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POLYCAST™ Cell Cast Acrylic Solutions for Aerospace

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The PolyOne Difference

PolyOne Designed Structures and Solutions is a premier supplier of specialized sheet solutions and has been manufacturing Polycast cast acrylic sheet for more than 30 years. Our standards consistently surpass the quality levels required by Military Material Specifications, and Polycast's optical clarity and sheet cleanliness are unmatched in the industry. Our team of engineers, technicians, sales members and customer service representatives are dedicated to meeting the present and future needs of both our customers and the demanding aerospace industry.

Our Aerospace Solutions

POLY A is our standard unshrunk acrylic. It is manufactured to a visual and optical aircraft specification **(ASTM D-4802)** and 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™ is our heat-resistant, preshrunk, clear and colored acrylic sheet formulated to meet military specification **Mil-PRF-5425**. Polycast is 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 thermal 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, Class 1 and 2**.

POLY 84™ is a uniquely formulated, crosslinked, preshrunk acrylic specifically designed to provide superior craze and solvent resistance for today's changing environment. Poly 84's water absorption and increased resistance to acids expands its number of "as cast" applications. Poly 84 also meets or exceeds **Mil-PRF-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.

POLY 2000™ is 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**.

Regulatory Compliance

PolyOne DSS 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-PRF-5425, Mil-PRF-8184, and Mil-PRF-25690 to the United States aerospace industry. PolyOne DSS has developed an enhanced crazed-resistance material and Mil-PRF-8184 has been revised to recognize the improved performance of the material.

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	±0.15	±4.039	±0.159	±4.039	±0.219	±5.563
4.000							

[1] Intermediate thicknesses are available.

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

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

Inches	Metric (mm)	Tolerance Class	Thicknesses[1]	.060/1.524	.080/2.032	.100/2.540	.125/3.175	.150/3.810	.187/4.750	.220/5.588	.250/6.350	.312/7.925	.375/9.525	.500/12.70	.625/15.875 & above
36 x 48	914.40 x 1219.20	A		●	●	●	●	●	●	●	●	●	●	●	○
36 x 60	914.40 x 1524.00	*		○	○	○	○	○	○	○	○	○	○	○	○
36 x 72	914.40 x 1828.80	*		○	○	○	○	○	○	○	○	○	○	○	○
40 x 50	1016.00 x 1270.00	A		○	○	○	●	○	●	○	●	○	○	○	○
48 x 48	1219.20 x 1219.20	*					●	○	●	○	●	○	○	○	○
48 x 60	1219.20 x 1524.00	*		○	○	○	●	○	●	○	●	○	○	○	○
48 x 72	1219.20 x 1828.80	B		○	○	○	●	●	●	●	●	●	●	●	●
48 x 96	1219.20 x 2438.40	C					●	●	●	●	●	●	●	●	●
60 x 72	1524.00 x 1828.80	B					●	○	●	○	●	●	○	○	○
60 x 96	1524.00 x 2438.40	C					●	○	●	○	●	●	○	○	○
72 x 72	1828.80 x 1828.80	C					●	○	●	○	●	●	●	●	●
72 x 96	1828.80 x 2438.40	C					○	○	●	○	●	○	○	○	○

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

Poly76™ & Poly84™ are available in most colors, manufactured in accordance with Mil-PRF-8184 insofar as the specification are applicable.

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

[1] Intermediate thicknesses are available with special ordering requirements.
* Available as cutdowns from larger sizes. Tolerance of larger size prevails.
** All measurements are listed in inches.

POLY II UVA
(Mil-PRF-5425)

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.

Inches	Metric (mm)	Tolerance Class	Thicknesses[1]	.030/.762	.060/1.524	.080/2.032	.100/2.540	.125/3.175	.150/3.810	.187/4.750	.220/5.588	.250/6.350	.312/7.925	.375/9.525	.500/12.70	.625/15.875	.750/19.050	.875/22.225	1.000/25.400
36 x 48	914.40 x 1219.20	A		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
36 x 60	914.40 x 1524.00	*			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
36 x 72	914.40 x 1828.80	*			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
40 x 50	1016.00 x 1270.00	A		●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○
48 x 48	1219.20 x 1219.20	*						●	●	●	●	●	●	●	●	●	●	●	●
48 x 60	1219.20 x 1524.00	*			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
48 x 72	1219.20 x 1828.80	B			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
48 x 96	1219.20 x 2438.40	C						●	●	●	●	●	●	●	●	●	●	●	●
60 x 72	1524.00 x 1828.80	B						●	●	●	●	●	●	●	●	○	○	○	○
60 x 96	1524.00 x 2438.40	C						●	●	●	●	●	●	●	●	○	○	○	○
72 x 72	1828.80 x 1828.80	C						●	●	●	●	●	●	●	●	○	○	○	○
72 x 96	1828.80 x 2438.40	C						●	●	●	●	●	●	●	●	○	○	○	○

APPROVALS & SPECIFICATIONS

	US	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

MECHANICAL	TEST METHOD	UNIT	Polycast	Poly FR9 (.060")	Poly 900 (DTD-5592-UK)	Poly II (Mil-PRF -5425)	Poly 84 (Mil-PRF -8184)	Poly 76 (Mil-PRF -8184)	Poly 2000 (Mil-PRF -25690 Class 1)	Poly 2000 (Mil-PRF -25690 Class 2)
Specific Gravity	ASTM D-792	-	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
Tensile Strength Yield Elongation, Rupture Modulus of Elasticity	ASTM D-638	 psi % psi	 11,250 6.4 450,000	 10,250 4.5 450,000	 11,250 46.2	 11,250 6.4	 11,250 4.0	 11,250 6.4	12,100	12,100
Flexural Strength (Rupture) Modulus of Elasticity	ASTM D-790	 psi psi	 15,250 475,000		 15,250 475,000	 15,250 475,000	 15,250 475,000	 15,250 475,000	-	-
Compressive Strength (Yield) Modulus of Elasticity	ASTM D-695	 psi psi	 18,000 440,000		 18,000 440,000	 18,000 440,000	 18,000 440,000	 18,000 440,000	-	-
Compressive Deformation (Under Load) 4000 PSI 122F, 24hr	ASTM D-621	 %	 0.75		 0.75	 0.75	 0.75	 0.75	-	-
Shear Strength	ASTM D-732	psi	9,000		9,000	9,000	9,000	9,000	3,700	3,700
Impact Strength Izod Milled Notch Falling Steel Ball, 0.5lb. (Breakage drop height (ft)	ASTM D-256	ft-lbs/in	.375* 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) Polycast Polycast Mil Spec	ASTM D-4802	 % %	 2.2	 <1	 2.2	 <1	 <1	 <1	-	-
OPTICAL										
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) Total Haze Yellowness Index	ASTM D-1003 ASTM D-1925	%	92 <0.5 0.5	92 <0.5	92 <0.5	92 <0.5	92 <0.75	92 <0.5	91 <1.5	91 <1.5
After 1000 hrs. Accelerated Weathering Total Haze	ASTM G26	%	92 <0.5	-	92 <0.5	92 <0.5	91 <0.75	91 <0.75	90 <3.0	90 <3.0
Effect Of Accelerated Weathering On Appearance - Crazing, Discoloration, Warping	ASTM G26	-	none	-	none	none	none	none	-	-
Ultraviolet Transmission @ 320nm		%	0	0	-	-	-	-	-	-
Craze Resistance DRY IPA Lacquer Thinner Sulfuric Acid WET IPA Lacquer Thinner Sulfuric Acid	Mil-P-8184	psi	 2,000 1,000 0 500 0 0		 0 2,100 1,350 NA 1,460 1,200 NA	 0 2,100 1,100 0 1,000 0 0	 0 3,225 3,030 1,550 2,775 2,700 1,020	 0 3,100 3,150 1,285 2,440 2,450 500	 0 3,700 3,300 2,750 2,650	 0 4,300 3,600 3,600 3,600
THERMAL										
Hot Forming Temperature		°F	320 **		320 **	320 **	320 **	320 **	218 **	218 **
Deflection Temperature under load Heat Distortion Temperature	ASTM D-648 66 psi 264 psi	 °F °F	 230* 203*		 230*	 216*	 221*	 234*	-	-
Max. Recommended Continuous Service Temp.	-	°F	180		180	180	180	180	-	-
Min. Recommended Continuous Service Temp. [lowest temp. tested for bullet-resistance]	-	-	-	-	-	-	-	-	-	-
Coefficient of Linear Thermal Expansion	ASTM D-696	in/in/°F	0.000042		0.000042	0.000042	0.000042	0.000042	0.000042	0.000042
Coefficient of Thermal Conductivity	Cento-Fitch	BTU/(hr) (Ft^2) (°F/in)	1.3		1.3	1.3	1.3	1.3	1.3	1.3
Thermal Relaxation @ 230 °F @ 293 °F	 Mil-P-25690 Mil-P-25690	 % %	 -	 -	 -	 -	 -	 -	 3.3 45	 3.3 45
Water Absorption	26 day immersion 24 hour immersion	% %	.065 0.2*	0.65 0.2	0.65 .02	0.65 0.2	1.6 0.2	2.6 0.2	2.6 .02	1.6 0.2
Flammability (Burning Rate) UL94HB	ASTM D-635	in/min	1.2*	<0.3	1.2*	1.2*	0.8*	0.8*	-	-
Self-ignition Temperature	ASTM D-1929	°F	830*		-	830	-	-	-	-
Specific Heat @ 77°F	DuPont 900 (Therm. An. Cal.)	BTU/(lb) (°F)	0.35		0.35	0.35	0.35	0.35	0.35	0.35
Smoke Density	ASTM D-2843	%	27**	Max 13% Rating 23.2%	-	27**	-	-	-	-
Crack Propagation (Received at STD Conditions)	Mil-P-25690	lbs/in 3/2	-	-	-	-	-	-	2,900	2,900

ADDITIONAL DATA CODES AND APPROVALS ARE AVAILABLE UPON REQUEST. Asterisked (*) values will change with thickness. Difference in length and width, as measured at room temperature, before and after heating above 300 deg. F.** Varies with thickness.