

PROCESSING GUIDELINE

Tepex® dynalite x08

TPU Consolidated Composite Laminate

1. General Remarks

Bond-Laminates develops and sells Tepex® as a technical semi-finished product. There are acceptable technology related blemishes within the polymer surface or slight process-related variations of the surface appearance. These surface blemishes and variations will disappear within a thermoforming process with suitable process- and part-specific parameters.

2. Storage / Handling

Storage time: Unlimited

The material is provided in sealed packages. In order to prevent moisture condensation on the cold sheet surface the sealed packages should be stored in the working area until a temperature equilibrium is reached. Prolonged direct contact with water should be avoided due to the matrix polymer's hygroscopy. The use of dust masks and ventilation whilst cutting, milling, drilling etc. is advised.

3. Heating

Forming temperature: 160 °C - 220 °C (320 °F - 430 °F)

Heating cycles should be short to avoid polymer oxidation (brownish surface color).

Preferred method: Heating via middle wavelength IR-radiation. Best results are obtained when heating power is controlled as a function of sheet surface temperature via pyrometer. Two sided heating should be applied starting from a material thickness of 1,0 mm to ensure a homogeneous temperature distribution over the sheet thickness.

Contact heating is feasible when a separate release film is applied. This release film has to be transferred to the forming process to prevent fabric distortion during peeling of the release film from the molten laminate surface.

Heating via convection oven is feasible but not recommended due to inefficient heat transfer. Long heat cycles may lead to excessive oxidation of the surface and material degradation.

4. Sheet Transfer

The sheet should be transferred within seconds.

Circulation of cool air in the processing environment may reduce the sheet temperature drastically and can lead to a reduction of fabric formability and the appearance of wrinkles on the formed part. Manual transfer is not recommended as it may cause significant fabric distortion and irreversible damage to the polymer surface due to unsuitable equipment or undefined contact forces. For obtaining maximum processing stability an automated handling system is recommended.

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5. Press Forming

Forming pressure: > 5 bar / 70 psi

The recommended closing speed of the press is at least 50 mm/s and should be reduced to approx. 5 mm/s during the last step (10 mm) of the tool path. Local clamping forces should be applied to prevent fabric wrinkling during molding. The optimal closing speeds, necessary clamping forces and the clamping positions depend on the fabric type, the material thickness and the complexity of the part.

While heating multi-layered Tepex® sheets, thickness may increase ("lofting"). During forming - providing a suitable mold cavity - a lofted sheet will be recompressed to its original thickness.

6. Cooling & Rapid Heating/Cooling

Demolding Temperature: ≤ 60 °C (140 °F)

Homogeneous pressure distribution over the surface of the Tepex® sheet is necessary for a controlled cooling cycle and subsequent uniform surface quality.

The mold temperature should both guarantee good formability and stable product extraction. Forming may take place in aluminum or steel molds held at static demolding temperature; for aesthetic applications a rapid heating/cooling cycle is recommended.

Cooling time depends on material thickness, max. mold temperature, demolding temperature and the mold materials. Usual cooling times can be expected between 20 - 60 s.

® Bond-Laminates registered trademark

The values in the datasheet are for this specific composition only, the characteristics of composites depend on the reinforcement level and the fiber orientation. Non-standard thickness may also alter some or all of these properties. The data listed here fall within the normal range of product properties, but they should not be used to establish specification limits nor used alone as basis of design.

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