



WHAT'S IN YOUR

WEEKEND?

SKILL LEVEL: INTERMEDIATE
TIME COMMITMENT: 5+ hours



Brian Oltrogge is the owner of Grunblau Machine, LLC and Grunblau Design Studio. Brian was trained as an architect and has taught at various institutions, including LTU, Cranbrook, RPI and College for Creative Studies in Detroit. Over the last 25+ years, he has worked as an architectural designer and fabricator whose work has been featured in various architectural publications, including Dwell Magazine. His work is also included in the permanent collection at the Museum of Modern Art. Brian uses Youtube as a platform for showcasing his ideas and expressing his creative energy in the hopes of educating and inspiring others to follow their passion and make something!

ROCKET STOVE

Learn how to create a rocket stove for your shop to help you survive the winter months!



STEP BY STEP

TOOLS AND MATERIALS



Patterns



Millermatic® 211 MIG welder



4" x 1/8" steel plate (Qty.1)



Angle grinder with cut-off wheel and flap disk



Degreaser to clean steel



Reciprocating saw and metal blade



Super 77 spray adhesive



Belt sander (not required)



Magnetic tabs for positioning parts



4" x 3/16" Rectangular tube steel
12" long (Qty. 2)



4" x 3/16" Rectangular tube steel
1.5" long (Qty. 1)



4" x 3/16" Rectangular tube steel
0.5" long (Qty. 1)



4" x 4" Expanded steel grate (Qty. 2)



Steel hinge approximately 4" long

WARNING: READ AND FOLLOW ALL LABELS AND THE OWNER'S MANUAL.

STEP 1



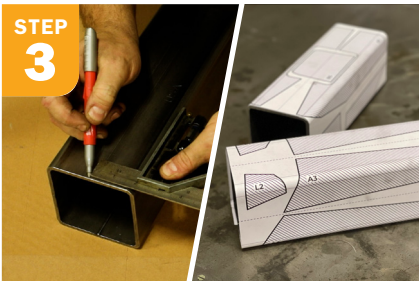
Print patterns at 1:1 scale at a local print shop. Verify that the patterns are correct by measuring the printed scale on the document. The document is formatted for 24" x 36" paper.

STEP 2



Cut two pieces of 4" x 3/16" square steel tube into 12" lengths. Deburr the edges for safe handling. Wipe down the tube inside and out with denatured alcohol to remove oils and surface contaminants. This is a necessary step for the patterns to stick to the steel. If the tube is rusty, you may want to also use a Scotch-Brite pad.

STEP 3



Mark the centerline of the tubes to help provide the best possible alignment of the patterns. Cut out and apply the patterns to the tubes using Super 77 spray glue (or equivalent). Apply spray glue to the rear of the pattern and to the steel to ensure maximum adhesion.

STEP 4



Using a cut-off wheel, reciprocating saw or plasma cutter, cut out the pieces. Leave a small amount of excess on the cut lines to allow for fine tuning later. *Hint: Try to make your cuts in an order that keeps the tube as intact as possible for ease of fixturing!*

Continued on next page





STEP 5

Once the parts are cut out, clean up the edges using an angle grinder or belt sander. The patterns can be removed with WD-40, citrus cleaner or blow-torch. *Note: Adding an 1/8" chamfer to the edges that will be welded will help keep the welds flush and improve penetration.*



STEP 6

Pair off the parts into the chimney front, chimney rear, stove top, and stove bottom and tack these together at the seams. Because the tube angles are 90 degrees, the seams might need a bit of adjusting to get everything to fit perfectly. This is because the more you taper the tube, the more 'star' shaped the tube will become.



STEP 7

Once the pairs are tacked together, you can begin to focus on the lower half of the stove. Check the fit of the geometry with the other parts and adjust if necessary. Add the plate to the stove bottom and tack into place to establish the overall shape of the bottom half of the stove.



STEP 8

Once the top and bottom of the stove is verified with the other half, the seams on the top and bottom halves of the stove can be welded.



STEP 9

The pattern for the shelf will need to be cut from a piece of flat steel. I chose 1/8" steel.



STEP 10

A small piece of expanded steel will need to be sourced for the internal air vent. I left some space when I cut my piece of expanded steel and grinded it to its final shape once it was welded to the shelf.



STEP 11

I used a piece cut from some of the tube scraps to fashion a wall in the front of the stove. I welded this inset approximately 1/4" from the front of the stove face.



STEP 12

Once the shelf geometry was established, I could lay out some tacks on the side walls to provide more shelf support. Two of the four tacks are positioned at the air vent, two toward the front, and one tack on the underside of the shelf to keep the shelf from slipping into the stove.



STEP 13

The next thing to focus on is the chimney. This could be welded up any time in this process. I tacked the pieces together at the ends and middle and then alternated stitch welds to help manage the heat. Cook's choice whether to grind these welds off or not.



STEP 14

Next, tack the four corners of the chimney onto the stove top. Then weld the front and back of the chimney on the inside of the stove and the left and right on the outside of the stove. This may or may not slightly warp the steel, so it is best to get this out of the way before putting too much effort into fitting the door and stove bottom. With these parts together, the door can be fit into the stove body.



STEP 15

The door will be attached with a hinge. I used a piano hinge from my local home improvement store. You may need to adjust the geometry of the shelf to accommodate the added thickness of the hinge. The door tab will fit flush with the rear of the chimney between the rear legs. Simply tack this hinge in place. Start your tack on the thicker steel and drag the puddle over the thinner metal to avoid blowouts.



STEP 16

The handle will be added to the door to allow for easy actuation of the lower hatch. Fit everything up and adjust if necessary. You want the door to be snug so that it holds itself closed. If it doesn't, a well positioned tack will do the trick!



STEP 17

Now the stove top and chimney can be joined to the stove bottom. Same as before, place a couple tacks at the front and back, then weld the seams. Once the stove body is complete, the top of the chimney and the mouth of the stove can be ground planar to look as good as possible.



STEP 18

The last step for the stove is to add the feet. These are positioned along the tube fillet and where the floor of the stove meets the underside of the stove bottom. I used three decent-sized tacks on the inside where no one will notice.



STEP 19

The cooking surface I came up with is a 1.5" long piece of the 4" tube capped with expanded metal. I fashioned a spacer out of two quadrants of the 4" tube that was 1/2" long and tacked them in place.



STEP 20

This simply rests on the chimney.

Have a project you'd like to show off?

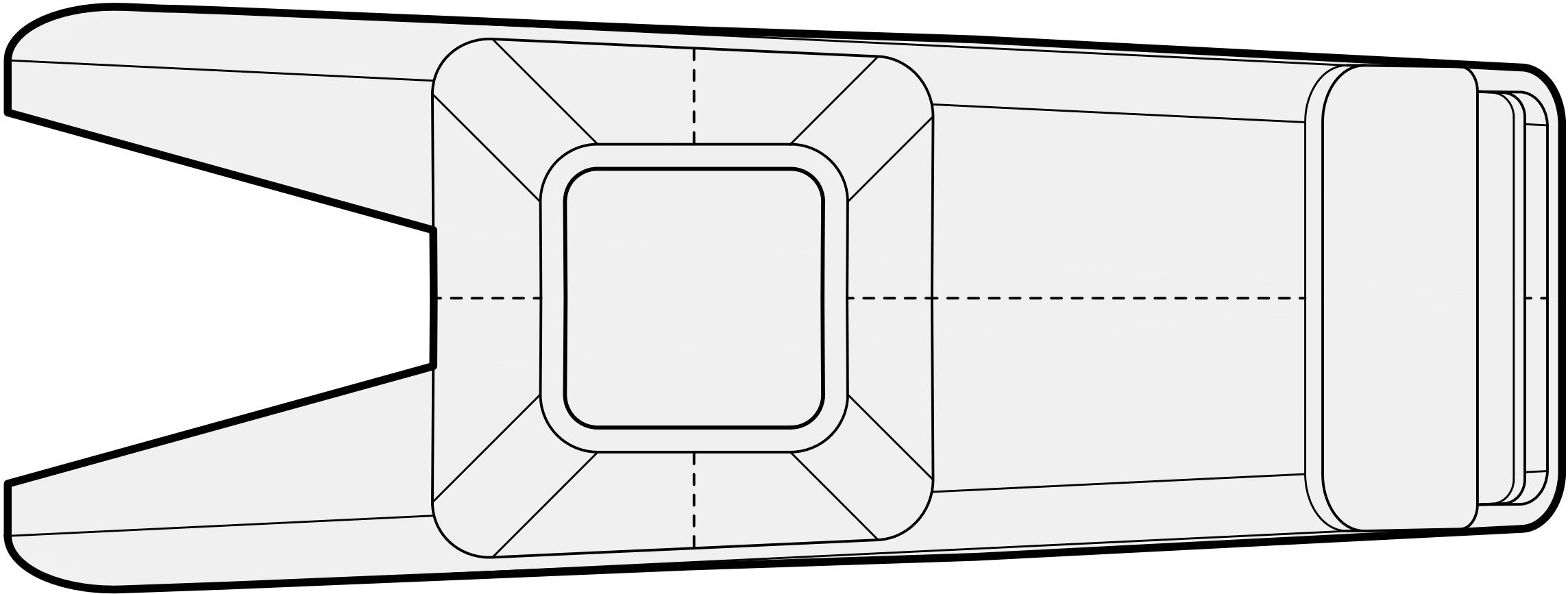
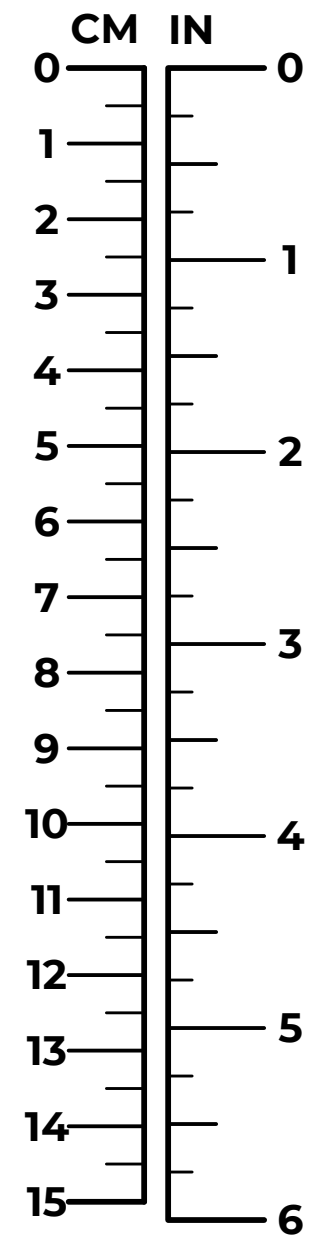
EMAIL IT TO: weekend@millerwelds.com



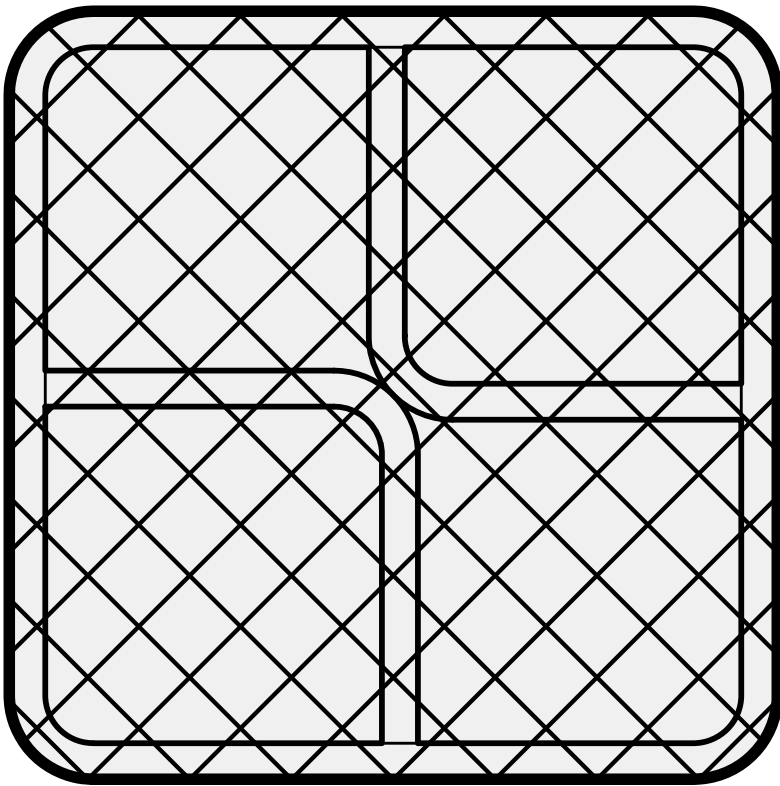
NOTES:

THESE PATTERNS ARE INTENDED TO BE PRINTED ON 24"X36" PAPER AT 1:1 SCALE. PLEASE CHECK THE ACCURACY OF THE PRINT BY USING THE SCALE BELOW.

SCALE: 1"=1"

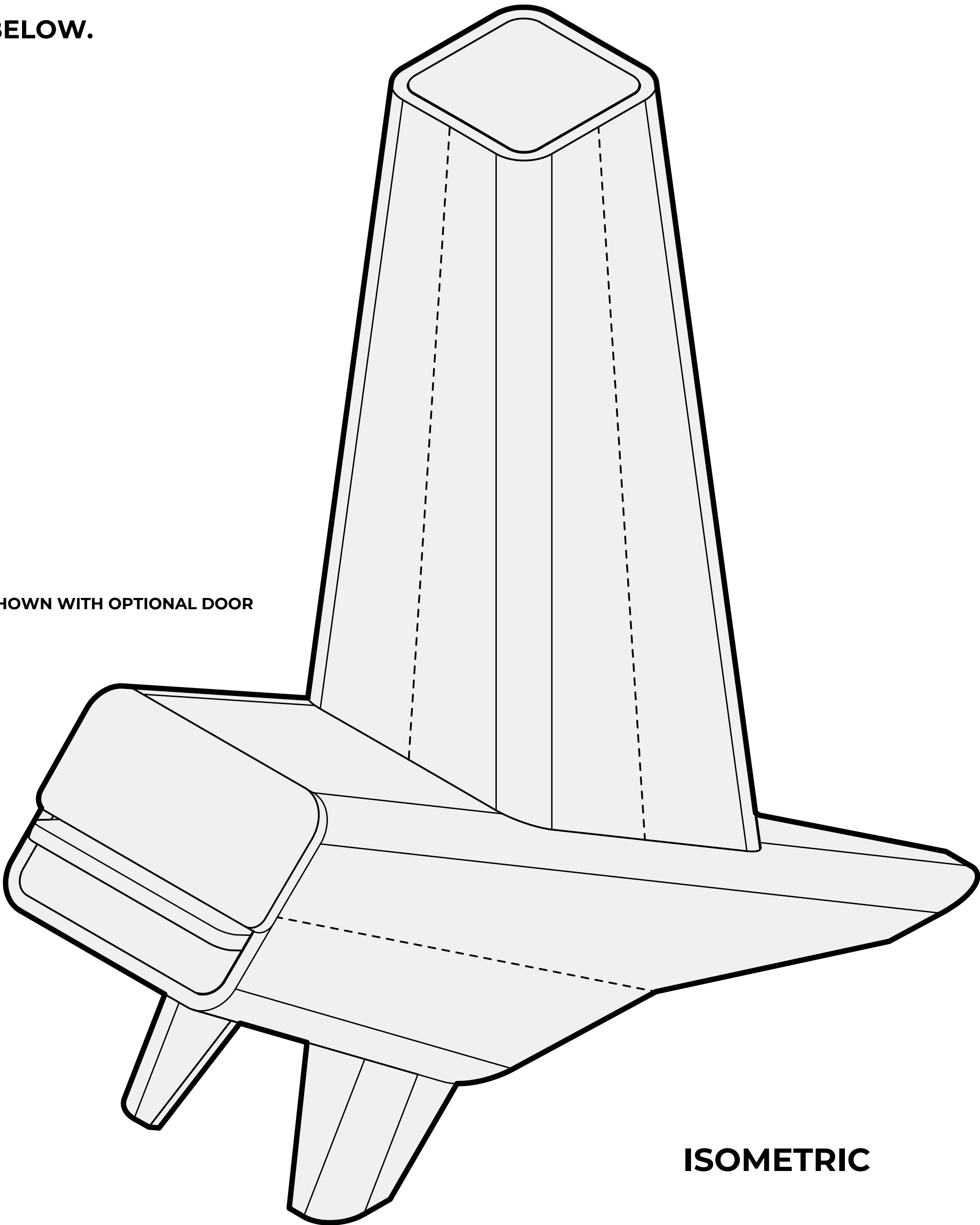


TOP

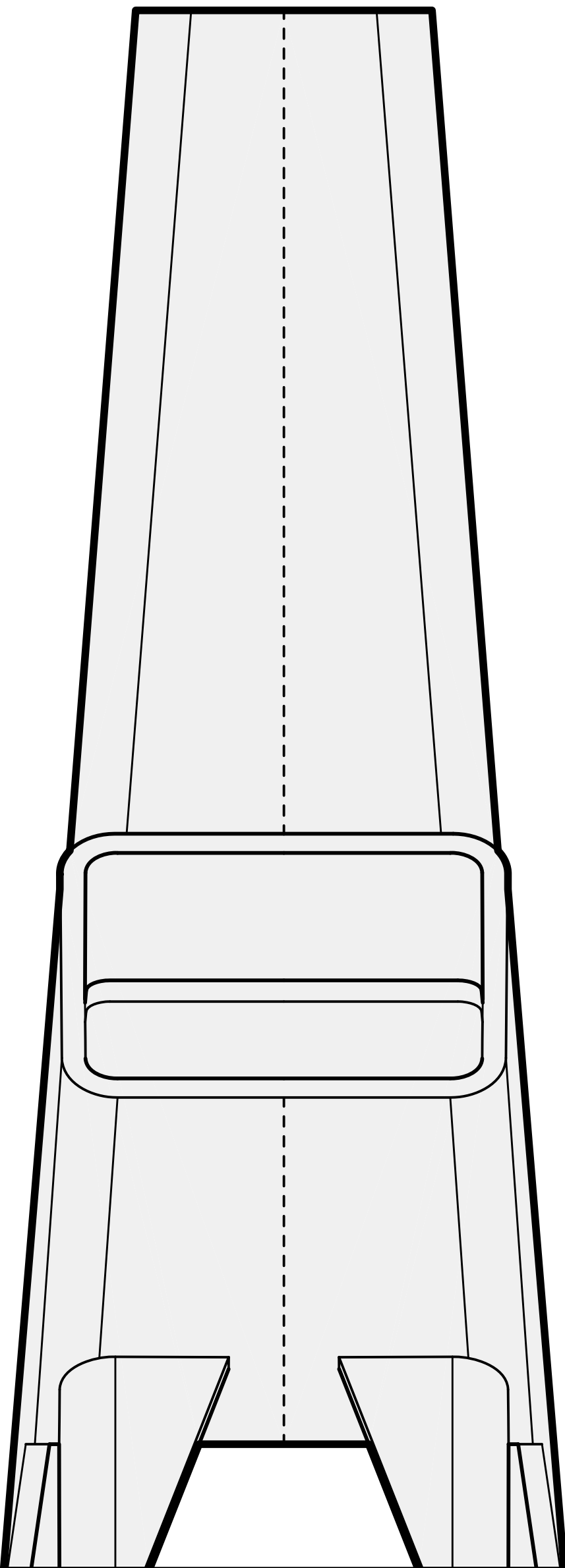


DIFFUSER TOP

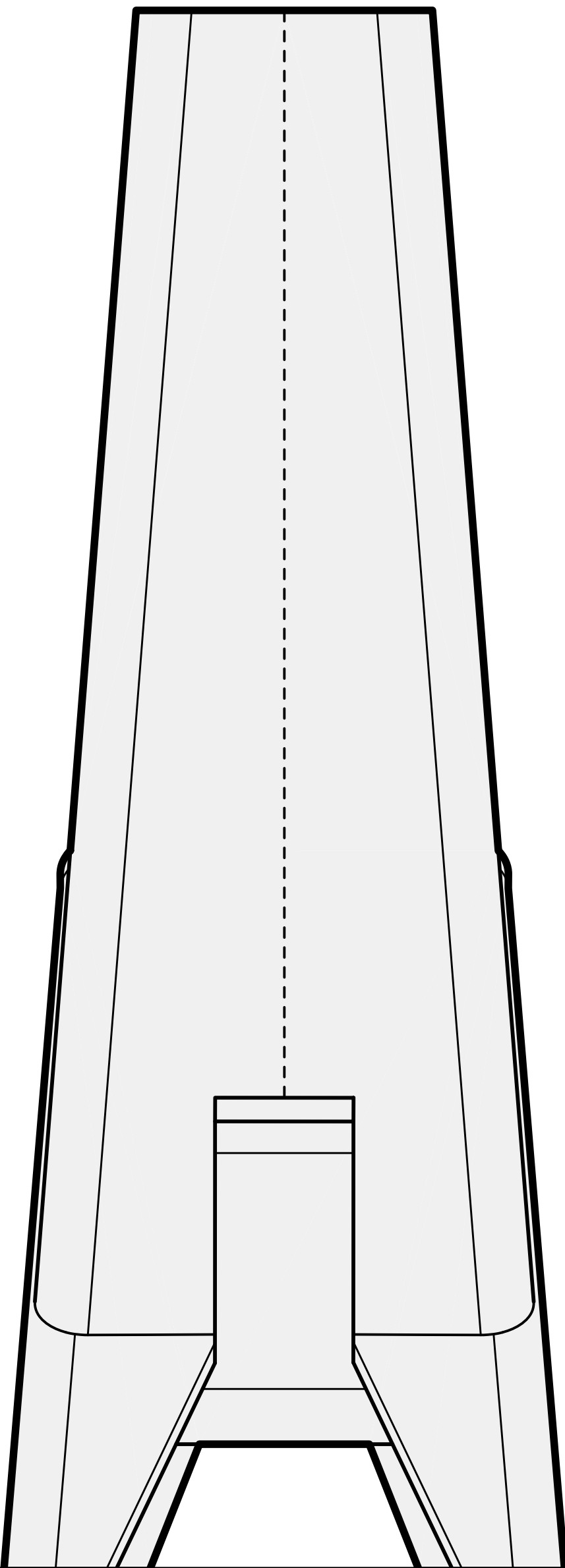
SHOWN WITH OPTIONAL DOOR



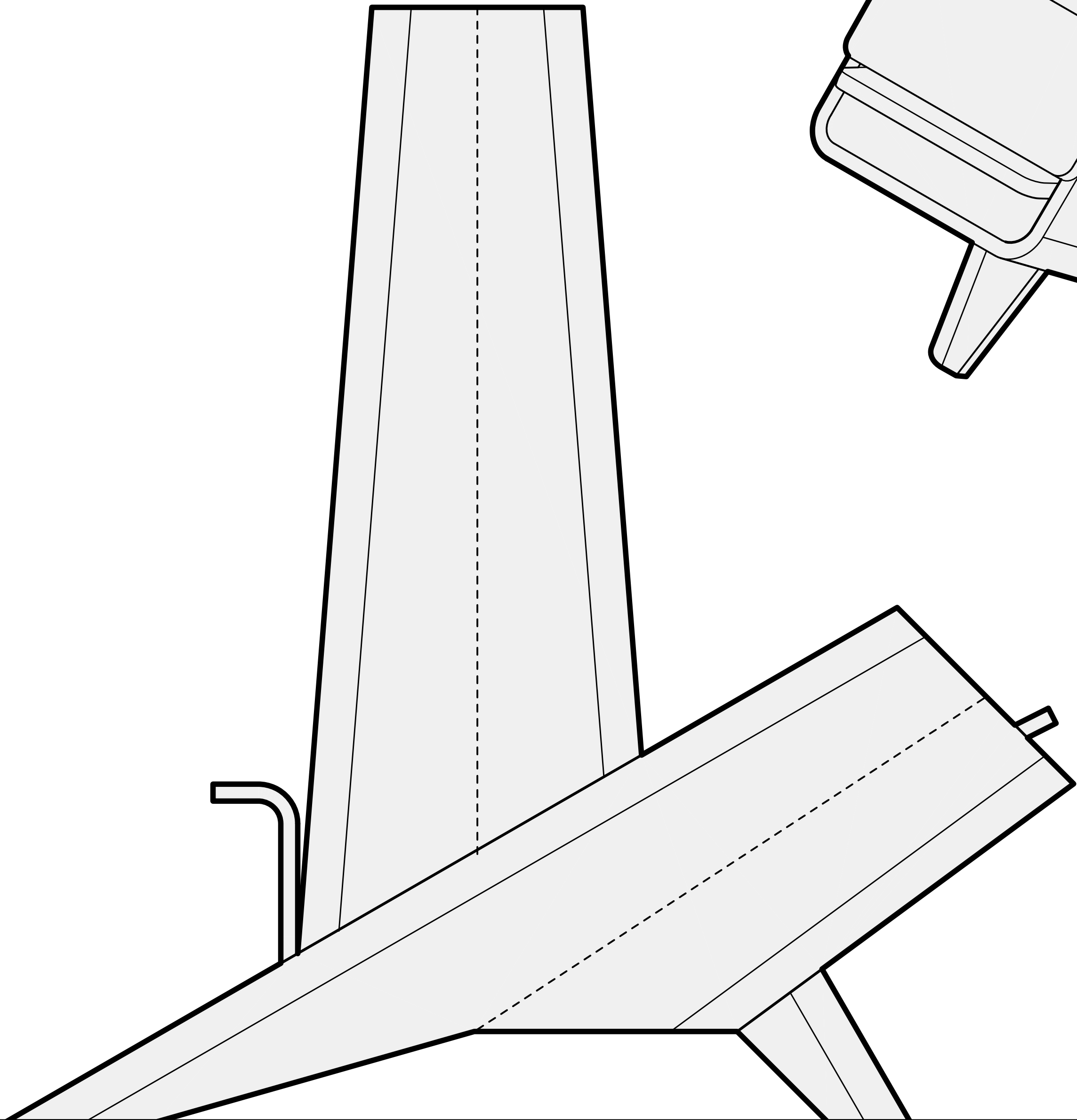
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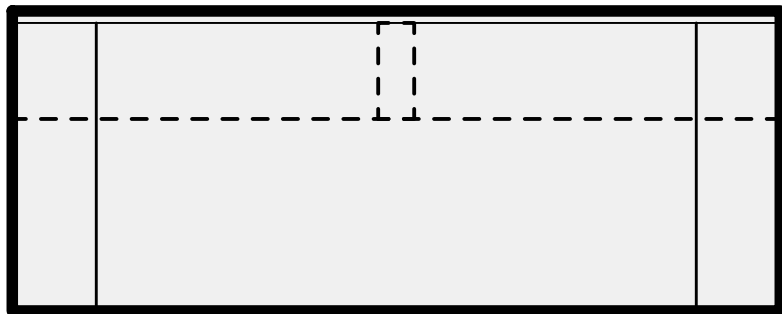
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REAR



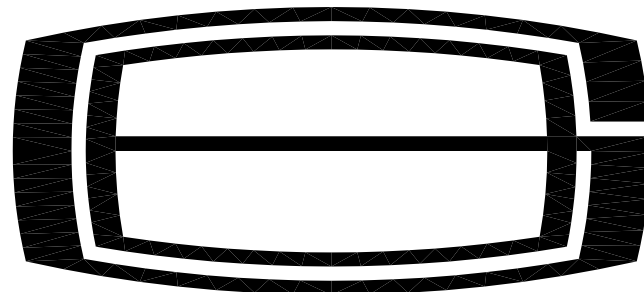
SIDE



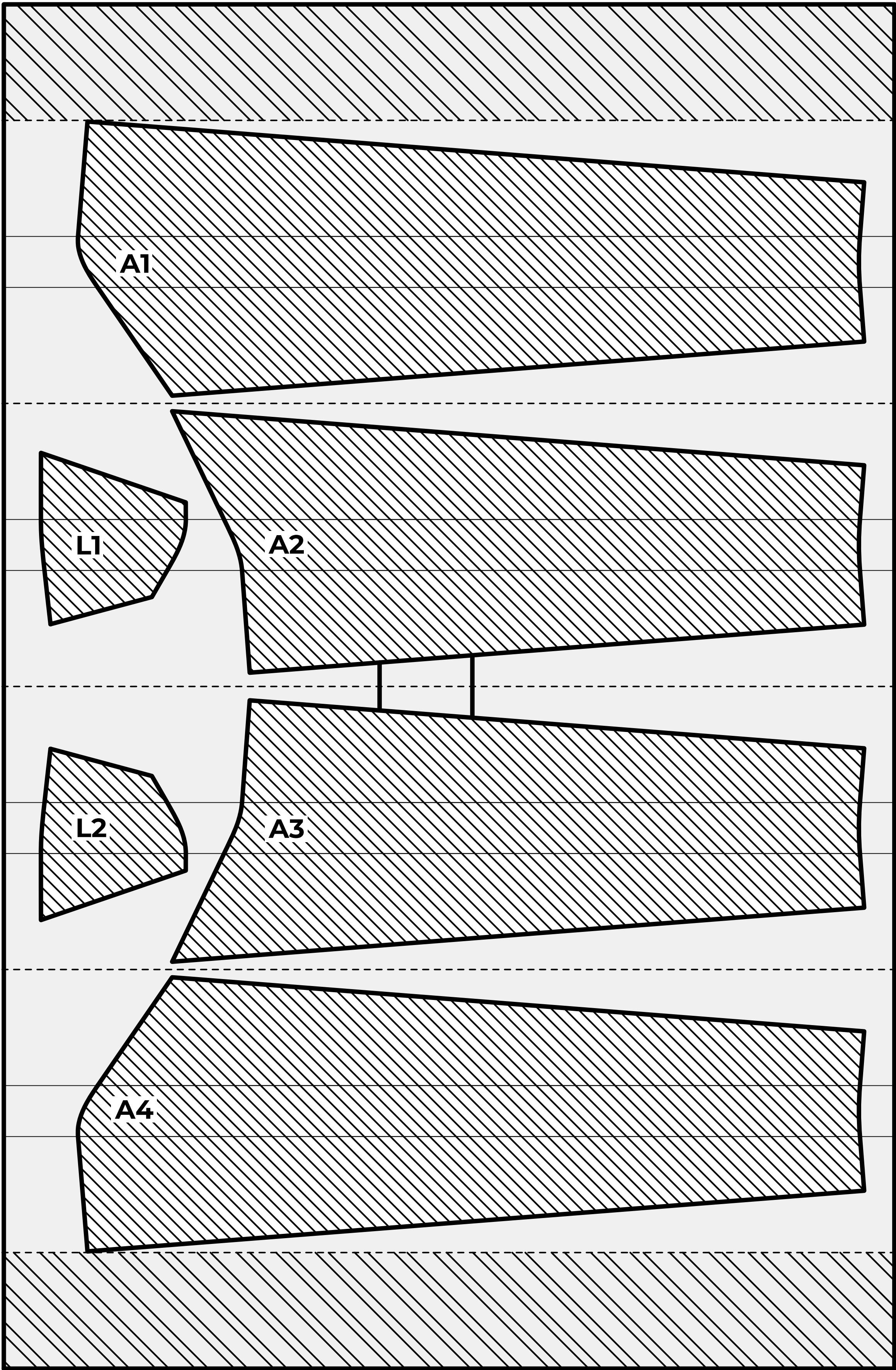
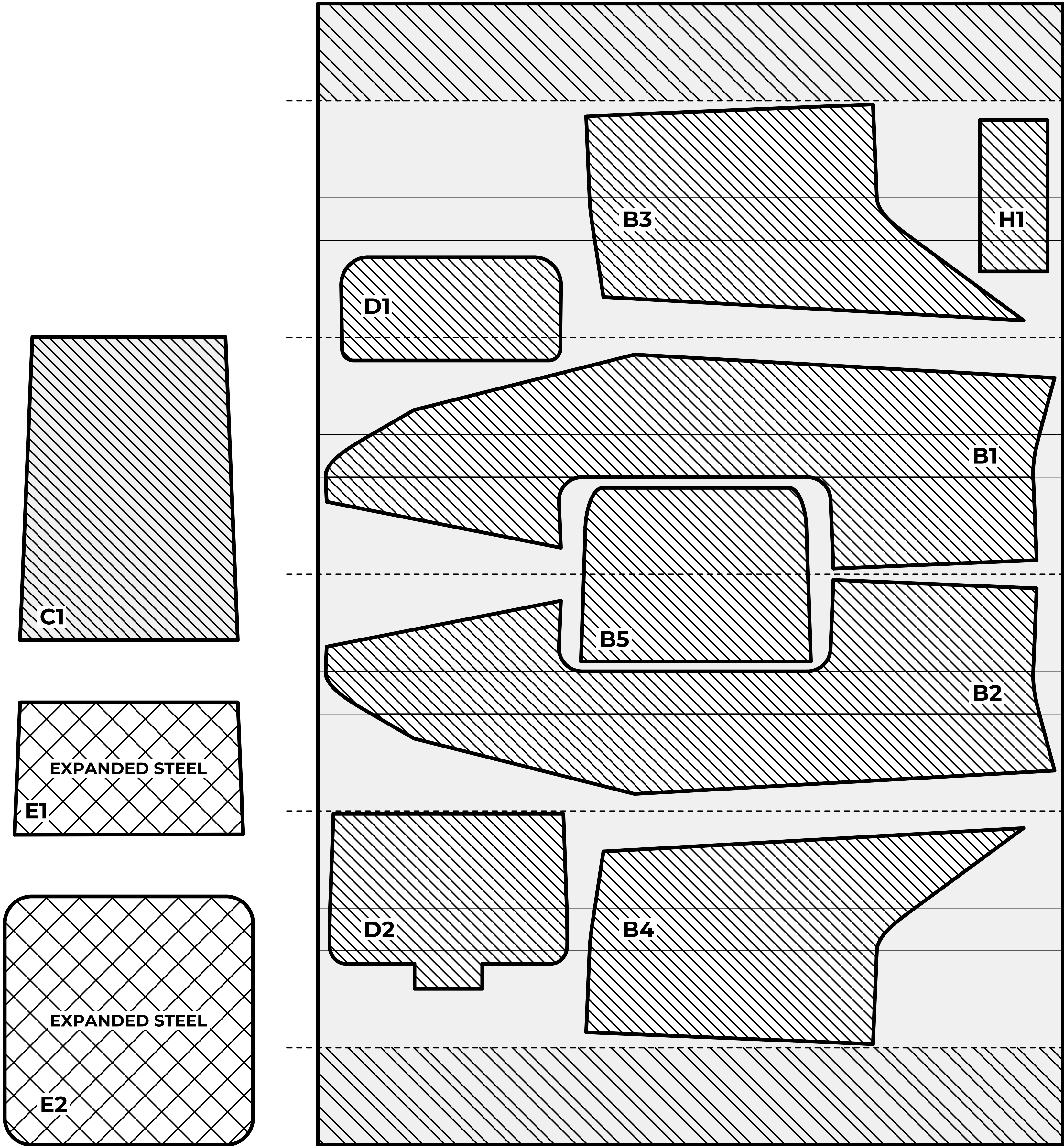
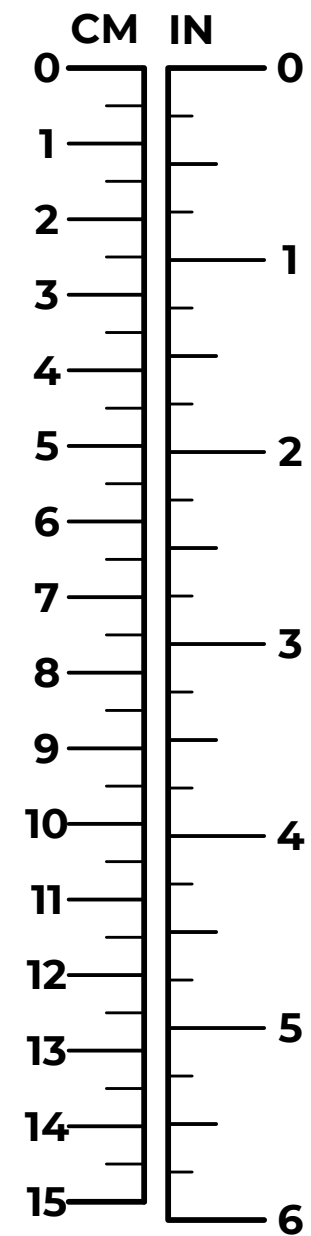
DIFFUSER SIDE

MINI ROCKET STOVE

VIEWS 001



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