in transparent colors. Poly 76 meets or exceeds all requirements of **MIL-PRF-8184, Type I and II and Class 1**.

POLY 84 is a uniquely formulated, crosslinked, preshrunk acrylic. With lower water absorption, it is specifically designed to provide superior craze and solvent resistance for today’s changing environment. Poly 84 also meets or exceeds **MIL-PRF-8184, Type I and II, Class 1 and 2**. It is ideal for monolithic windscreens, outer laminates and canopies. Also available in transparent colors.

POLY 2000 is produced to a military specification covering stretched acrylic sheet specially designed from **MIL-PRF-8184** base material. It offers enhanced craze properties and increased crack resistance. It meets or exceeds all requirements of **MIL-PRF-25690**.

Common Applications include: fixed wing transparencies, helicopter bubbles, wing tip lenses, edge-lit display panels.

POLYCAST® UV-SC is a custom cell cast acrylic sheet that blocks out significant amounts of near-Infrared radiation while maintaining high visible light transmission. This acrylic solution offers full UV protection for pilots and aircraft interiors without sacrificing acrylic’s superior light transmission qualities. Our aircraft-quality monolithic glazing material can be manufactured to MIL-PRF 5425, 8184 and 25690; DTD-5592; L-P-391; ASTM D4802 and other specifications. It is available in a wide range of colors and/or light transmissions, including night vision compatibility.

POLY II UVA
MIL-PRF-5425

Product Dimensions		Tolerance Class[1]	Thickness[2]															
Inches	Metric (mm)		.030" .8 mm	.060" 1.6 mm	.080" 2.1 mm	.100" 2.6 mm	.125" 3.2 mm	.150" 3.9 mm	.185" 4.8 mm	.220" 5.6 mm	.250" 6.4 mm	.312" 8.0 mm	.375" 9.6 mm	.500" 12.7 mm	.625" 15.9 mm	.750" 19.1 mm	.875" 22.3 mm	1.000" 25.4 mm
36 × 48	914.40 × 1219.2	A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
36 × 60	914.40 × 1524.0	*		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
36 × 72	914.40 × 1828.8	*		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
40 × 50	1016.00 × 1270.0	A	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○
48 × 48	1219.20 × 1219.2	*					●	●	●	●	●	●	●	●	●	●	●	●
48 × 60	1219.20 × 1524.0	*		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
48 × 72	1219.20 × 1828.8	B		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
48 × 96	1219.20 × 2438.4	B					●	●	●	●	●	●	●	●	●	●	●	●
60 × 72	1524.00 × 1828.8	B					●	●	●	●	●	●	●	●	○	○	○	○
60 × 96	1524.00 × 2438.4	C					●	●	●	●	●	●	●	●	○	○	○	○
72 × 72	1828.80 × 1828.8	C					●	●	●	●	●	●	●	●	○	○	○	○
72 × 96	1828.80 × 2438.4	C					●	●	●	●	●	●	●	●	○	○	○	○

Poly II UVT available upon request.

POLY 76
MIL-PRF-8184, Type I and II, Class 1

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

Product Dimensions		Tolerance Class[1]	Thickness [2] (inches/mm)											
Inches	Metric (mm)		.060" 1.6 mm	.080/ 2.1 mm	.100" 2.6 mm	.125" 3.2 mm	.150" 3.9 mm	.187" 4.8 mm	.220" 5.6 mm	.250" 6.4 mm	.312" 8.0 mm	.375" 9.6 mm	.500" 12.8 mm	.625" 15.9 mm & Up
36 × 48	914.40 × 1219.2	A	●	●	●	●	●	●	●	●	●	●	●	○
36 × 60	914.40 × 1524.0	*	○	○	○	○	○	○	○	○	○	○	○	○
36 × 72	914.40 × 1828.8	*	○	○	○	○	○	○	○	○	○	○	○	○
40 × 50	1016.00 × 1270.0	A	○	○	○	●	○	●	○	●	○	○	○	○
48 × 48	1219.20 × 1219.2	*				●	○	●	○	●	○	○	○	○
48 × 60	1219.20 × 1524.0	*	○	○	○	●	○	●	○	●	○	○	○	○
48 × 72	1219.20 × 1828.8	B	○	○	○	●	●	●	●	●	●	●	●	●
48 × 96	1219.20 × 2438.4	B				●	●	●	●	●	●	●	●	●
60 × 72	1524.00 × 1828.8	B				●	○	●	○	●	●	○	○	○
60 × 96	1524.00 × 2438.4	C				●	○	●	○	●	●	○	○	○
72 × 72	1828.80 × 1828.8	C				●	○	●	○	●	●	●	●	●
72 × 96	1828.80 × 2438.4	C				○	○	●	○	●	○	○	○	○

CLEAR

● **Standard Items:** Standard items may be ordered in standard packages (cases and pallets).

○ **Non-Standard Items:** Contact Polycast® Customer Service for availability.

COLOR

Poly 76 & Poly 84 are available in most colors, manufactured in accordance with MIL-PRF-8184 insofar as the specification is applicable.

POLY II is available in most colors, manufactured in accordance with MIL-PRF-5425 insofar as the specification is applicable. Please contact Customer Service for further information.

[1] **Refer to tolerance table on page 6.**

[2] **Intermediate thicknesses are available with special ordering requirements.**

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

SPECIFICATIONS BY PRODUCT, RANKED BY PERFORMANCE

PRODUCT	PRODUCT DESCRIPTION	USA	EUROPEAN EQUIVALENT SPECIFICATION
POLY A	As Cast	ASTM 4802, AMS-L-P-391	EN 4364, WL5.1412
POLY II	As Cast, Pre-Shrunk	MIL-PRF 5425	EN 4364, WL5.1412
POLY 900	Crosslinked, As Cast		DTD 5592, EN4365
POLY 76	Crosslinked, As Cast, Pre-Shrunk	MIL-PRF 8184 (Class 1)	EN4365, WL5.1415
POLY 84	Crosslinked, As Cast, Lower Water Absorption, Pre-Shrunk	MIL-PRF 8184 (Class 2)	EN4365, WL5.1415
POLY 2000 (POLY 20001, POLY 20002)	Crosslinked and Stretched, Pre-Shrunk	MIL-PRF 25690	EN4366, WL5.1416

Customers may inquire about other specifications not listed, such as France AIR 9106 and Russia GOST 10667-90

TYPICAL PROPERTIES			POLYCAST POLY A	POLY 900 DTD-5592-UK	POLY II MIL-PRF-5425
MECHANICAL	**TEST METHOD**	**UNIT**			
Specific Gravity	ASTM D792	–	1.19	1.19	1.19
Tensile Strength Tensile Strength, at Break Elongation, at Break Modulus of Elasticity	ASTM D638	 psi % psi	 11,250 5 450,000	 11,250 5 450,000	 11,250 5 450,000
Flexural Strength Rupture Modulus of Elasticity	ASTM D790	 psi psi	 15,250 450,000	 15,250 450,000	 15,250 450,000
Compressive Strength Yield Modulus of Elasticity	ASTM D695	 psi psi	 18,000 440,000	 18,000 440,000	 18,000 440,000
Compressive Deformation (Under Load) 4,000 psi 112F, 24 hr.	ASTM D621	 %	 0.75	 0.75	 0.75
Shear Strength	ASTM D732	psi	9,000	9,000	9,000
Impact Strength Izod Milled Notch	ASTM D256	 ft-lbs/in	 .375*	 –	 –
Rockwell Hardness	ASTM D785	–	M98*	M98*	M98*
Barcol Hardness	ASTM D2583	–	50*	50*	50*
Residual Shrinkage (Internal Strain)	ASTM D4802	 %	 2.2	 2.2	 <1
OPTICAL	**TEST METHOD**	**UNIT**			
Refractive Index	ASTM D542		1.49	1.49	1.49
Luminous Transmittance Haze Yellowness Index	ASTM D1003 ASTM D1925	% 	92 <0.5 0.5	92 <0.5 	92 <0.5
After Accelerated Weathering Luminous Transmittance Haze	ASTM G155	 %	 92 <0.5	 92 <0.5	 92 <0.5
Effect of Accelerated Weathering on Appearance – Crazing, Discoloration, Warping	ASTM G155	–	none	none	none
Ultraviolet Transmission @ 320nm		%	0	0	0
Craze Resistance DRY IPA Lacquer Thinner Sulfuric Acid WET IPA Lacquer Thinner Sulfuric Acid	MIL-PRF	psi 2,000 1,000 NA 500 NA NA	 2,100 1,350 NA 1,460 1,200 NA	 2,100 1,100 1,000 NA
THERMAL	**TEST METHOD**	**UNIT**			
Hot Forming Temperature		°F	320*	320*	320*
Deflection Temperature Under Load (Heat Distortion Temperature)	ASTM D648 264 psi	°F	203*	230*	215*
Max. Recommended Continuous Service Temperature	–	°F	180	180	180
Coefficient of Linear Thermal Expansion	ASTM D696	in/in/°F	0.000042	0.000042	0.000042
Coefficient of Thermal Conductivity	Cenco-Fitch	BTU/ (hr) (Ft^2) (°F/in)	1.3	1.3	1.3
Thermal Relaxation @ 230°F @ 293°F	 MIL-PRF-25690 MIL-PRF-25690	 % %	 – –	 – –	 – –
Water Absorption Long-Term 24-Hour Immersion	 MIL-PRF-8184 ASTM D570	 % %	 .065 0.2*	 .065 0.2*	 .065 0.2*
Flammability (Burning Rate) UL94HB	ASTM D635	in/min	1.2*	1.2*	1.2*
Self-ignition Temperature	ASTM D1929	°F	830*	–	830
Specific Heat @ 77°F	DuPont 900 (Therm. An. Cal.)	BTU/(lb) (°F)	0.35	0.35	0.35
Smoke Density	ASTM D2843	%	27*	–	27*
Crack Propagation (Received at STD Conditions)	MIL-PRF-25690	lbs/in 3/2	–	–	–

*** Values vary by thickness. Values shown are for 0.250" thickness.**

TYPICAL PROPERTIES			POLY 76 MIL-PRF-8184	POLY 84 MIL-PRF-8184	POLY 20001 MIL-PRF-25690 CLASS 1 POLY 76	POLY 20002 MIL-PRF-25690 CLASS 2 POLY 84
MECHANICAL	**TEST METHOD**	**UNIT**				
Specific Gravity	ASTM D792	–	1.19	1.19	1.19	1.19
Tensile Strength Tensile Strength, at Break Elongation, at Break Modulus of Elasticity	ASTM D638	 psi % psi	 11,250 5 450,000	 11,250 5 450,000	 12,100 –	 12,100 –
Flexural Strength Rupture Modulus of Elasticity	ASTM D790	 psi psi	 15,250 450,000	 15,250 450,000	 – –	 – –
Compressive Strength Yield Modulus of Elasticity	ASTM D695	 psi psi	 18,000 440,000	 18,000 440,000	 – –	 – –
Compressive Deformation (Under Load) 4,000 psi 112F, 24 hr.	ASTM D621	 %	 0.75	 0.75	 –	 –
Shear Strength	ASTM D732	psi	9,000	9,000	3,700	3,700
Impact Strength Izod Milled Notch	ASTM D256	 ft-lbs/in	 –	 –	 –	 –
Rockwell Hardness	ASTM D785	–	M98*	M98*		
Barcol Hardness	ASTM D2583	–	50*	50*		
Residual Shrinkage (Internal Strain)	ASTM D4802	 %	 <1	 <1	 –	 –
OPTICAL	**TEST METHOD**	**UNIT**				
Refractive Index	ASTM D542		1.49	1.49	1.49	1.49
Luminous Transmittance Haze Yellowness Index	ASTM D1003 ASTM D1925	% 	92 <0.5 	92 <0.75 	91 <1.5 	91 <1.5
After Accelerated Weathering Luminous Transmittance Haze	ASTM G155	 %	 91 <0.75	 91 <0.75	 90 <3.0	 90 <3.0
Effect of Accelerated Weathering on Appearance – Crazing, Discoloration, Warping	ASTM G155	–	none	none	–	–
Ultraviolet Transmission @ 320nm		%	0	0	0	0
Craze Resistance DRY IPA Lacquer Thinner Sulfuric Acid WET IPA Lacquer Thinner Sulfuric Acid	MIL-PRF	psi 3,100 3,150 1,285 2,440 2,450 500	 3,225 3,030 1,550 2,775 2,700 1,020	 3,700 3,300 2,750 2,650	 4,300 3,600 3,600 3,600
THERMAL	**TEST METHOD**	**UNIT**				
Hot Forming Temperature		°F	320*	320*	218*	218*
Deflection Temperature Under Load (Heat Distortion Temperature)	ASTM D648 264 psi	°F	235*	225*	–	–
Max. Recommended Continuous Service Temperature	–	°F	180	180	–	–
Coefficient of Linear Thermal Expansion	ASTM D696	in/in/°F	0.000042	0.000042	0.000042	0.000042
Coefficient of Thermal Conductivity	Cenco-Fitch	BTU/ (hr) (Ft^2) (°F/in)	1.3	1.3	1.3	1.3
Thermal Relaxation @ 230°F @ 293°F	 MIL-PRF-25690 MIL-PRF-25690	 % %	 – –	 – –	 3.3 45	 3.3 45
Water Absorption Long-Term 24-Hour Immersion	 MIL-PRF-8184 ASTM-D570	 % %	 2.6 0.2*	 1.6 0.2*	 2.6 0.2*	 1.6 0.2*
Flammability (Burning Rate) UL94HB	ASTM D635	in/min	0.8*	0.8*	–	–
Self-ignition Temperature	ASTM D1929	°F	–	–	–	–
Specific Heat @ 77°F	DuPont 900 (Therm. An. Cal.)	BTU/(lb) (°F)	0.35	0.35	0.35	0.35
Smoke Density	ASTM D2843	%	–	–	–	–
Crack Propagation (Received at STD Conditions)	MIL-PRF-25690	lbs/in 3/2	–	–	2,900	2,900

*** Values vary by thickness. Values shown are for 0.250" thickness.**

TOLERANCES FOR POLY II, POLY 76 AND POLY 84
as per MIL-SPEC

Standard Thickness[1]		Class A		Class B		Class C	
Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
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
0.500	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
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	±0.150	±4.039	±0.159	±4.039	±0.219	±5.563

[1]Intermediate thicknesses are available.

POLY 900
Thickness and Sheet Sizes

Thickness	Tolerance	36 x 48"	40 x 50"	48 x 72"	48 x 96"	60" x 72"	60" x 96"	72" x 72"	72" x 96"
.060" / 1.50 mm	.048/.072"	●	●	●	—	—	—	—	—
.080" / 2.0 mm	.165/.095"	●	●	●	—	—	—	—	—
.100" / 2.50 mm	.082/.118"	●	●	●	●	—	—	—	—
.118" / 3.0 mm	.098/.138"	●	●	●	●	—	—	—	—
.125" / 3.20 mm	.105/.145"	●	●	●	●	○	○	○	○
.138" / 3.50 mm	.116/.159"	●	●	●	●	○	○	○	○
.150" / 3.80 mm	.127/.173"	●	●	●	●	○	○	○	○
.157" / 4.0 mm	.133/.181"	●	●	●	●	○	○	○	○
.187" / 4.70 mm	.161/.213"	●	●	●	●	○	○	○	○
.197" / 5.0 mm	.169/.225"	●	●	●	●	○	○	○	○
.220" / 5.60 mm	.191/.249"	●	●	●	●	○	○	○	○
.236" / 6.0 mm	.208/.264"	●	●	●	●	○	○	○	○
.250" / 6.40 mm	.220/.280"	●	●	●	●	○	○	○	○
.315" / 8.0 mm	.280/.350"	●	●	●	●	○	○	○	○
.375" / 9.50 mm	.337/.413"	●	●	●	●	○	○	○	○
.394" / 10.0 mm	.355/.433"	●	●	●	●	○	○	○	○
.472" / 12.70 mm	.429/.514"	●	●	●	●	○	○	○	○
.50" / 12.70 mm	.455/.545"	●	●	●	●	○	○	○	○
.512" / 13.0 mm	.466/.558"	●	●	●	●	○	○	○	○
.591" / 15.0 mm	.544/.638"	●	●	●	●	○	○	○	○
.625" / 15.90 mm	.575/.675"	●	●	●	●	○	○	○	○
.709" / 18.0 mm	.659/.759"	●	●	●	●	○	○	○	○
.750" / 19.0 mm	.697/.803"	●	●	●	●	○	○	○	○
.787" / 20.0 mm	.736/.838"	●	●	●	●	○	○	○	○
.875" / 22.20 mm	.822/.928"	●	●	●	●	○	○	○	○
.984" / 25.0 mm	.930/1.038"	●	●	●	●	○	○	○	○

● **Standard Items:** Standard items may be ordered in standard packages (cases and pallets).

○ **Non-Standard Items:** Contact Polycast® Customer Service for availability.

Tolerances interpreted from Fig. 2 of DTD-5592A.

POLYCAST® POLY 2000 STRETCHED ACRYLIC
SHEET (MIL P 25690)

KEY ATTRIBUTES

- Largest sheet yields lower unit costs
- Superior optical quality
- Available in standard thicknesses

MANUFACTURING PERFORMANCE

- Offer tighter tolerances than standard mil spec (+/- .020" < .250"; >.250" +/- 10%), upon request
- Flexibility and consistency
- Control from cell casting to stretching

SERVICE

- Parts cut to your size and shape configurations
- Cradle to grave options
- Inventory levels exacted to your specifications
- Technical expertise and superior customer support

APPLICATIONS

Military, commercial and general aviation glazing for fixed and rotary wing:

- Aircraft cockpit windows
- Aircraft canopies
- Windscreens
- Cabin windows
- Outer laminates

PROPERTY	REQUIREMENT	TYPICAL VALUE
Angular Deviation*	7 minutes (more than 2" from edge)	1–3 min.
Optical Distortion*	< 14 minute of arc over any 6"	3 min./6"
Luminous Transmittance		
Before Weathering	0.060" – 0.220": 91% 0.221" – 0.375": 90% 0.376" – 0.675": 89% > .675": 88%	92.0 91.0 90.0 89.0
After Weathering	0.060" – 0.220": 89% 0.221" – 0.375": 88% 0.376" – 0.675": 87% > .675": 86%	89.0 90.0 88.0 87.0
Haze*:		
Before Weathering	3% max.	< 1.5
After Weathering	4% max.	< 3.0
Long Term Water Absorption (Class 2)	≤ 2.90%	2.79 – 2.85%
Crack Propagation		
Received @ STD Conditions	Individual value: 2,300 lbs/in$^{3/2}$ Average value: 2,700 lbs/in$^{3/2}$	2,600 – 3,000 2,700 – 3,100
As Received @ –17.8C	Individual value: 1,150 lbs/in$^{3/2}$ Average value: 1,250 lbs/in$^{3/2}$	1,200 – 1,500 1,300 – 1,600
After Weathering @ STD Conditions	Individual value: 2,100 lbs/in$^{3/2}$ Average value: 2,300 lbs/in$^{3/2}$	2,500 3,000
Thermal Relaxation		
@ 110C @ 145C	10.0% max. 37.5% min.	1.6 – 5.0% 40.0 – 50.0%
Tensile Strength	Individual value: 10,000 psi Average value: 10,500 psi	11,300 – 12,700 11,300 – 12,900
Shear Strength	3,000 psi	3,200 – 4,200
Craze Resistance		
Dry IPA		
a) Class 1	3,000 psi	3,700 – no craze
b) Class 2	3,000 psi	4,300 – no craze
Dry Laquer Thinner		
a) Class 1	2,500 psi	3,300 – no craze
b) Class 2	2,500 psi	3,400 – 3,800
Wet IPA		
a) Class 1	2,000 psi	2,400 – 3,000
b) Class 2	2,500 psi	3,100 – 4,100
Wet Laquer Thinner		
a) Class 1	1,750 psi	2, 200 – 3,100
b) Class 2	2,000 psi	2, 700 – 3,300
Dimension Stability	0.2% max. after natural weathering	0.11

***Special optical requirements will be considered.**

We are a leading plastics manufacturer that leverages our knowledge of materials, processing, and application development to deliver the highest level of value to our customers.

SPARTECH®

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POLYCAST®
PRODUCT SELECTION GUIDE

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