HO-009 Three-wing garment folding board

Fold a clean dry shirt repeatedly to one footprint without marking or measuring the garment each time.

Original bounded component build. Dimensions describe this example, not an approved structural, occupied-building or universal fit design.

US inches/feet control; metric figures are references. No physical build, load certification or animal trial performed.

Before cutting

Read the whole assembly and inspect its receiving space before cutting. Measure actual sheet thickness; nominal lumber labels do not control these joints.

Set aside straight, clean stock and allow it to acclimate. Keep fingers clear of blades, clamp work and use tool-appropriate eye/hearing protection.

Dry-fit moving pieces before final fastening; stop if a proposed dimensional substitution changes clearances. Purchased hardware dimensions and hole patterns below must match the actual item.

Materials and actual cuts

Part	Qty	Actual size	Material and special cut
A Center datum board	1	10 x 24 x 1/4 in 254.00 x 609.60 x 6.35 mm	Sound untreated hardwood or exterior-bond plywood, actual measured thickness; reject split/warped stock Square ends; remove all splinters and burrs.
B Side wing	2	10 x 24 x 1/4 in 254.00 x 609.60 x 6.35 mm	Sound untreated hardwood or exterior-bond plywood, actual measured thickness; reject split/warped stock Square ends; remove all splinters and burrs.
C Lower wing	1	10 x 12 x 1/4 in 254.00 x 304.80 x 6.35 mm	Sound untreated hardwood or exterior-bond plywood, actual measured thickness; reject split/warped stock Square ends; remove all splinters and burrs.
D Long flexible hinge strip	2	20 x 2 x 1/16 in 508.00 x 50.80 x 1.59 mm	Durable woven polyester webbing; thickness is schematic Cut cleanly and seal fabric edges by the supplier method without heating an assembled panel. Both edges use local length stations 1, 4, 7, 10, 13, 16, 19 in; transverse centers 1/2 and 1 1/2 in. Hole 9/64 in; see global assembly pattern.
E Short flexible hinge strip	1	8 x 2 x 1/16 in 203.20 x 50.80 x 1.59 mm	Same woven polyester webbing Finished 8 x 2 in strip; not a third 20 in installed strip. Two transverse rows 1/2 and 1 1/2 in; local length stations 1, 3, 5, 7 in; hole 9/64 in.

Hardware and tools

36 x #4-40 x 1/2 in smooth-head machine screw. 28 long-hinge and 8 short-hinge stations; insert smooth head from panel underside; head envelope<=1/2 in.

72 x #4 broad washer. Two per bolt; each nominal 1/32 in thick; OD at most 1/2 in. Measure actual stack.

36 x #4-40 capped nut. One per bolt on garment side; OD<=1/2 in, nominal usable threaded cavity>=5/32 in; verify actual engagement and blind-end clearance.

Tape, square, pencil; clamped saw setup appropriate to the material; drill/driver and depth stop; countersink for wood fasteners; files/sanding block; clamps. Specific additional tools are noted in the steps.

Measured assembly reference

Coordinates refer to the illustrated pose: x left/right, y front/rear, z up. Positions are inches from the front-left underside datum. A negative position projects beyond that datum. The size vector gives the part orientation before any stated rotation; it is not a substitute for its cut profile.

Part / instance	Origin x, y, z	Size dx, dy, dz / rotation
A / 1	10 1/4, 0, 0 in 260.35, 0.00, 0.00 mm	10 x 24 x 1/4 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
B / 1	0, 0, 0 in 0.00, 0.00, 0.00 mm	10 x 24 x 1/4 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
B / 2	20 1/2, 0, 0 in 520.70, 0.00, 0.00 mm	10 x 24 x 1/4 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
C / 1	10 1/4, -12 1/4, 0 in 260.35, -311.15, 0.00 mm	10 x 12 x 1/4 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
D / 1	9 1/8, 2, 1/4 in 231.77, 50.80, 6.35 mm	2 x 20 x 1/16 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
D / 2	19 3/8, 2, 1/4 in 492.12, 50.80, 6.35 mm	2 x 20 x 1/16 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg
E / 1	11 1/4, -1 1/8, 1/4 in 285.75, -28.57, 6.35 mm	8 x 2 x 1/16 in Rotation x/y/z: 0.0000, 0.0000, 0.0000 deg

Numbered assembly

01. Choose a level clean table at least 31 x 37 in. This board is for folding dry garments; it is not a pressing board or hot-iron surface.

02. Cut A 10 x 24 in, two B 10 x 24 in and C 10 x 12 in from actual 1/4 in smooth plywood or solid plastic. Round all corners to 1/2 in radius.

03. Sand cut edges until a scrap of thin cloth passes over them without catching. Reject splintering ply rather than hiding its edge under tape.

04. Arrange A in the center with a B on either side and a 1/4 in gap along each 24 in edge. Put C below A's short front edge with the same 1/4 in gap.

05. Cut D two 20 x 2 in fabric hinge strips for the sides and E one 8 x 2 in strip for the lower joint. Keep sealed or stitched edges outside the fold line; no extra full-length strip is installed.

Complete the assembly

06. Lay the side D strips centered over the gaps, starting 2 in from the board ends. They overlap each panel by 7/8 in and must remain unstretched.

07. On EACH 20 in long strip mark seven stations s = 1, 4, 7, 10, 13, 16 and 19 in (25.4, 101.6, 177.8, 254.0, 330.2, 406.4 and 482.6 mm) from its y=2 in end. These are global y = 3, 6, 9, 12, 15, 18 and 21 in. Repeat on both strap edges: left hinge global x=9 5/8 and 10 5/8 in; right hinge x=19 7/8 and 20 7/8 in. This is 28 long-hinge bolts, not seven shared by two edges.

08. For the 8 in lower strip retain local s=1, 3, 5, 7 in from its left end: global x=12 1/4, 14 1/4, 16 1/4, 18 1/4 in. Its two bolt rows are y=-5/8 and+3/8 in, each 3/8 in into its panel. This adds eight bolts. Keep the lower panel gap 1/4 in; do not drill a hole in the gap.

09. Before drilling all stations, dry-stack one selected #4-40 x 1/2 in smooth-head screw, two 1/32 in washers and a matching smooth capped nut on scrap 1/4 in panel and the actual webbing. Confirm head/washer/cap OD<=1/2 in (12.7 mm). The nut must clamp without bottoming, meet its maker-required thread engagement and retain at least 1/32 in (0.79375 mm) blind-end clearance beyond the tip. Reject incompatible hardware

10. Clamp each unstretched strip in its measured position; mark both edges and all stations from the common panel datum. Use scrap backing and drill 9/64 in (3.571875 mm) clearance holes through the matched fabric/panel at all 36 centers. Deburr both faces and remove loose fibers. The 1/2 in maximum washer circle leaves 1/8 in of panel between circle and joint edge, and 1/4 in between circle and strap outer edge.

11. At every station insert the smooth screw from the panel underside: head, one washer, 1/4 in panel, fabric, second washer, then capped nut on the garment side. Use a driver below and hand tool above; tighten only until the cloth is held flat. The nominal material stack is 3/8 in, leaving 1/8 in of the 1/2 in screw inside a cap whose usable threaded cavity is at least 5/32 in deep. Confirm the actual sample-stack clearance before repeating all 36.

12. Fold each wing once with no garment. The 1/4 in gap lets the hinge bend around the panel thickness; if a seam tightens or a bolt catches, stop and correct it.

13. Lay a clean shirt face down centered on A. Fold one side wing, return it flat, fold the other, return it, then fold the lower wing and return it.

14. Inspect the first garment for snagging and adjust only its placement. Keep fingers out of the fold and store the board flat and dry.

Acceptance and intermediate checks

Three panel gaps are 1/4 in and webbing is unstretched; both 20 in straps start at y 2 and end at y 22 in.

Each long strap has two rows of seven matching holes at local s 1, 4, 7, 10, 13, 16, 19 in; all 28 long and 8 short bolt centers match the working plates.

All centers are 3/8 in into sound panel from the joint edge. Actual washer/head/cap OD<=1/2 in; no washer overhangs a panel or fabric outer edge.

All 36 screws have two washers and a matching smooth cap; the actual sample meets its maker-required usable thread engagement, clamps without rocking and retains>=1/32 in blind-end tip clearance.

Every fastener remains tight enough to retain the fabric while the hinges fold freely; no cap bottoms before clamping, loose washer, exposed tip or damaged weave is accepted.

A clean cloth test shows no snagging over both faces and all three folds; this is a required user check, not a trial already performed.

Use and maintenance

Dry garment folding only; no ironing or hot cookware.

Thin material and fabric hinges are not child-play hinges or load-carrying hardware.

Remove bolt caps as needed for separate fabric/board cleaning; keep matching hardware together and dry the webbing fully before folding closed. Inspect stitches/bolt holes for tearing and hinge strips for creep; re-measure the equal 7/8 in overlaps after repair. Replace frayed straps rather than tightening bolts through torn weave.

Measured interface notes

Long row axes in metric: x 244.475, 269.875, 504.825, 530.225 mm; common y 76.2, 152.4, 228.6, 304.8, 381.0, 457.2, 533.4 mm. Local s stations are identical for both 20 in strips.

Washer OD 1/2 in maximum gives 1/8 in circle-edge reserve at the panel joint and 1/4 in at the strap outside edge. Along a long row, 3 in pitch leaves 2 1/2 in between maximum washer circles. Across its two rows, 1 in pitch leaves 1/2 in.

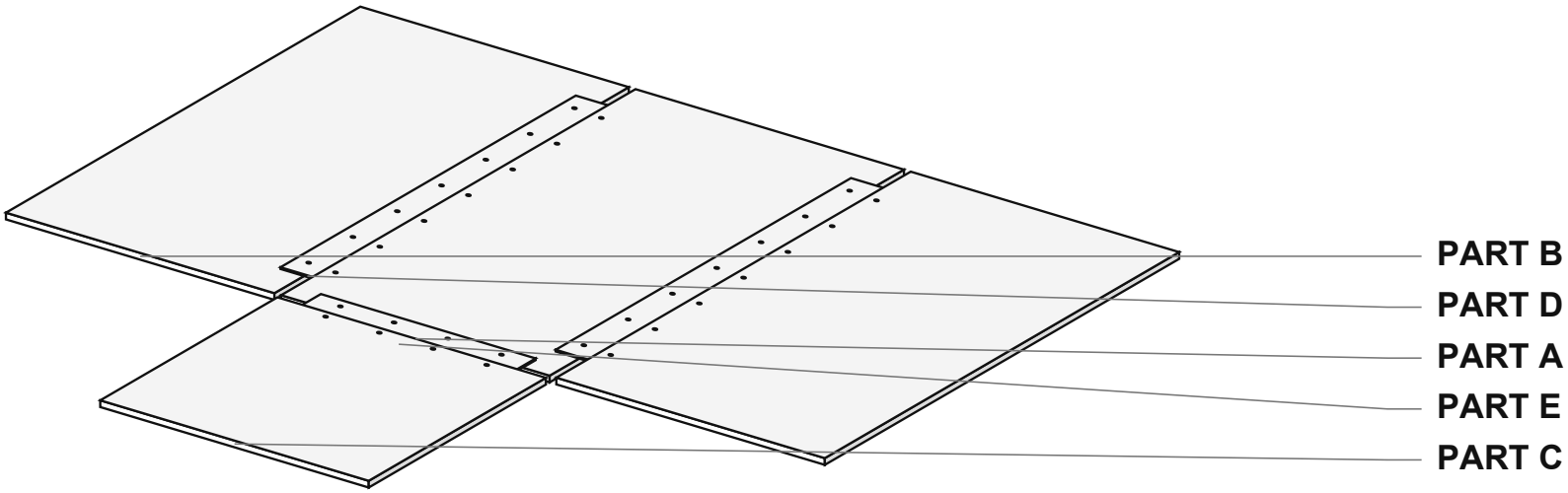
Webbing 1/16 in is the nominal illustrated stack, not a universal fabric compression value. Measure the clamped sample; select matching capped nuts with full thread engagement and extra blind-end space. A nominal length label alone is not a fit check.

Primary context references

S4: Purdue University Extension, Wood drying: FNR-37. https://extension.purdue.edu/extmedia/FNR/FNR-37.html

HO-009 | ASSEMBLY AND ORIENTATION

x = left/right; y = front/rear; z = height. Match part letters to the cut list.



Displayed envelope (width x depth x height):

30 1/2 in x 36 1/4 in x 5/16 in

Metric: 774.7 x 920.8 x 7.9 mm

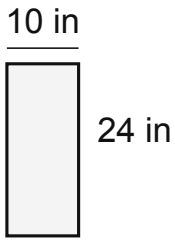
Locate joints and hardware using the numbered steps; view is not a full-size pattern.

Original B/W vector drawing - dimensions control - unbuilt / untested

HO-009 | PART SIZES 1 OF 1

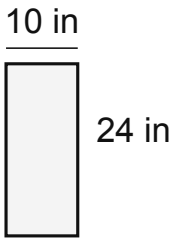
Actual dimensions; labels identify any stock blanks. Allow for saw kerfs between pieces.

A Center datum board x1



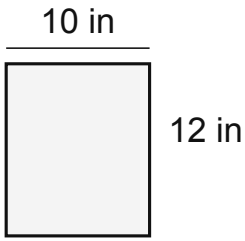
Face: 254.0 x 609.6 mm
Thickness: 1/4 in / 6.35 mm
Special cuts: see cut list and steps.

B Side wing x2



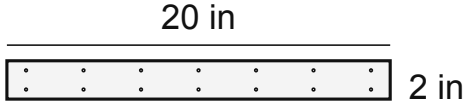
Face: 254.0 x 609.6 mm
Thickness: 1/4 in / 6.35 mm
Special cuts: see cut list and steps.

C Lower wing x1



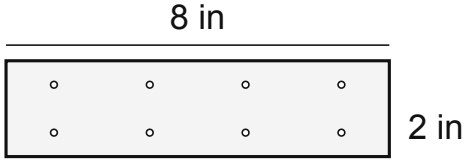
Face: 254.0 x 304.8 mm
Thickness: 1/4 in / 6.35 mm
Special cuts: see cut list and steps.

D Long flexible hinge strip x2



Face: 508.0 x 50.8 mm
Thickness: 1/16 in / 1.59 mm
Special cuts: see cut list and steps.

E Short flexible hinge strip x1

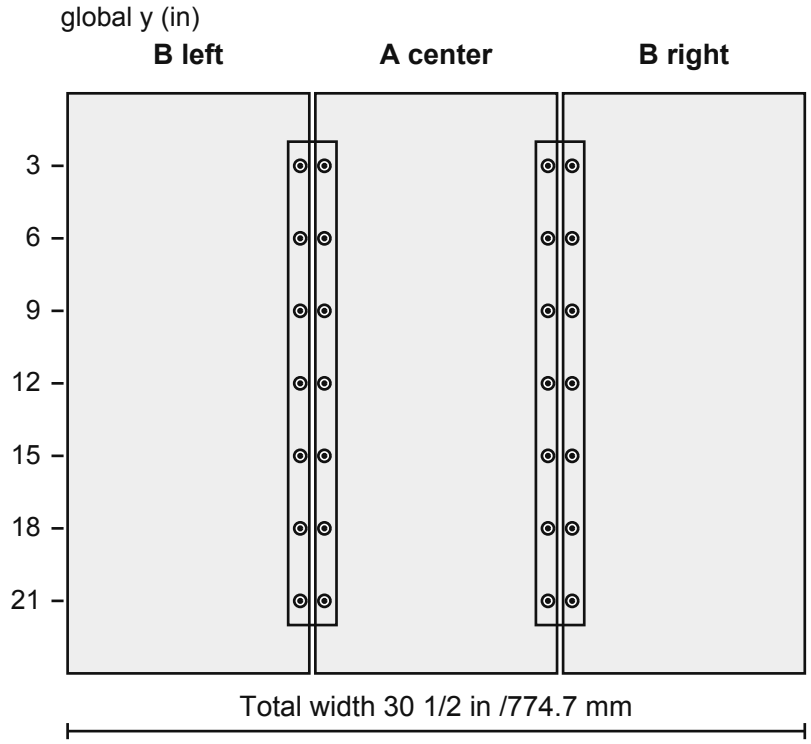


Face: 203.2 x 50.8 mm
Thickness: 1/16 in / 1.59 mm
Special cuts: see cut list and steps.

Original B/W vector drawing - dimensions control - unbuilt / untested

HO-009 | ALL 28 LONG-HINGE BOLT CENTERS

Full long-panel plan. The front edge y=0 is at the top; the lower12in wing is not shown here.



ONE DATUM, BOTH LONG STRIPS

Local s from strap start y=2 in:

s (in)	global y (in)	y (mm)
1	3	76.2
4	6	152.4
7	9	228.6
10	12	304.8
13	15	381.0
16	18	457.2
19	21	533.4

Left rows x 9 5/8 and 10 5/8 in

Right rows x 19 7/8 and 20 7/8 in

7 centers per row;4 rows =28 bolts

Straps y 2-22 in; panels y 0-24 in

All circles: outer envelope washerOD 1/2 in maximum; center hole 9/64 in /3.571875 mm. Long-row pitch 3 in /76.2 mm. Both row ends are 1 in /25.4 mm from strap ends.

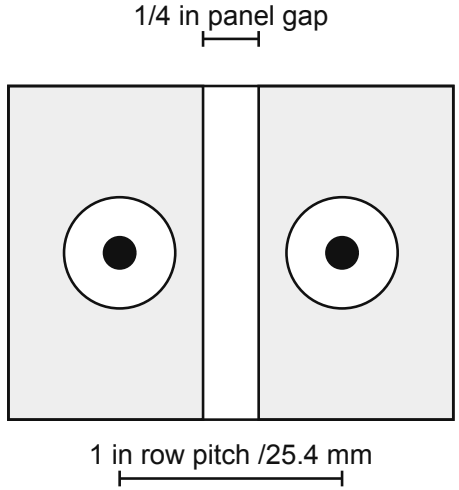
Long strips remain x 9 1/8-11 1/8 and 19 3/8-21 3/8 in. Each overlaps both panels 7/8 in /22.225 mm. Every center is 3/8 in /9.525 mm inside its actual panel edge.

The separate 8 in lower hinge adds 8 bolts, at global x 12 1/4,14 1/4,16 1/4,18 1/4 in and y-5/8,+3/8 in. Its local length stations are 1,3,5,7 in; the stock plate shows its matching holes.

Original B/W construction detail - unbuilt / untested; not a print-scale template

HO-009 | WASHER RESERVE AND CAPPED-BOLT RETENTION

Enlarged local joint and nominal axial stack. Measure actual purchased hardware before drilling all stations.



Strap is 2 in wide; cropped along its length.

Washer reserve:1/8 in at panel joint edge;
1/4 in at either outer cloth edge.

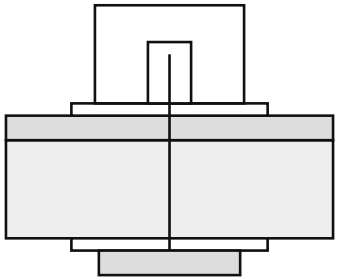
AXIAL STACK AT ONE STATION

Smooth head below;cap above fabric.

Screw under-head length 1/2 in

Cap cavity>=5/32 in deep

Nominal tip inside cap:1/8 in



Panel 1/4 + cloth 1/16 +
two washers 1/32 each =3/8 in

Order from below: smooth screw head, washer, panel, unstretched webbing, washer, smooth capped nut. One screw +two washers +one cap at each of 36 stations. Maximum head/washer/cap width 1/2 in /12.7 mm.

Nominal screw projection beyond the top washer is 1/2-3/8=1/8 in /3.175 mm. Usable threaded cap cavity at least 5/32 in /3.96875 mm leaves 1/32 in /0.79375 mm beyond that tip. The cap outline is schematic, not a universal nut shape.

Verify the maker-required usable thread engagement and at least 1/32 in blind-end tip space in the actual sample stack. Reject caps that bottom before cloth retention; do not crush cloth, omit washers or leave exposed points to make incompatible hardware fit.

Original B/W construction detail - unbuilt / untested; not a print-scale template