

Steps for Building the No. 14 Chair

This chair can be made using green wood split from a log, but as I only build it from air dried and kiln dried these basic instructions will follow the processes involved in the latter.

1. Steam bending
If boards are rough-sawn, skim them with a plane or on a jointer so grain is visible on all 4 surfaces of the board. The parts for steam bending (arm bow and crinoline) are best cut from the board edges where, if the board is flat-sawn, the annular grain will be visible on both top and sides making it easier to see if you are maintaining continuous grain which is critical for successful bending. Cut these components on the bandsaw as this will allow you to follow the grain. It doesn't matter if you end up with a bowed or slightly wiggly shape. The priority here is to maintain continuous grain for strength and bendability. Be sure to prepare extra of both arm bows and crinolines to allow for any failures during the bending process and to give yourself the chance to dial in your steam bending.

Size down and shape the arm bow and crinoline in preparation for steaming. At this point I soak the components, completely submerged, in water for a few days. Adding moisture will help conduct heat through the wood.

Build bending forms.

Steam parts for at least an hour (longer for kiln dried). This time can vary between species. Some need more, others less. Having prepared several pieces will allow you to discover the ideal steaming time. I use a compression strap for my bends.

Once bent and parts have cooled, transfer to drying forms to allow air to flow over all surfaces of the bend. Leave out overnight before placing into a drying box. Mine is a simple form-ply box heated by a small oil heater. Drill holes in the top for the moist air to escape through.

2. Mill components for legs and spindles oversized for turning but cut to length.

3. Turn legs and spindles to final dimensions. Turn the 6° taper into the leg tops.

Take great care when turning the spindle tenons to size. Check them repeatedly until they fit tightly into a testing block drilled with the different mortice sizes.

4. Mill seat blank and laminate if seat is more than one piece. Once cleaned up and sized to finish thickness, use template to mark in the position of mortices and drilling sightlines. Drill mortices and depth guide holes in seat.

Flip seat and ream mortices until legs fit to the end of turned taper (see illustration above).

5. Carve seat starting with the deepest section of the seat, known as the bowl. When bulk of material has been removed, cut seat outline on bandsaw. Clean up milled edge with a spokeshave. Flip seat and remove material for the undercut; this can be achieved with a drawknife followed by spokeshave.

Continue with seat top until full shape has been roughed in.

6. House legs into seat, orienting grain so legs and seat expand and contract in the same direction. Mark leg mortices for the crinoline and rear stretcher tenons, then drill.

7. Size tenons of crinoline to fit the leg mortices then assemble. Mark mortice position on the crinoline for the rear stretcher, then drill. Measure the lengths of the 2 stretchers then mill, turn them and fit the tenons to the mortices.

8. Dismantle the undercarriage with care (I use a soft-blown mallet). Cut kerfs perpendicular to the seat grain into the leg tops, then cut kerfs into the rear stretcher tenons that will run through the crinoline to take wedges once assembled.

Make wedges then glue the rear stretchers into the crinoline and drive the wedges in. Clean up glue then flush trim the through tenons once glue has set.

9. Glue and assemble the legs to the crinoline/stretchers. Place the assembly into the seat without glue and allow the undercarriage to set in place. Once set and glue cleaned up, remove the assembled undercarriage from the seat, apply glue to both the seat mortices and leg top tenons then reinsert into the seat and make sure they are firmly housed before turning the seat over and driving the wedges into the leg top kerfs. Trim the leg tops and finish the seat carving to refinement.

10. Remove arm bow from the drying box on day 5 or 6. Cut in the top arm taper and the 25° face taper. Cut arms to length and shape in the undercuts at the ends.

11. Drill spindle mortices and dry fit spindles into both seat and arm bow.

12. Glue spindles into the seat. Clean up glue. Make wedges for the 4 side spindles which are through tenons. You can cut kerfs into these in situ, or use a chisel to start them once the arm bow is in place. Glue the arm bow in place then drive in the wedges. Trim the tenons and refine arm bow, softening edges, etc. Prepare for finish.

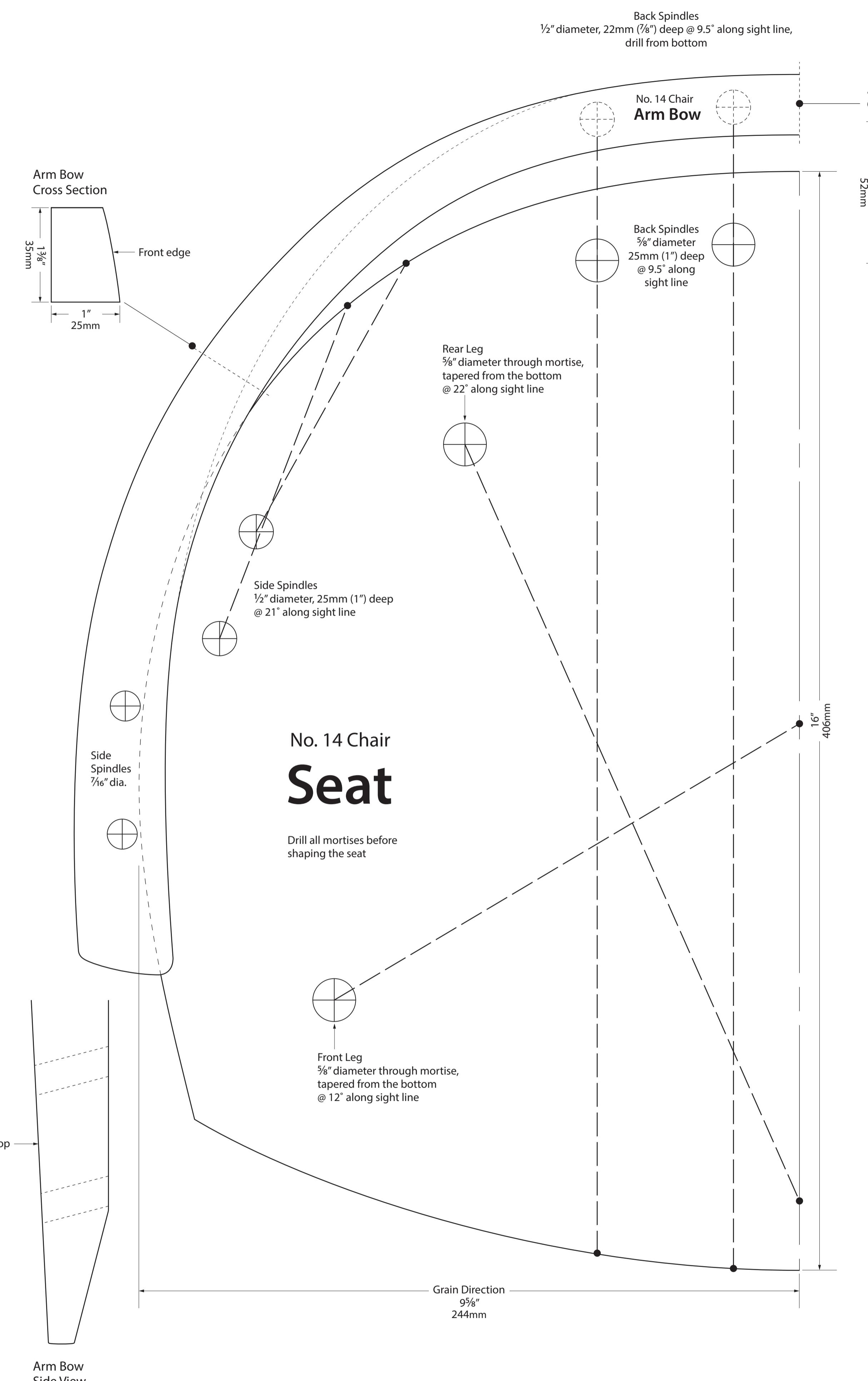
Parts List

Buying timber: I have used kiln or air-dried Victorian blackwood, American white oak, ash and walnut for this chair. Select straight grained boards with continuous grain visible on both planes (top/bottom and sides).

	Rough	Final
Legs	4 1 3/4" x 1 3/4" x 21" 45mm x 45mm x 533mm	1 1/2" x 1 1/2" x 20 1/4" 38mm x 38mm x 514mm
Side Spindles	4 1" x 1" x 12" 25mm x 25mm x 305mm	1 1/16" x 1 1/16" x 11 5/8" 17mm x 17mm x 295mm
Back Spindles	4 1" x 1" x 12" 25mm x 25mm x 305mm	3/4" x 3/4" x 11 5/8" 19mm x 19mm x 295mm
Rear Stretchers	2 1" x 1" x 7 1/2" 25mm x 25mm x 190mm	3/4" x 3/4" x 6 7/8" 19mm x 19mm x 175mm
		Approximate length — adjust to final length after measuring once mortices have been drilled and legs and crinoline are in situ
Crinoline Stretcher	1 1 1/8" x 1 1/8" x 26" 29mm x 29mm x 660mm	1" x 1" x 24 3/4" 25mm x 25mm x 630mm
		final length for bending
Arm Bow	1 2 1/4" x 2" x 48" 57mm x 51mm x 1220mm	2 1/4" x 1 3/4" x 47 1/4" 52mm x 35mm x 1200mm
		final length for bending
Seat	1 19 1/4" x 16 1/2" x 11 5/8" 502mm x 419mm x 46mm	19 1/4" x 16" x 13 1/4" 489mm x 406mm x 45mm
		Grain direction runs side-to-side along the 19 1/4" (489mm) dimension

Measurements for rough dimensions are approximate

Title: No. 14 Chair — Templates		
Design by: Bern Chandley	Drawn by: Jeff Lefkowitz	
Scale: FULL/1:1	Page: 2 of 4	Paper Size: A1 841mm x 594mm
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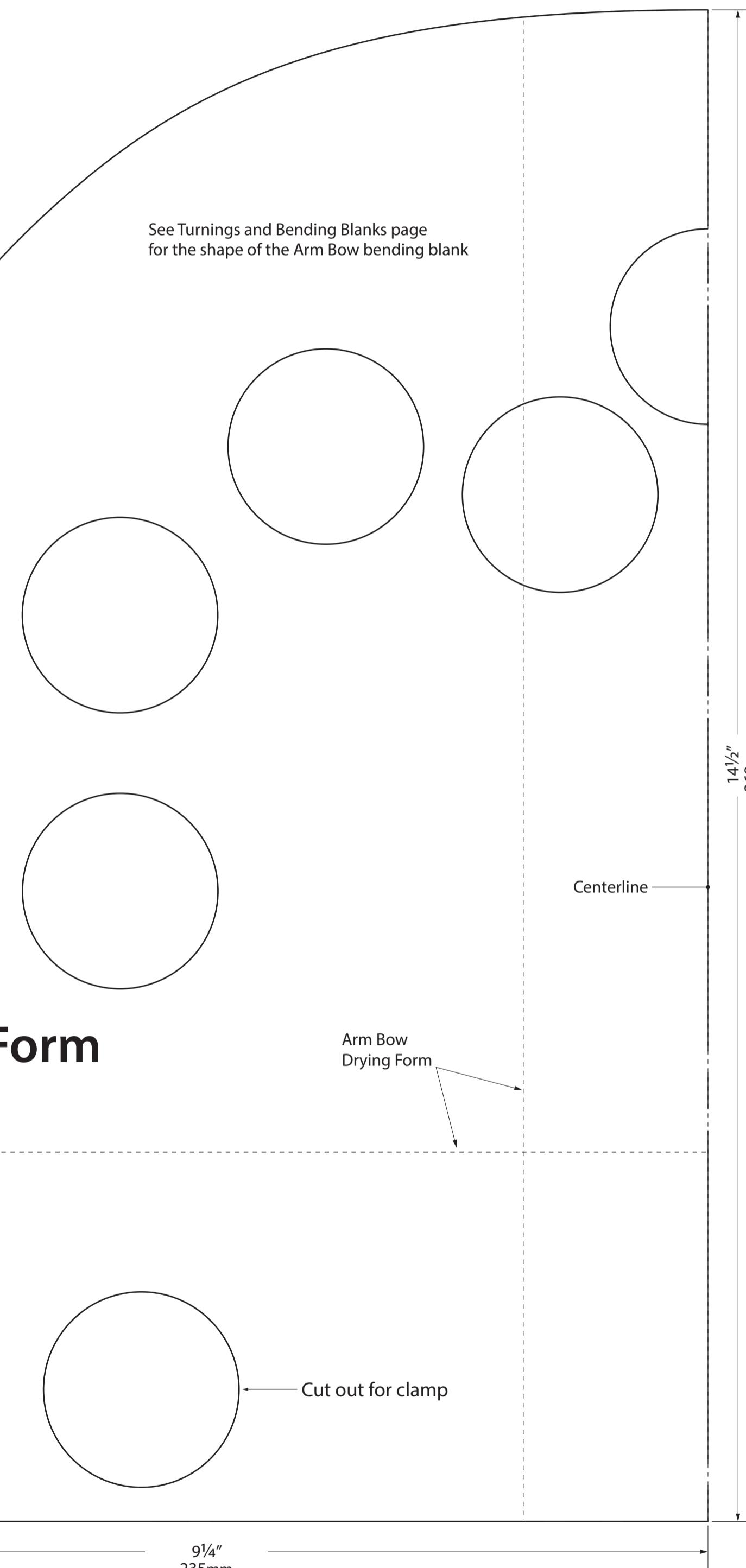
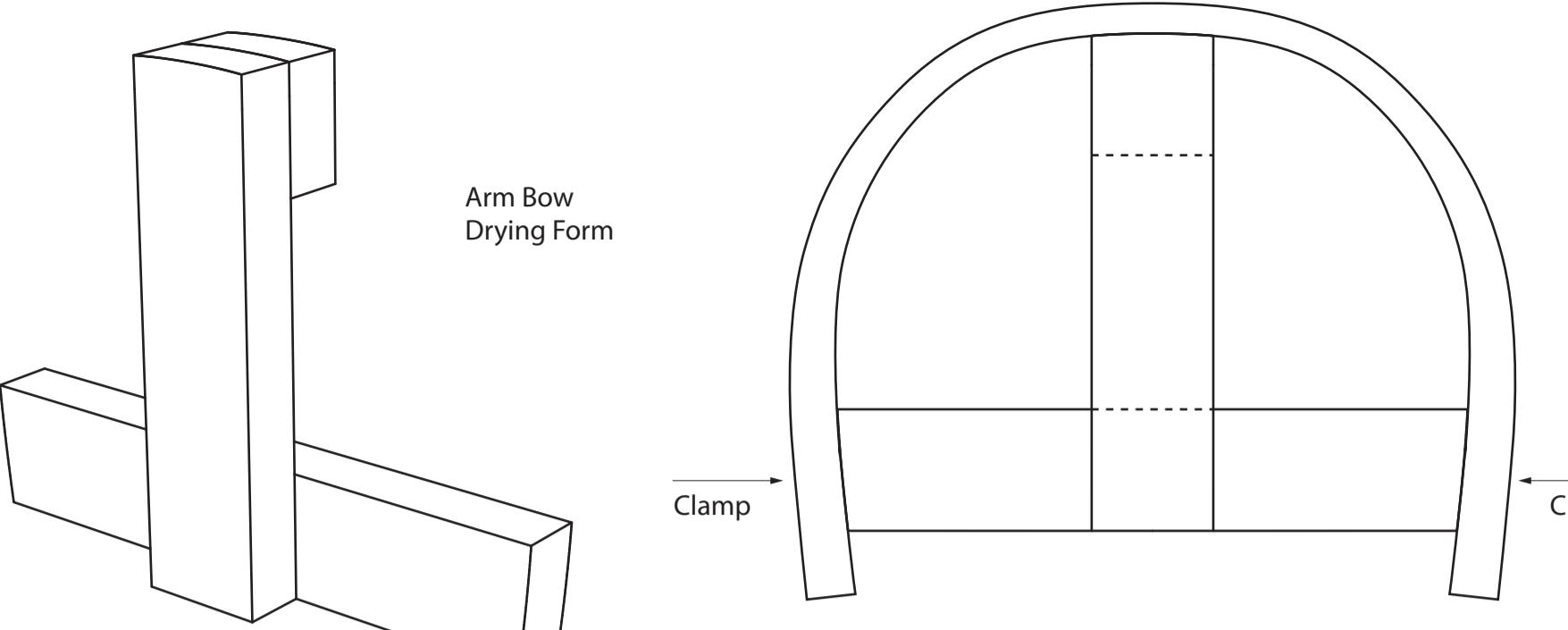
No. 14 Chair Seat

Drill all mortises before shaping the seat

No. 14 Chair Arm Bow Bending Form

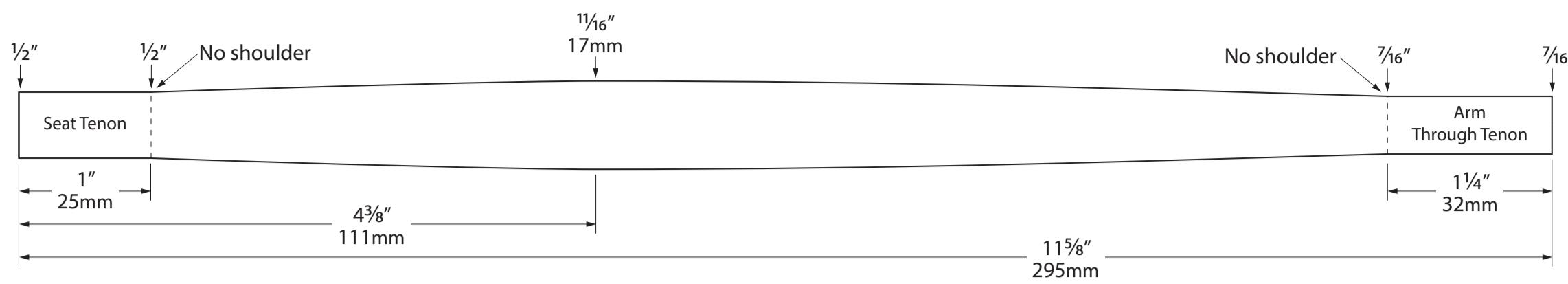
66mm (2 5/8") thick

No. 14 Chair Arm Bow Shaping

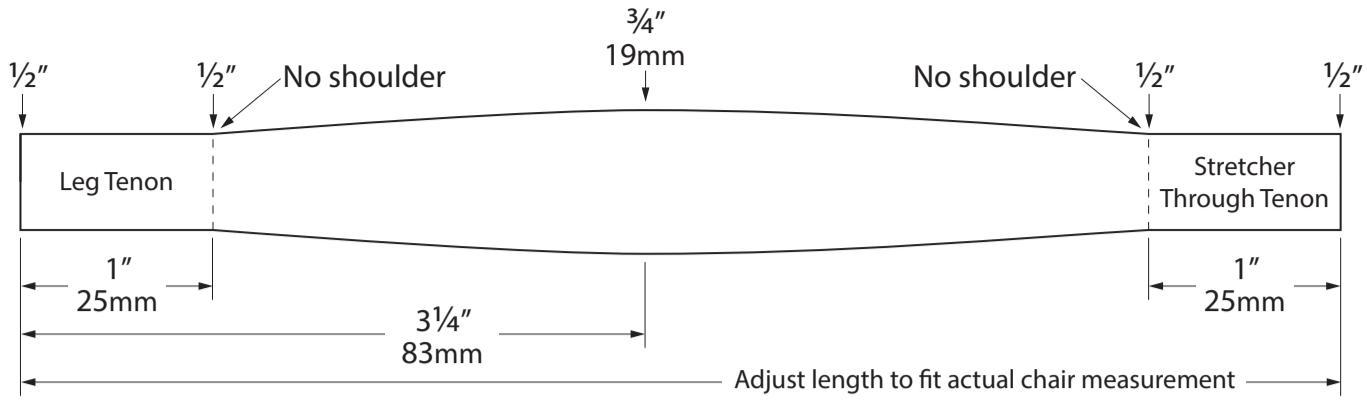


No. 14 Chair Crinoline Stretcher Bending Form
32mm (1 1/4") thick

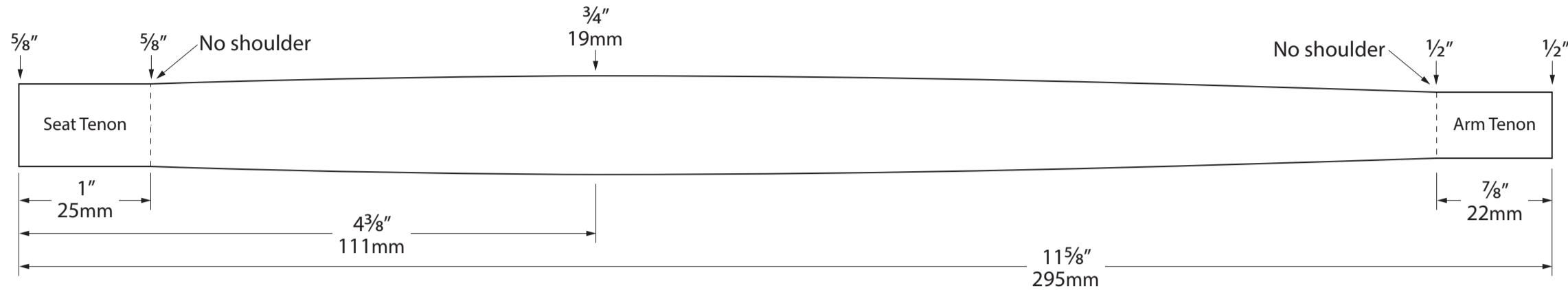
Side Spindles



Rear Stretchers

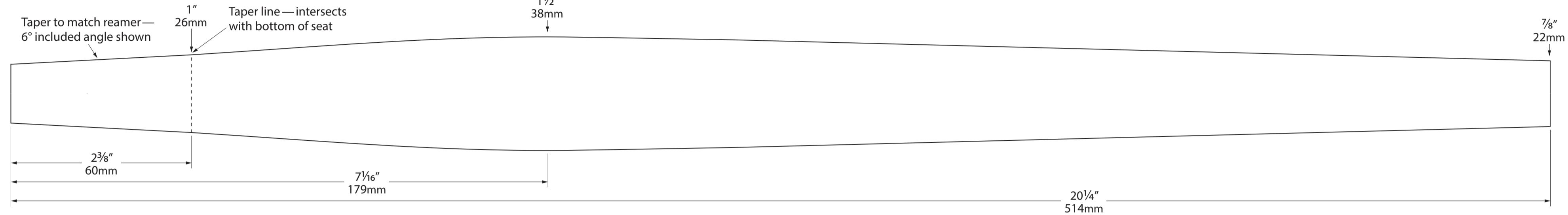


Back Spindles

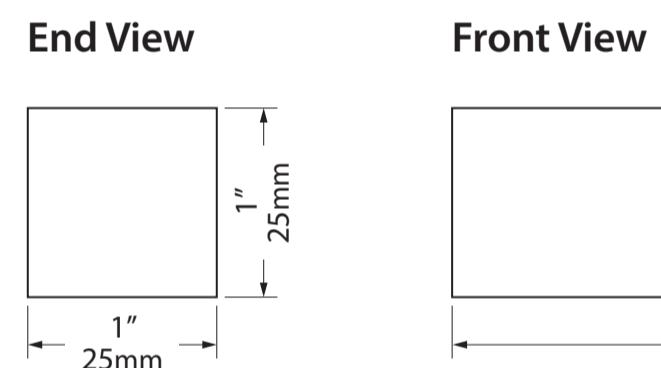


Metric Equivalent Mortise and Tenon Diameters	
7/16"	12mm
1/2"	13mm
5/8"	16mm

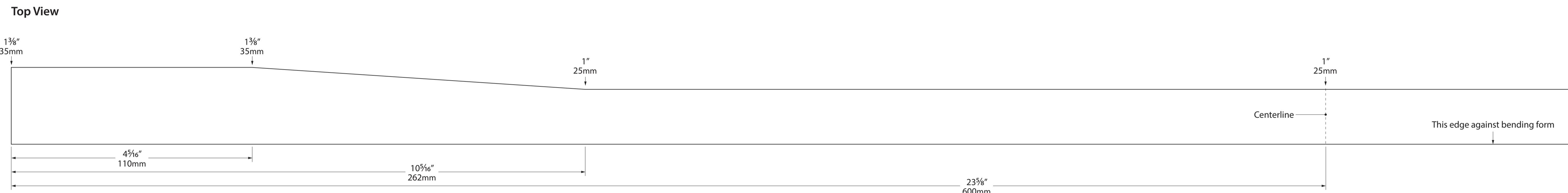
Legs



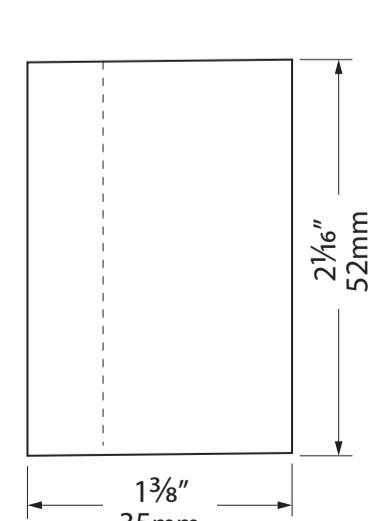
Crinoline Stretcher Bending Blank



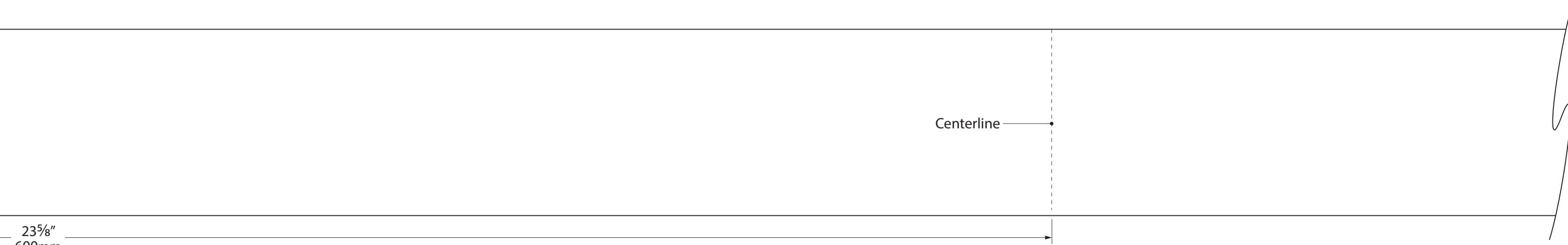
Arm Bow Bending Blank



End View

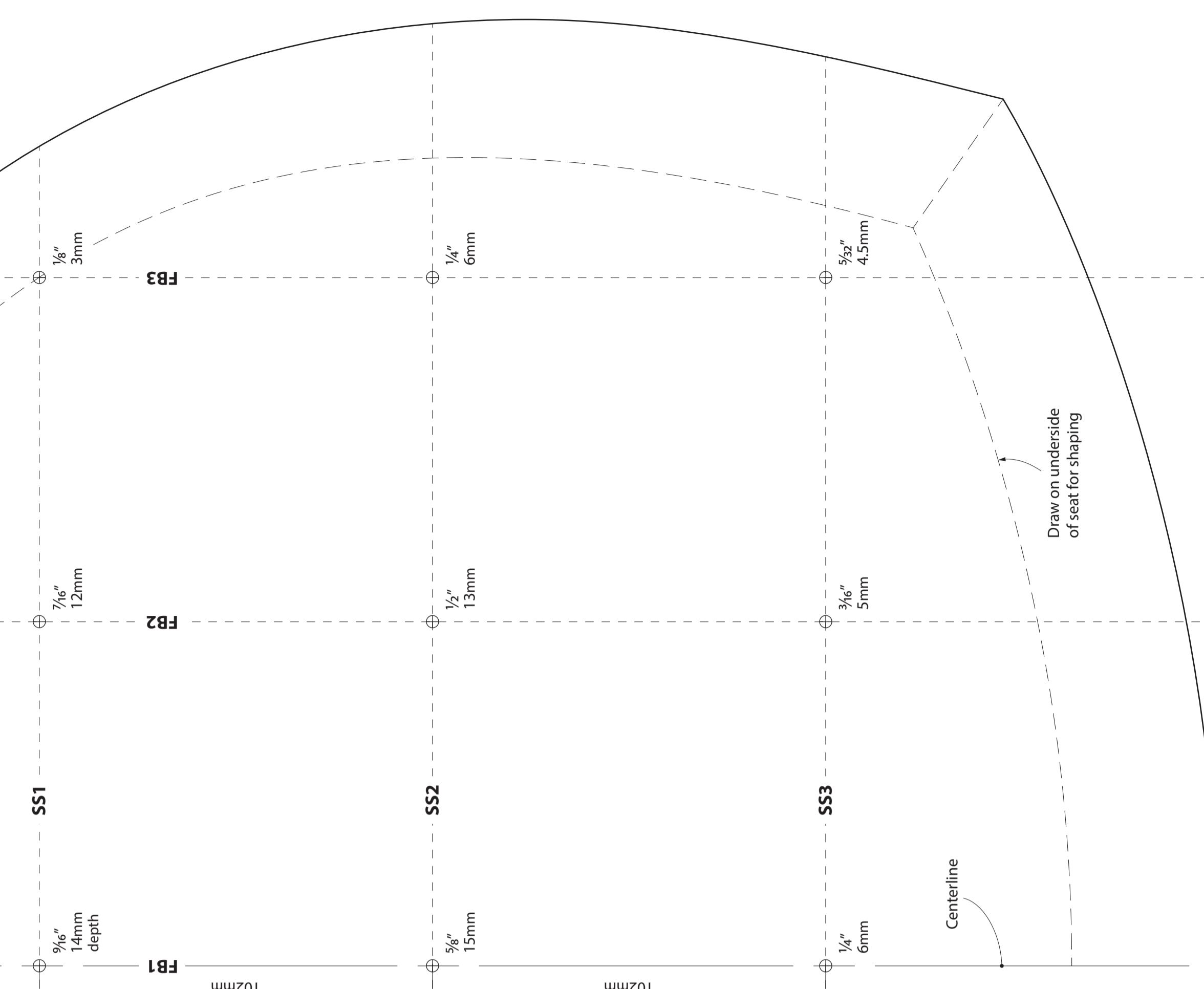
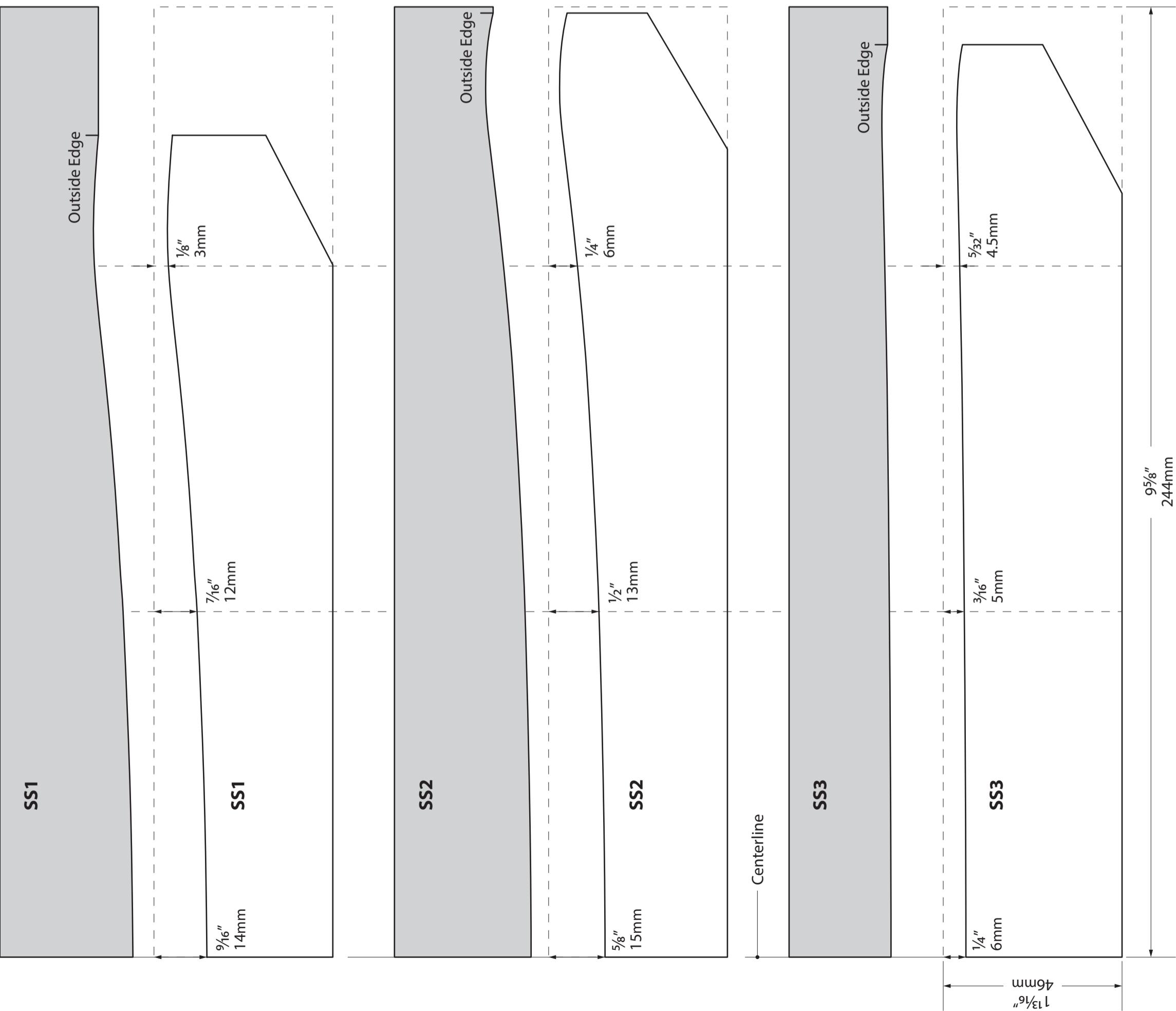


Front View



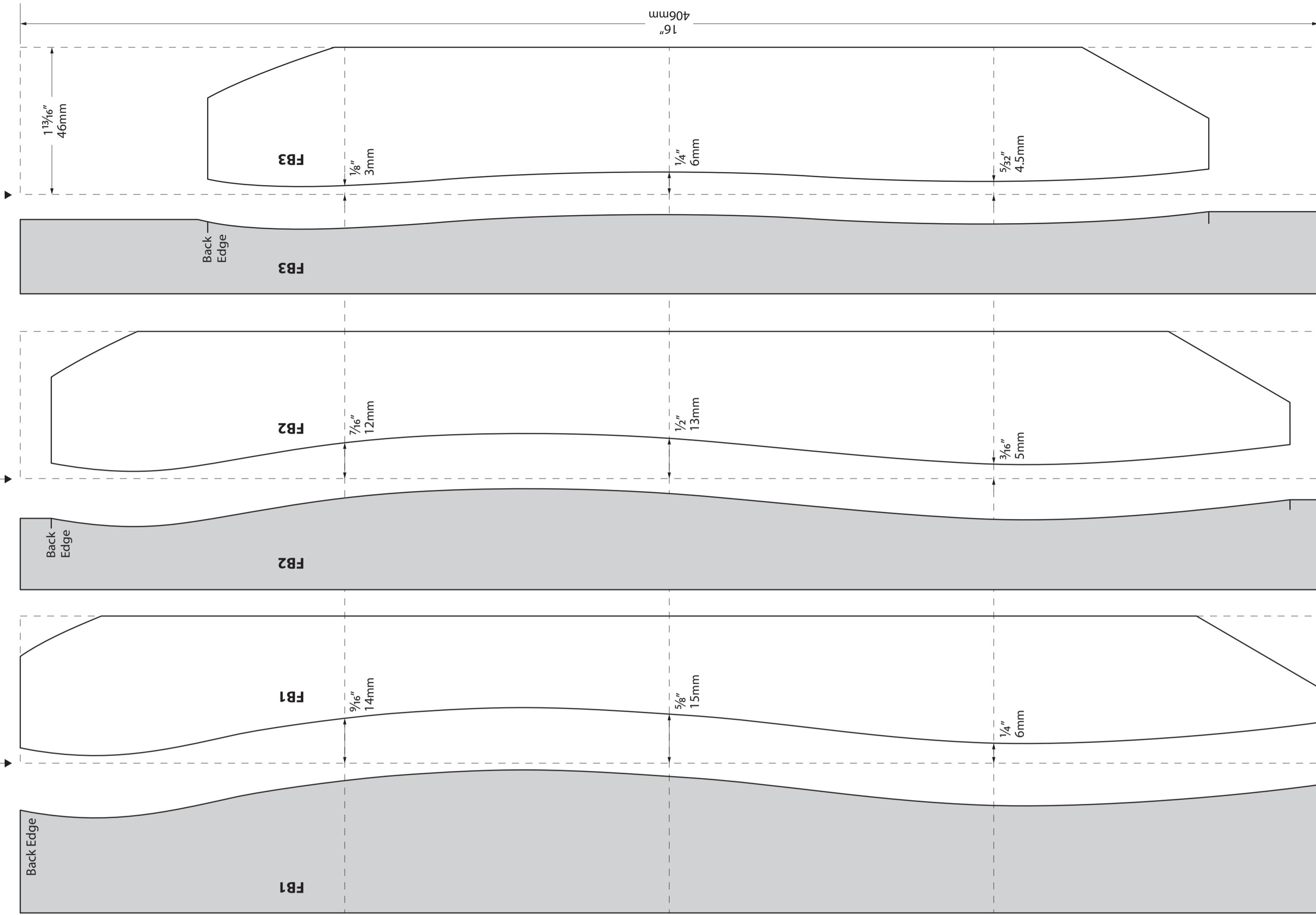
Side-to-Side (SS) Cross Sections

Use to check cross section accuracy after carving



Front-to-Back (FB) Cross Sections

Use to check cross section accuracy after carving



BERN CHANDLEY
CHAIR MAKER + FINE FURNITURE

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