

Core Guide for Hardwood Plywood

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Particleboard (PBC) – Raw PBC is composed of multiple layers of refined wood particles which vary in size from the outside into the center all bonded together in most cases with urea formaldehyde resin. PBC is the least expensive of the core options for hardwood plywood construction, offering a smooth, void-free surface for veneer lay-up. PBC is very uniform in thickness and density, providing tight thickness tolerances. PBC is one of the heaviest core options for hardwood plywood construction. Weight on a 3/4" panel can be as much as 100 lbs. PBC has the least amount of structural (spanning) strength compared to the other core options. This core is subject to the greatest amount of expansion if exposed to moisture. PBC is a preferred core for fixture and low-end furniture applications including Ready-To-Assemble (RTA) furniture. It is also used in selected kitchen cabinet components. There are phenolic-bonded particleboard products which eliminate added urea formaldehyde resin available in the market at a premium. Currently there are no fire-rated, through-treated particleboard cores on the market that are urea-formaldehyde free.



Medium Density Fiberboard (MDF) – MDF is made in a production process similar to PBC except the all of wood particles throughout the board are uniformly refined to a very small size (think sawdust.) MDF offers great stability and is the least likely to react when subjected to a measurable change in temperature or humidity. It offers a very smooth, void-free surface for veneer lay-up. MDF has greater strength & screw holding properties than particleboard. Like PBC, MDF is the other "heavyweight" which, like particleboard, requires two people (or a lift truck) to maneuver around the shop. MDF is used in cabinets, furniture, fixtures and moulding. MDF is highly recommended for thin panel applications such as door inserts for cabinets & paneling. Like particleboard, most MDF is manufactured with ureaformaldehyde resins. There are several no added urea formaldehyde resin MDF products which utilize either polymeric methyl diphenyl isocyanate (MDI) adhesive or phenolic resin available at a premium. Currently, there are no fire-rated, through-treated MDF cores on the market that are urea-formaldehyde free.



Standard Veneer Core – Made with all veneer core inner plies. In North America, the innerply species are usually soft wood on the west coast and poplar or aspen on the east coast. Veneer core panels are relatively light in comparison with composite panels, typically weighing between 70-72 lbs per panel (which can be moved around a cabinet shop by one person.) Veneer core offers great strength and stability with better spanning properties than either PBC or MDF. Since the cellular structure of the wood is still intact within the panel, veneer core does have a wider variance in thickness in comparison with highly engineered PBC or MDF. This thickness variation is not compatible with some of today's more sophisticated high-volume production methods. Additionally, this core is not as forgiving with today's thinner face veneers; core transfer is a possibility after end user performs secondary sanding and finishing. For high-end, plain sliced woods, HXB (hardwood) or IXB (tropical) cross bands are recommended to prevent core telegraphing. Standard veneer core construction is a retail/do-it-yourself (DIY) favorite with mass merchants.



Combi-Core Panels – Constructed of veneer core inner plies with particleboard or MDF crossbands. Offers similar strength and stability to veneer core but has the void-free surface quality of PBC. (Veneer core inner plies with MDF outer crossbands shown here.) Excellent substrate for the thin sliced woods & even rotary woods, reducing the potential for core transfer. Combi-core panels tend to offer more consistent tolerances than standard veneer cores.



Multi-Ply Panels – This is a specialty all hardwood "European style", high-ply-count veneer core blank. It can be either all birch or composed of alternating birch & alder veneer inner plies. This core is often used for decorative applications where the panel edge is revealed. Applications include drawer sides, children's furniture, fixture components, & other exposed core profile applications. Most of the multiply panels on the market today have added urea formaldehyde. Phenolic bonded panels are available in some cases, but the color (dark brown to black) of the glueline between core veneers interferes with the clean edge appearance of this product.