Tips & Projects

The Simple Math of a Raised Panel Door

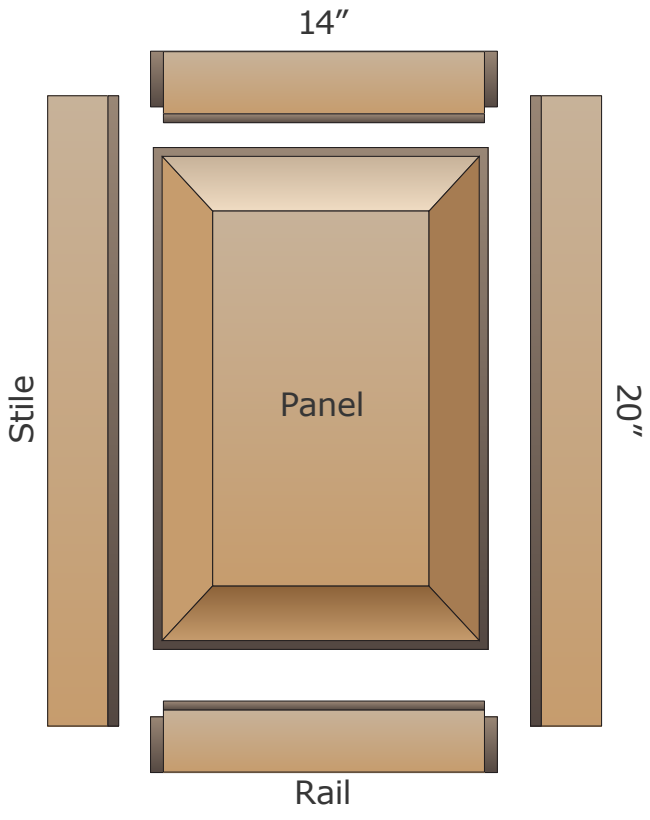
For many of you, making raised panel doors has become a regular part of your woodworking skill. The part that still might scare you though is sizing your parts.

A typical raised panel door has 5 parts and they are: Stiles, or the sides of your door; Rails - the top and bottom of the door; and the panel itself.

If your calculations are off on any of these parts your door either won't fit together or it will be sized wrong for the project.

The daunting task of trying to figure out the math for all of these parts will never be a burden again.

First, start with the actual size of the door needed to fit the project. Keep in mind any hardware that you will install to hang the door, or if it will become a structural part of a cabinet such as a side wall or back.



Using a door that is say, 14" x 20" as an example - we will now take the mystery out of the math...

Hint...

Recreate this handy chart.

Fill in all of the numbers that you don't have to think about first. Such as the length of the stiles - they're always the full length of your door from top to bottom. In our case here, the stiles are 20".
The thickness of your stock for the rails and stiles on a typical raised panel door is 3/4".

	Length	Width	Thickness
Stile			
Rail			
Panel			

The panel is a bit different. If you are using a raised panel cutter with a back-cutter the your stock can be 3/4". If your panel cutter has no back-cutter, but has a bearing on top, your stock should be 5/8".

Finding 5/8" stock that is already dressed is very difficult. This is why I prefer using a bit with the back-cutter. This is especially handy because many stores only carry 3/4" stock, and if you don't own a planer to dress it down to 5/8", the search may take longer.

	Length	Width	Thickness
Stile	20"		3/4"
Rail			3/4"
Panel			3/4"

Now for the fun part...

Determine the depth of cut that your stile and rail cutter cuts on your cope and bead. The stile and rail cutters that I am using are 7/16" deep from the edge of the groove cutter to the bearing.

A great starting point for your rail and stile width is an even 2". Using the 2" as a finished width, add the depth of the stile and rail cutter to this width, making your total stile and rail width 2 7/16" wide. Fill this number into your chart.

	Length	Width	Thickness
Stile	20"	2 7/16"	3/4"
Rail		2 7/16"	3/4"
Panel			3/4"

Next we need to determine the length of the rails. This drawing shows how the cope and bead cut fit together. Notice how the end of the cope cut fits perfectly into the side of the bead cut.

The cut piece of each board becomes a part of the other board, so the 7/16" negates itself - leaving you with only 2" (or a whole number) to subtract from your overall length. If the width of our door is 14" and we remove 2" from the left stile and 2" from the right stile, we are left with a final rail length of 10".

	Length	Width	Thickness
Stile	20"	2 7/16"	3/4"
Rail	10"	2 7/16"	3/4"
Panel			3/4"

Next: the panel length and width...

Using the same 2" from our stiles and rails, we also know the length of the door is 20" . Subtract the 4" from the rail on top and bottom and this leaves you with 16".

	Length	Width	Thickness
Stile	20"	2 7/16"	3/4"
Rail	10"	2 7/16"	3/4"
Panel	16"		3/4"

We know the width of the door is 14". Again, simply subtract 2" from the left and right stiles - leaving you with 10".

This is the fastest and easiest way of getting the numbers that you need for cutting all of the parts for a typical 5 part raised panel door.

	Length	Width	Thickness
Stile	20"	2 7/16"	3/4"
Rail	10"	2 7/16"	3/4"
Panel	16"	10"	3/4"

SIMPLY ROUTING by Mark Eaton

Make room for wood expansion...

The only number I would change would be the width of the panel itself. Since wood is always expanding and contracting, we need to make the panels a bit narrower to allow for this. I rip my panel stock 1/4" narrower than the overall total. This would then give me a final width of 9 3/4" for my panel part, which allows for a 1/8" expansion and contraction space on either side of the panel.

	Length	Width	Thickness
Stile	20"	2 7/16"	3/4"
Rail	10"	2 7/16"	3/4"
Panel	16"	9 3/4"	3/4"

Some stile and rail bits have cut depths of 3/8", 1/2" or 9/16". Just remember to add this amount to the width of your stiles and rails, i.e. 2 5/8" or 2 9/16", this will always give you a whole number to subtract rather than having to use a fraction.

Even if your door width were 15 13/64" wide, the rail length would be 15 13/64" minus the 4" in the stile widths for a total of 11 13/64".

Making your stile and or rail widths wider has no effect on this math. For example, a 4" wide stile and rail on a 14" wide door would make the length of the rails 14" minus 8" (stile width) for a total of 6" long rails.

If you don't like doing the math there is software on the market that will do it for you.
Oak Park Enterprises of Manitoba, sells a software package called *Pro Door*. This software includes 13 different styles of doors with 6 different species of wood.
It renders in 3 dimensions and allows you to align grain patterns so you can see how your door will look before you even cut the first piece.

Making the raised panel doors is the easy part and now so is the math to get you there.

Have fun!

Mark Eaton