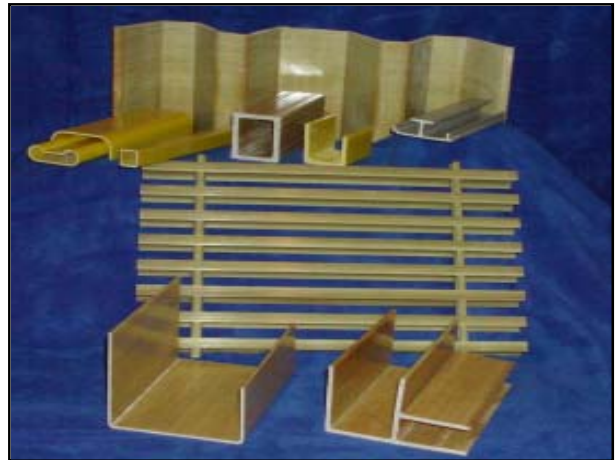
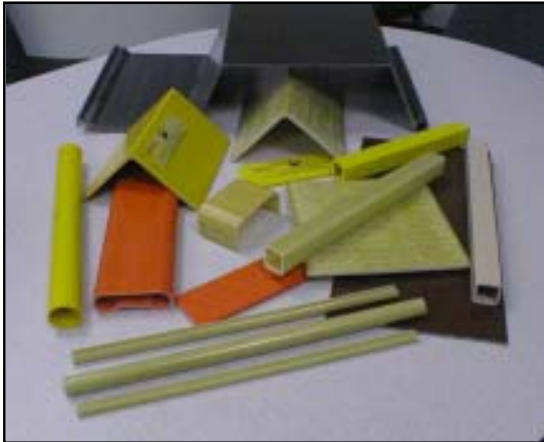


# DATA SHEET

## Polyurethane Pultrusions Series 4000



### Description and Features

#### Series 4000 / Polyurethane

Creative Pultrusions, Inc. now offers a range of pultruded profiles manufactured with Thermoset Polyurethane resin matrix designated as Series 4000. These profiles range in various sizes up to 21.5" wide x 4.25" deep. Polyurethane pultruded composite profiles exhibit excellent mechanical properties including superior toughness, shear strength, E-modulus and above all superior impact strength. The improvements in properties are unparalleled compared to traditional resin systems. Fire, smoke, toxicity and corrosion properties are comparable to traditional flame retardant vinyl ester resin systems. Fabrication operations such as punching, threading, drilling and cutting are enhanced with this superior toughened matrix system. The urethane resin matrix allows for superior paint and adhesion with zero surface preparation. The environmentally friendly matrix contains no VOC's, which allows for a healthier work environment and zero residual monomer in the finished product.

### Features/Benefits

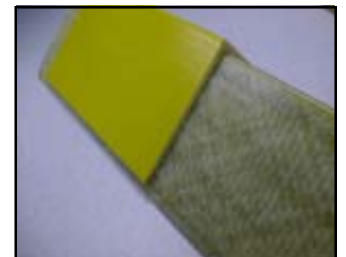
- **Superior Toughness...Increased Impact Strength**
- **Excellent Strength...Enhanced Performance Characteristics**
- **Optimized Properties...Lower Raw Material Cost**
- **Improved Damage Tolerance...Superior Fabrication Characteristics**
- **Enhanced Compatibility...Superior Paintability and Adhesive Bonding**
- **VOC Free...Healthier Work Environment and Unlimited Production Supply**



*Perforated Panel*



*Screw Retention*



*Excellent Bonding Adhesion*



**CREATIVE PULTRUSIONS, INC.**

214 Industrial Lane ■ Alum Bank, PA 15521

Toll-Free: 888-CPI-PULL (274-7855) ■ 814-839-4186 ■ Fax: 814-839-4276

Web site: <http://www.creativepultrusions.com> ■ E-mail: [crpul@pultrude.com](mailto:crpul@pultrude.com)

# Polyurethane Series 4000 Comparative Properties

## Polyester and Polyurethane Materials

Mechanical / Physical Properties	ASTM Test	Units	Polyester 1500 Series*	Vinyl Ester 1625 Series*	Polyurethane Mat/roving	Polyurethane Triax/roving	Polyurethane All Roving
Tensile Strength (LW)	D638	psi	33,000	37,500	100,000	85,000	120,000
Tensile Strength (CW)	D638	psi	7,500	8,000	6,000	30,000	----
Tensile Modulus (LW)	D638	10 <sup>6</sup> psi	2.5	3.0	6.0	5.6	6.4
Tensile Modulus (CW)	D638	10 <sup>6</sup> psi	0.8	1.0	1.3	1.2	----
Compr. Strength (LW)	D695	psi	33,000	37,500	65,000	45,000	75,000
Compr. Strength (CW)	D695	psi	16,500	20,000	20,000	30,000	----
Compr. Modulus (LW)	D695	10 <sup>6</sup> psi	3.0	3.0	5.7	4.1	6.3
Compr. Modulus (CW)	D695	10 <sup>6</sup> psi	1.0	1.2	2.5	3.2	----
Flexural Strength (LW)	D790	psi	33,000	37,500	100,000	85,000	120,000
Flexural Strength (CW)	D790	psi	11,000	12,500	25,000	60,000	----
Flexural Modulus (LW)	D790	10 <sup>6</sup> psi	1.6	2.0	3.4	2.9	6.2
Flexural Modulus (CW)	D790	10 <sup>6</sup> psi	0.8	1.0	1.7	2.0	----
Interlaminar Shear	D2344	psi	4,500	4,500	7,500	5,000	9,000
In-Plane Shear (LW)	mod D2344	psi	----	----	9,500	8,500	9,700
In-Plane Shear (CW)	mod D2344	psi	----	----	1,400	4,500	1,500
Bearing Strength (LW)	D953	psi	30,000	30,000	45,000	50,000	23,000
Bearing Strength (CW)	D953	psi	18,000	18,000	20,000	35,000	----
Water Absorption	D570	% Max	0.6	0.6	0.3	0.3	0.3
Density	D792	lb/in <sup>3</sup>	.06 - .07	.06 - .07	0.07	0.068	0.074

\*1500 and 1625 series are mat and roving compositions. The data shown above was derived from ASTM coupon and full section testing. The results are average values based on random sampling and testing of production lots. Creative Pultrusions believes this information to be reliable and accurate as of date of publication. However, we assume no obligation or liability which may arise as a result of use.

## Polyester, Vinyl Ester and Polyurethane Materials

Impact / Electrical & Fire Safety	Test Description	Units	Polyester Mat/Roving	Polyurethane Mat/roving	Polyurethane Mat/0/90 Fabric	Polyurethane Triax/roving	Polyurethane All Roving
Notched Izod Impact (LW)	D256	ft-lb/inch	20	78	70	62	92
Notched Izod Impact (CW)	D256	ft-lb/inch	5	4	14	35	(.157" sample)
Dart Impact Testing	D3763		test results on 1/8" thick samples				(estimated 1/8")
Time to Peak	"	msec	3.5	3.5	4.5	3.3	3.1
Max Load	"	lbs	740	1040	1420	1720	1100
Max Deflection	"	inch	0.31	0.30	0.38	0.29	0.3
Max Energy at Failure	"	ft lb	11	14	26	21	10
Total Energy	"	ft lb	20	35	52	39	22
Velocity Change	"	%	5.4	7.4	15.6	11.6	5
Total Deflection	"	inch	0.8	0.61	0.93	0.75	1
Max Load Change, 0 - 150F	"	% of avg	52%	17%	12%	11%	----
Max Energy Change, 0 - 150F	"	% of avg	96%	18%	15%	14%	----
Velocity Change, 0 - 150F	"	% of avg	102%	23%	16%	43%	----
Horizontal Burning	D625	---	Self-Extinguishing	Self-Extinguishing	Self-Extinguishing	Self-Extinguishing	Self-Extinguishing
Opt. Smoke Density (Fl.)	E662	Dmax	650	----	----	220	405
Opt. Smoke Density (non-Fl.)	E662	Dmax	----	----	----	250	285
Oxygen Index	D2863-97	% O2	----	----	----	31	40
Flame Resistance (Ignition)	D229-96	sec	----	----	----	60	55
Flame Resistance (Burning)	D229-96	sec	----	----	----	320	320
Flame Resistance (Ignition)	FTMS406-2023	sec	55	----	----	----	----
Flame Resistance (Burning)	FTMS406-2023	sec	30	----	----	----	----
Arc Resistance	D495-99	sec	120	----	----	100	115
Dielectric Strength (PF)	D149-9	V/mil	200	----	----	280	325
Dielectric Constant	D150-98	---	5.2	----	----	5.3	5.2

The data shown was derived from initial test data on developmental products. Creative Pultrusions presents these results as a comparison to polyester 1500 Series products. We assume no obligation or liability which may arise as a result of use.