

Guide to 3D Laminates for Specification

3D Laminates are used today all around the world for all types of case goods, kitchens, store fixtures, furniture, wall panels, and more; and, in numerous environments such as multi-family residential, retail fixtures, hospitality, office, and healthcare. 3D laminates provide designers of commercial and residential interiors flexibility to design furniture, fixtures and cabinetry in a variety of shapes without seams or edge-banding, and can be formed around contoured edges and corners giving the appearance of solidity. For the specifier who would like to utilize 3D Laminates in their respective project, understanding the basic materials involved in the 3D Lamination process will help to ensure a successful specification.

Basic Materials Involved in Manufacturing 3D Laminated Components:



CNC Routers are used to create contoured edges, corners and 3D profiles in preparation for 3D Lamination

1. **MDF (medium density fiberboard).** MDF is a substrate consisting of double-refined, 100% recycled wood chips for superior surface quality. The surface is sanded and polished on both sides during the manufacturing process; one side is thermally fused with a melamine-coated paper, and the other side is kept "raw" to which the 3D Laminate is then applied to by vacuum press. When specifying, you may choose standard door-core quality MDF, or you may choose urea-formaldehyde free door-core quality MDF to achieve LEED points. Examples of manufacturers of this door core quality of MDF are Flakeboard, Roseburg, Sierra Pine, etc. Every press manufacturer has their own preferred supplier of door-core quality MDF based upon their geographical location, supply, type of machinery used, etc.

2. **Waterborne Polyurethane Adhesive.** Is designed for membrane/vacuum pressing 3D Laminates to MDF to create heat resistance and bond strength. This adhesive is a base adhesive mixed with a hardener, and is typically applied using an HVLP spray system. Also, being water-based, the adhesive will help achieve LEED points.



Spraying the MDF with Water-Based Adhesive



3D Laminate Rolls

3. **3D Laminates.** A flexible, thermoformable laminate supplied in rolls that are typically 57" wide x 219LY length, designed to be used in a vacuum or membrane press. Material is offered cut-to-size depending on the job size. Due to its thermoforming quality, 3D Laminates may be formed over curves and shapes. There is no need for edge-banding as the 3D Laminate will form over the edge of a component, essentially becoming the edgebanding itself, though without any seams. 3D Laminates also offer superior Impact Resistance.

4. Press Machines (Vacuum & Membrane). There are two primary type of machines used in the thermoforming process. A vacuum press utilizes light bulbs as a heating source and relies solely on a vacuum pressure from below to pull the 3D Laminate into the crevices and grooves of the MDF component. A membrane press uses a heating element on top (upper platen) which transfers heat to a silicone membrane, which is then inflated to “push” the 3D Laminate into the MDF components, thus transferring the heat and applying pressure into the routed crevices and grooves.



Thermoforming Vacuum Press

5. The Pressing Process. The MDF is cut using a CNC router to create the shape, edge type, etc of the desired component. The water-based polyurethane adhesive is then applied using a HVLP spray system to the routed MDF component. The sprayed MDF components are then stored to dry for a minimum of 20 minutes prior to press activation. The sprayed doors are placed onto the tray of the press machine and the 3D Laminate are then pulled over top the tray ensuring that the rubber gasket seal is covered to guarantee proper vacuum during pressing. Typical pressing time is 30 seconds to 4 minutes, with an adhesive temperature of 130 – 176F. The tray then slides out, the components are cut out, and any over-spray or residue is cleaned from the back of the door. The 3D Laminate components are now finished and ready for installation.

A Finished 3D Laminated Component

