

UP781

UP781 is a ultra-high molecular weight polyethylene unidirectional material engineered specifically for lightweight composite armor to protect against high-energy rifle rounds. UP781 consists of four plies of unidirectional product, cross-plied in 0°/90°/0°/90° configuration. Each layer is individually constructed within a resin matrix using Barrday's proprietary UD technology to align the fibers in a parallel direction.

FEATURES AND BENEFITS

- Proprietary thermoplastic resin engineered to maximize ballistic performance versus rifle rounds
- Improved rigidity versus UP771 with lower backface deformation
- Can be autoclaved at low pressures (150 to 200psi) for use with ceramic armor
- Resistant to temperature extremes and moisture
- Molded panels can be readily waterjet cut without abrasive media
- Compatible with other Barrday products for painting UP781 armor or bonding UP781 to other materials

PHYSICAL PROPERTIES

Characteristic	Lower Limit	Target	Upper Limit
Width	63.0 in 160.0 cm	63.3 in 161.0 cm	63.8 in 162.0 cm
Nominal Weight	5.3 oz/yd ² 179 g/m ²	5.5 oz/yd ² 185 g/m ²	5.6 oz/yd ² 191 g/m ²

BALLISTIC PERFORMANCE

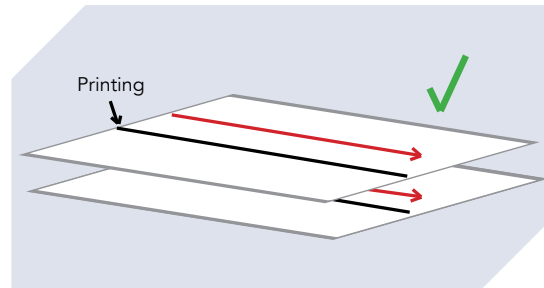
Threat	Layers	Conditioned Areal Density kg/m ² *	Conditioned Areal Density lb/ft ² *	Average V50 m/s**	Average V50 ft/s**
FSP 17gn (0.22cal)	41	7.32	1.5	860	2822
FSP 0.30cal	82	14.65	3.0	1140	3740
M80 Ball on Clay	86	15.6	3.2	970	3182
PS Ball on Clay	86	15.6	3.2	864	2835

The ballistic data listed here is representative of typical results and may be subject to revision. Performance may also vary between different test laboratories.

*Listed values and target areal densities only

** As per MIL-STD-662F. Panels pressed at 3000 psi.

CORRECT LAYUP



Writing on UD should always be face up.
The writing direction can be rotated but not flipped.

PROCESS INFORMATION

The following are general recommendations for successful processing. Adjustments may be required to achieve optimum results in your specific manufacturing environment.

Press Cycle

1. Load Panel into press heated to 215-220°F (102-104°C)
2. Press at 50 to 150psi (3.5 to 10.4 bar), at 220°F (104°C) for 7 to 10 minutes to remove air and moisture
3. Bump-press (if necessary) to allow any moisture present to escape & to prevent blistering
4. Press at 260-265°F (127-130°C) at 3000 psi or above* for 20 to 45 minutes depending on layer count. The panel's centerline temperature must hit ~262°F (128°C) for 20 minutes.
5. Cool Down until center of panel is below 100°F (38°C) – Under full pressure

*Pressure:

Better performance is achieved with higher pressing pressures:

Low: 150 psi (10.4 bar) up to 200 psi (13.8 bar)

High: 3000 psi (207 bar)

Ultra-High: 10 000 psi (690 bar)

Vacuum Bag in Autoclave Cycle

1. Draw vacuum and apply 100 (6.9 bar) to 200 (13.8 bar)
2. 5°F/min ramp to 220°F (104°C)
3. Hold at 220°F (104°C) for 10 to 20 minutes
4. 5°F/min ramp to 260°F (130°C)
5. Hold at 265°F (130°C) for 20 to 60 minutes. The panel's centerline temperature must hit >260°F (>127°C) for 20 minutes.
6. Cool down until center of panel is below 110°F (49°C) - Under full pressure
7. Release pressure and vacuum and demold

General Processing Notes:

- A conditioning pressing-cycle is highly recommended to give better ballistic performance
- Longer press times may help with lower backface deformation
- Longer pressured cool downs to lower temperatures may improve ballistic consistency and reduce delamination

Note:

The data presented herein has been developed under controlled manufacturing conditions. No warranty is expressed or implied regarding the accuracy or use of this data and product. It is the responsibility of the end user to determine suitability for use. Pressing conditions can have a significant impact on ballistic performance. All recommendations are based on limited internal research and Barrday assumes no liability arising from the application, processing or use made of the information provided.