

# THERMOPLASTICS RESINS

Lightweight, cost competitive and ballistically superior, Barrday's thermoplastic resin based products can be molded into complex 3D shapes and reshaped using high temperatures. Their excellent ballistics properties make thermoplastics ideal for a wide range of applications including stab resistant materials and composite armors. Ballistic panels made using these resins can be used as either as stand-alone structures or in combination with steel or ceramic in personal or vehicle armor.

## FEATURES AND BENEFITS

- Performance: Barrday's specially designed thermoplastic resins offer unsurpassed ballistic performance, on a per weight basis, versus ballistic thermosetting resins. They can be used stand-alone or behind steel or ceramic.
- Shelf-life: thermoplastic resins do not require special storage or packaging and typically have a shelf life in excess of 3 years.
- Processing: thermoplastic resins are easy to work with, do not off-gas, are environmentally friendly, and often can be molded at low or atmospheric pressures.
- Customizable: thermoplastic resins are customizable to give properties such as high temperature resistance, rigidity or good adhesion to HMWPE.
- Tough: these resins offer excellent impact resistance and typically have good environmental resistance and durability.

## PRODUCT FORMS

Barrday's Specialized Thermoplastic resins:

- Are available in powder form, film form, as top coating, or as a prepreg. They are typically supplied as a top coated, double side coated or prepregged fabric.
- Have typical resin contents that range from 10 to 30% on a dry prepreg per weight basis.
- Can be purchased as cast or powder coated films in weights of 15 to 300 g/m<sup>2</sup>.
- Typically come as a standard clear (unpigmented) resin, but colours can be added to certain resins upon request.

## PROCESS INFORMATION

The following guidelines are provided to assist with general recommendations for successful processing. These are meant for starting purposes only, final process parameters will be based on part geometry and manufacturing methods.

	Temperature	Pressure (psi)	Time (min)	Shelf Life
Engineered Rubbers	250 – 280°F (121 – 138°C)	14 – 3000	30 – 60	1 year
Co-Polyamide	360 – 401°F (182 – 205°C)	14 – 3000	30 – 60	Approximately 3 years
Polyethylene	220 – 240°F (104 – 116°C)	150 – 350	20 – 60	
Co-Polypropylene	350 – 380°F (176 – 194°C)	14 – 3000	30 – 60	
Polyurethane Film	210 – 250°F (98 – 121°C)	150 – 350	30 – 60	
CAF	285 – 320°F (140 – 160°C)	150 – 350	30 – 60	
ARG	290 – 330°F (143 – 166°C)	150 – 3000	30 – 60	



## PROCESSING RECOMMENDATIONS

- Place parts in the mold at temperatures less than the melt temperature of the resin.
- Apply pressure and heat based on manufacturing process.
- Hold pressure and heat for recommended cure time at target cure temperature.
- Cooling under pressure is highly recommended prior to removing parts from the mold.

## COMMON ENGINEERED RUBBER CONFIGURATIONS

	Style 1013	Style U471	Style U501	Style U531
Applications	Vehicles	Plates	Plates	Plates
Finished (Coated / Impregnated) Fabric Weight	16.8 oz/yd <sup>2</sup> 568 g/m <sup>2</sup>	8.0 oz/yd <sup>2</sup> 271 g/m <sup>2</sup>	6.6 oz/yd <sup>2</sup> 223 g/m <sup>2</sup>	16.2 oz/yd <sup>2</sup> 548 g/m <sup>2</sup>
Pick Count	17 x 17	N/A	N/A	N/A
Weave Type	Plain	Uni Directional	Uni Directional	Uni Directional
Fiber Denier	3000 Denier (3300 Dtex)	N/A	N/A	N/A
Fiber Type	Aramid	BarrFlex™	BarrFlex™	BarrFlex™
Typical Resin Content	20 ± 2%	14 ± 2%	16 ± 2%	15 ± 2%

## COMMON CO-POLYPROPYLENE CONFIGURATIONS

	Style 1013	Style 1146	Style 1191	Style 1136 & 1174	Style A533
Applications	Helmets and Vehicles	Aircraft, Plate and Helmets	Plates and Low cost armor	Vehicles and Marine	Marine and Car Armor
Finished (Coated / Impregnated) Fabric Weight	15.5 oz/yd <sup>2</sup> 525 g/m <sup>2</sup>	7.7 oz/yd <sup>2</sup> 260 g/m <sup>2</sup>	15.8 oz/yd <sup>2</sup> 535 g/m <sup>2</sup>	30.1 oz/yd <sup>2</sup> 1020 g/m <sup>2</sup>	31.26 oz/yd <sup>2</sup> 1060 g/m <sup>2</sup>
Pick Count	17 x 17	28 x 28	9 x 9	5 x 5	29.5 x 29.5
Weave Type	Plain	Mod-Sentinel®	Plain	Plain or Basket	Mod-Sentinel®
Fiber Denier	3000 Denier (3333 Dtex)	840 Denier (930 Dtex)	5355 Denier (5950 Dtex)	18300 Denier (20330 Dtex)	18300 Denier (20330 Dtex)
Fiber Type	Aramid	Aramid	E-Glass	S2 or S-Glass	S-Glass
Typical Resin Content	13 ± 2%	15 ± 2%	20 ± 2%	20 ± 2%	20 ± 2%



## COMMON ARG CONFIGURATIONS

	Style 1023	Style 1013	Style 1181	Style 1182	Style 1146
Applications	Helmets	Vehicles and Plates	Vehicles and Plates	Vehicles and Plates	Plate, Aircraft and Marine Armor
Finished (Coated / Impregnated) Fabric Weight	7.8 oz/yd <sup>2</sup> 260 g/m <sup>2</sup>	15.5 oz/yd <sup>2</sup> 525 g/m <sup>2</sup>	14.8 oz/yd <sup>2</sup> 500 g/m <sup>2</sup>	14.0 oz/yd <sup>2</sup> 476 g/m <sup>2</sup>	7.6 oz/yd <sup>2</sup> 258 g/m <sup>2</sup>
Pick Count	31 x 31	17 x 17	16 x 16	21 x 21	28 x 28
Weave Type	Plain	Plain	Mod-Sentinel <sup>®</sup>	Mod-Sentinel <sup>®</sup>	Mod-Sentinel <sup>®</sup>
Fiber Denier	850 Denier (940 Dtex)	3000 Denier (3300 Dtex)	3000 Denier (3300 Dtex)	2250 Denier (2500 Dtex)	840 Denier (930 Dtex)
Fiber Type	Aramid	Aramid	Aramid	Aramid	Aramid
Typical Resin Content	13 ± 2%	13 ± 2%	15 ± 2%	16 ± 2%	15 ± 2%

Note: Thermoplastic coated fabric rolls are packaged in sealed black polyethylene film bags to protect them from moisture, UV degradation and other contaminants. The prepreg should be stored in a cool and dry environment and should remain in the sealed bags. When not in use, the fabric should be sealed again in a black polyethylene film bag to minimize moisture absorption and UV damage. Torn bags should be replaced and desiccants can be used as needed. No warranty is expressed or implied regarding the accuracy or use of this data or the use of this product. It is the responsibility of the end user to determine suitability for use.



