

Processing Guidelines for Honeywell Ballistic Materials Hard Armor Products

Honeywell Gold Shield® Hard Armor Products

Autoclave Process

- Insert thermocouple into center of the stack of material to be processed.¹
- Place assembled material onto caul sheet and vacuum bag.
- Connect vacuum line, pull vacuum, and seal leaks in vacuum bag if required.
- Insert materials in autoclave and close door.
- Ramp autoclave temperature to processing temperature of 250°F (121°C) to 290°F (143°C).
- Monitor autoclave temperature and material centerline temperature.
- Once the centerline of material reaches processing temperature, apply pressure (100 – 200 psi) and hold at temperature under pressure for 30-60 minutes.²
- After 30-60 minutes at pressure and temperature, begin cool down of autoclave under pressure.
- Once the centerline of the material reaches 100°F (38°C), release autoclave pressure.³
- Release vacuum.
- Open autoclave.

Compression Molding Process

- Preheat the platens (or mold) to processing temperature 250°F (121°C) to 290°F (143°C).
- Layup the material to the desired areal density.⁶
- Insert a thermocouple into the center of the stack of material to be processed.¹
- Open the press.
- Place the stack of material (with the thermocouple at the centerline) between the platens.
- Close the platens on the material, applying minimal pressure (this allows the material to preheat).
- Once the centerline of the material stack reaches the processing temperature 250°F (121°C) to 290°F (143°C), apply tonnage and hold under pressure and temperature for 15-30 minutes.^{4,5}
- Cool, under pressure, until the centerline temperature is less than 100°F (38°C).³
- Open press.
- Remove molded sample from press.

Disclaimer: These are general processing guidelines for Honeywell Gold Shield® ballistic materials. Specific process parameters should be optimized for the equipment and materials used by our customers.

¹ Thermocouple may be placed at corner of the panel in the center of the stack. Experiments should be run to determine differences in the temperature profiles of the center of panel compared to corner during processing.

² Both higher and lower autoclave pressures may be employed for the consolidation of Honeywell ballistic materials. Hold times at temperature and under pressure may differ depending upon the areal density of the panel.

³ Production throughput may require removal of material at higher temperatures to be determined by the customer.

⁴ Longer hold times may be required depending upon sample areal density.

⁵ Higher molding pressure may provide improved ballistic performance.

⁶ Adhesive films may be used on outer surfaces of the panel to improve surface appearance, durability, and adhesion.