

# Cabinet Materials and Construction

## **Materials**

Most of us think of kitchen cabinets as being made out of wood and that's true for the most part. But don't think that it's all "solid wood" like the lumber used to frame a house. There are other materials that go into the construction of cabinets. Some are wood-based but others are not.

Here's a list of the primary cabinet materials you'll encounter:

- **Solid wood** - just as the term implies, it's solid homogeneous wood, all the way through. The only variation might be boards or panels that are several pieces of solid wood joined together.

- **Particle board** - an engineered wood product that's made from wood chips and particles that are combined with an adhesive and fused together into boards and panels. Particle board makes up a large percentage of the materials used in today's cabinetry, from the panels that make up the boxes to shelving.



- **Medium density fiberboard (MDF)** - another engineered wood product that's made up of wood fibers. The fibers are combined with an adhesive under pressure and formed into boards and panels. MDF has a finer texture than particle board and is denser and heavier than particle board. It's used in cabinet doors, shelves and cabinet boxes.

- **Plywood** - yet another engineered wood product but one that's probably most familiar to people. It's made up of thin wood "plies" or layers of wood that are glued together in a sandwich form. Usually the plies are oriented with their grain direction at varying angles with respect to each other to give the board or panel more rigidity and stability. Plywood is used for shelving, doors and cabinet boxes.



## Editor's Comment

You'll typically see plywood as an upgrade (and corresponding up-charge) from particle board or MDF from many cabinet makers. Or sometimes the plywood cabinet boxes are only in the manufacturer's higher-end product lines.

Also, be watchful for the terms "solid wood" or "all wood" as it pertains to cabinet construction in a manufacturer's literature. "Solid wood" should represent whole, uniform lumber, not a fabrication or wood composite, like particle board, MDF or even plywood. "All wood" is slightly different in that it usually means all-plywood construction or a combination of plywood and solid wood.

The point is, just be sure when you encounter these terms that you're clear on whether it's truly "solid wood" or plywood so you don't run into any surprises.

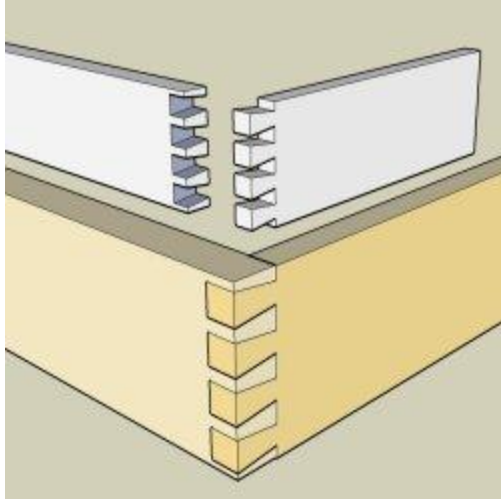
- ***Stainless steel/metal*** - yes, not to be outdone, stainless steel is used to make complete cabinets though it's much less prevalent than wood cabinetry. There are whole cabinets (boxes and doors/drawers) made from stainless steel and there's also some manufacturers that produce stainless steel doors for wood cabinets.
- ***Plastic laminate*** - this is virtually the same material that's used on laminate countertops although it's usually thinner when used on cabinets. It's basically a plastic product, formed by fusing paper and plastic resin together under heat and pressure. Laminate's used for covering cabinet boxes and/or doors to provide a easily-cleaned surface.
- ***Melamine*** - another plastic-based product that's also used to cover cabinet surfaces. It's a popular material for covering particle board panels that are used in making cabinet boxes. One type of construction you may see involves cabinet boxes made with melamine and wood veneer over particle board. The melamine is on the inside part of the cabinet and the wood veneer is on the outside of the cabinet box.
- ***Thermofoil*** - a thin vinyl film that's used to cover cabinet boxes, doors and drawer fronts. The vinyl usually starts as a rigid film that's then heated and formed over the substrate material (such as cabinet door made from MDF). You'll usually encounter the term "thermofoil cabinets" which implies cabinets that are covered with the thermofoil material (the base material will usually be one of the engineered wood products).

## Construction Methods

Cabinet construction methods will vary based on manufacturer and the level of quality you pay for. There's no need to become a master carpenter to be an informed cabinet buyer but there are some terms and construction techniques that you'll probably encounter, even if it's just browsing a cabinet maker's brochure or website.

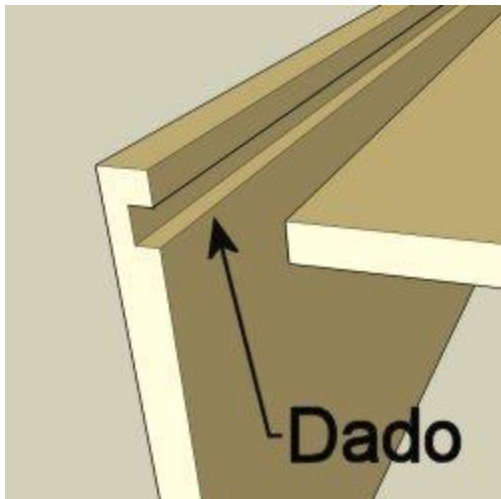
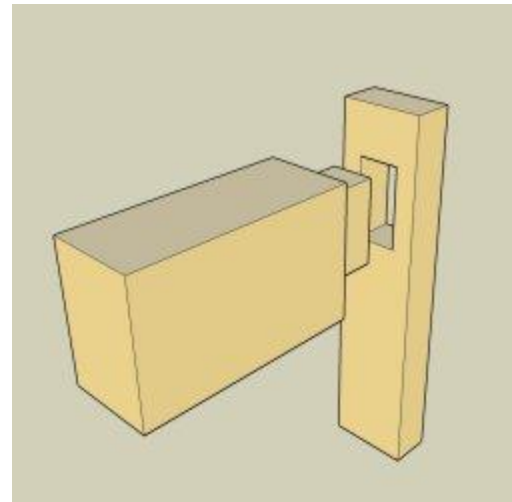
The important thing to take home about cabinet construction methods is that there is a relationship between the type of construction and the cabinet's level of quality and durability.

The following terms describe some common methods of wood cabinet "joinery" ('joinery' just being the trade term for how the various wood parts are joined together):



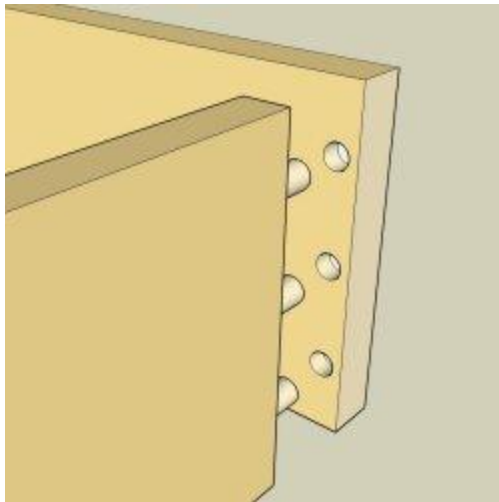
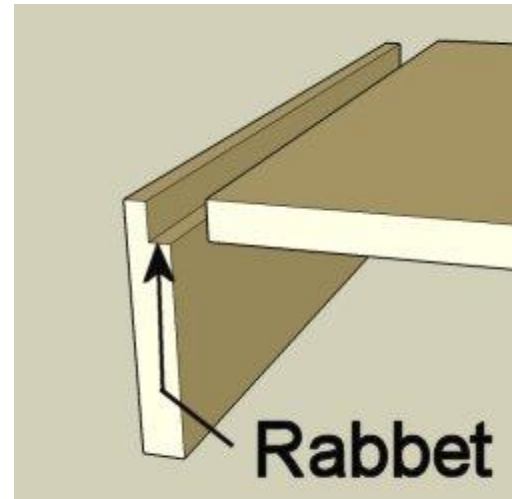
**Dovetail joints** - this is a strong method of joining two boards together at right angles, such as with drawer boxes. The ends of two boards or panels are notched with v-shaped cutouts that mesh with corresponding notches on the adjoining panel. If they're tight, these types of joints are considered very solid.

**Mortise and tenon** - another form of joinery, this method uses a square "post" protruding from one end of a piece of wood that fits into a square hole or cutout in the mating piece. This type of joinery might be used to fasten the pieces of a cabinet's face frame together.



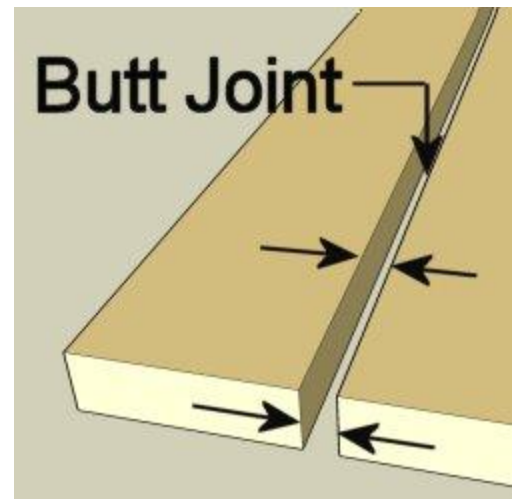
**Dado** - this is a groove that's cut into a board or panel that the edge of another board/panel can fit into. A good example is the sides and back of a cabinet drawer that are dadoed to accept the edges of the drawer bottom. It's a stronger way to 'capture' the drawer bottom than just gluing or nailing the drawer bottom edges to the side panels.

**Rabbet** - this is not the kind that Elmer Fudd chases but rather, a notch or step that's cut into the edge of a board to accept the edge of another board to form a 90-degree angle. It's similar to a dada cut except one side is left "open".



**Doweled joint** - this joinery technique uses round wood dowels (pegs) that are pressed and/or glued half way into holes drilled into one piece of wood. The protruding part of the dowel is then fit into holes drilled into the mating piece of wood. This method is another way to join the sides of drawers or cabinet boxes together.

**Butt joint** - on a butt joint, the ends of two pieces of material are brought or "butted" together, edge to edge. Some form of mechanical retention like nails, screws or glue is needed to hold this joint together.



- **Nails, screws, staples, glue** - while these aren't classified as true wood 'joinery' techniques, they're included because they're also used in a lot of cabinet construction. They either reinforce the wood joinery techniques or they're used alone which makes for less-sturdy construction.

The bottom line on cabinet construction methods is that good joinery techniques where the parts 'lock' together or where one piece is captured in the other makes for the strongest joints. Supplemental fastening methods on these joints (such as a mortise and tenon joint plus screws) makes an even stronger connection. Stronger joints equate to more durable cabinets.

## **Cabinet Boxes And Face Frames**

- ***Materials***

Cabinet boxes are made from particle board, MDF or plywood. Solid wood panels normally aren't used to construct the cabinet box except for the face-frame on framed cabinets. Panels made from these wood products are usually covered in either a wood veneer, plastic laminate/melamine or thermofoil.

Stainless steel is another material used to construct cabinets though it's much less prevalent than wood. Stainless steel cabinetry provides a novel look and depending on the setting, resembles professional kitchens. On the plus side steel won't expand and contract like wood will in a kitchen environment. One of the down sides is the challenge in keeping the cabinets free from fingerprints which can be tough to clean.

- ***Construction***

The cabinet box is essentially just that - a box. The key point to understand here is that there are several methods used to reinforce the box and make sure it remains rigid. One means of reinforcing the cabinet box involves the use of triangular braces in the corners of the box. They're made from either particle board, MDF, plywood, solid wood or plastic. Another reinforcing feature uses an "beam" brace that runs from the front of the box to the rear on the inside of the side panels or along the back from side to side. The beam brace usually fits in a dado slot in the side panel.

## **Drawers**

- ***Materials***

Cabinet drawers are predominantly made from the same materials that are used to construct the cabinet cases such as particle board, MDF, plywood and solid wood. On higher quality drawers more of the drawer parts tend to be made of solid wood to stand up the abuse from more frequent opening and closing. On stainless steel cabinets the drawers are made from stainless steel. Some cabinet manufacturers offer options for metal drawers on their wood cabinet lines. These drawers are coated with an epoxy coating.

Drawer fronts, the part of the drawer that you see, tend to be made from solid wood or MDF that's either painted or covered with thermofoil.

- ***Construction***

The way a drawer is built plays a large role in its durability and longevity. The drawer box is made up of two side panels, front and back panels and the bottom. Most cabinet drawers have a separate front piece that's attached to the front drawer-box panel although on some drawers the drawer front and front panel are the same piece.

The parts that make up the drawer box can be assembled in several ways. Dovetail joints that are tight form the strongest connection at the corners of the drawer. Doweled joints where one side of the drawer box has dowels installed on one end that fit in holes in the mating panel end is another form of joinery. Drawer bottoms that fit into dado slots in the drawer slides are stronger than bottoms that are just nailed and/or glued to the bottom of the drawer box. Glue, small nails and staples are also used to fasten drawer parts together.

## **Doors**

- ***Materials***

Cabinet doors, except for stainless steel cabinets, are made from solid wood or one of the engineered wood products (particle board, MDF, plywood). Engineered wood doors are covered with a wood veneer, laminate or thermofoil.

One of the benefits of MDF is that it can be routed and cut, similar to solid wood, with better results than particle board which is less dense and tends to chip. This feature allows MDF to be formed with a smooth finish to resemble raised-panel doors. The only drawback however is that unlike solid wood, MDF can't be stained (it has no grain) so it has to be painted or covered in thermofoil.

- ***Construction***

There are two basic types of cabinet door construction - framed and slab. Framed doors are made up of an outer frame that is built around a panel in the center of the door. The edges of the panel fit into slots milled into the inside edges of the frame and are allowed to "float" within the frame to allow for normal expansion and contraction of the wood. Raised panel doors are a common variety of the frame door style.

Slab doors don't have the separate parts like a framed door and are usually one-piece construction or the combination of several solid pieces of wood glued and joined together to form a solid slab. Slab doors made from plywood or MDF are covered in a veneer, laminate or thermofoil covering.

## **Shelves**

- ***Materials***

Cabinet shelves are made from one of the engineered wood products - either plywood, MDF or particle board. Regardless of which material is used they're normally covered with another material such as a wood veneer or laminate ply.

- ***Construction***

There really isn't much to a cabinet shelf's construction except for the mention of thickness and whether it's built with a reinforcing rail. Beyond that we're just talking about straight boards made out of one of the materials mentioned above.

Shelf thickness varies based on cabinet manufacturer and the particular product line (often equating to the level of quality) within a certain brand. Shelf thickness ranges from 1/2" to 5/8" to 3/4" thick. Obviously thicker is better when it comes to longer shelves on wide cabinets in order to avoid sag.

The reinforcing rail is an additional strip of wood that's attached to the front edge of a shelf. It provides added rigidity which is especially helpful in avoiding sag, particularly on long shelves. It's a worthwhile feature if you can find it but it's not a prevalent feature on many manufactured cabinets.

One additional aspect about cabinet shelf construction lies not so much with the shelf itself but how it's held in the cabinet box and whether or not it's adjustable. Shelves are held in place with a variety of hardware that come in different sizes and materials (metal or plastic).