Insulated outdoor cat shelter

A 2×4-framed plywood box lined with pink foam. Write each piece's letter on it in pencil as you cut so it matches the drawings and lists.

Outside 32″ × 24″ × 18″ **Inside space 27″ × 19″ × 13″**

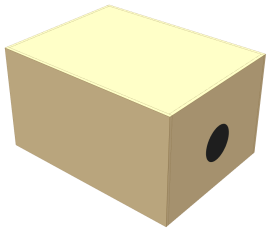
Length (in)	Width (in)	Height (in)	Entry hole
32	24	18	6″

Plywood	Foam	2×4 length	Plywood / foam sheet
1/2″	2″	8 ft	4×8 ft

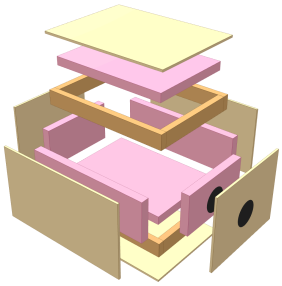
- [ ] Second exit on the other end
- [ ] 2×4 runners to lift it off the ground

Cat space inside the foam: **27″ long × 19″ wide × 13″ tall.**

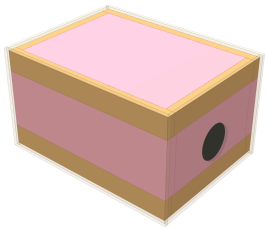
The box



Assembled



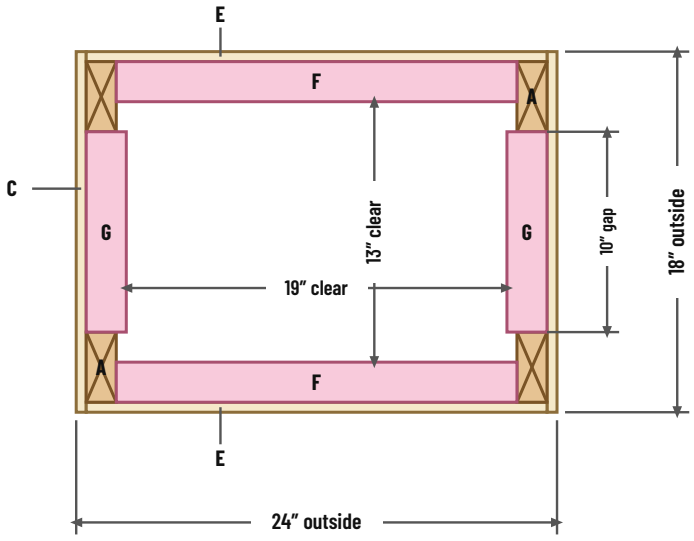
Pulled apart



See-through: insulation inside

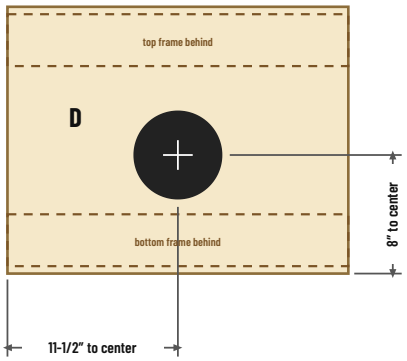
Drawings

Cross-section through the middle



2×4 frame (on edge) Plywood Foam

Entry hole on end wall D



Viewed from outside. Mark the center 11-1/2″ in from the side and 8″ up from the bottom edge, draw a 6″ circle, drill a starter hole and cut it with a jigsaw. The bottom of the opening sits 2-1/2″ above the floor foam, which helps keep straw in.

Cut list

Part	Qty	Cut size	Shape	Notes
2×4 lumber (cut to length)				
A Frame long rail	4	31″ long		2 for the bottom frame, 2 for the top frame
B Frame end rail	4	20″ long		Fits between the long rails; 2 per frame
Plywood, 1/2″ exterior				
C Front & back wall	2	32″ × 18″		Full length; covers the ends of the end walls
D End wall	2	23″ × 18″		One gets a 6″ round entry hole (see drawing)
E Floor & roof panel	2	31″ × 23″		Fits inside the four walls
Pink foam board, 2″				
F Floor & roof foam	2	28″ × 20″		Drops inside the 2×4 frame
G Long wall foam	2	31″ × 10″		Fills between the top and bottom frames
H End wall foam	2	19″ × 10″		One gets a matching hole, centered 4″ up from its bottom edge

2×4 cutting layout

2×4s: buy 3 × 8 ft

Cut the factory ends square first if they're rough. Buying 2 × 10 ft boards instead would also work.

Board 1 · 2-3/4″ left over



Board 2 · 4-5/8″ left over



Board 3 · 6′ 4″ left over



Tips

- Use foam-board adhesive labelled safe for polystyrene. Regular solvent-based construction adhesive melts pink foam.
- Fill the inside with loose straw, not blankets or hay. Straw stays dry; fabric and hay hold moisture and freeze.
- Cover cut foam edges around the entry with foil tape so cats don't pick at them.
- Screw the roof down without glue so it lifts off for changing bedding.
- Face the entry away from the wind and keep the floor off wet ground.
- Plywood sold as 1/2″ is usually 15/32″ thick. Measure yours if the fit needs to be exact.

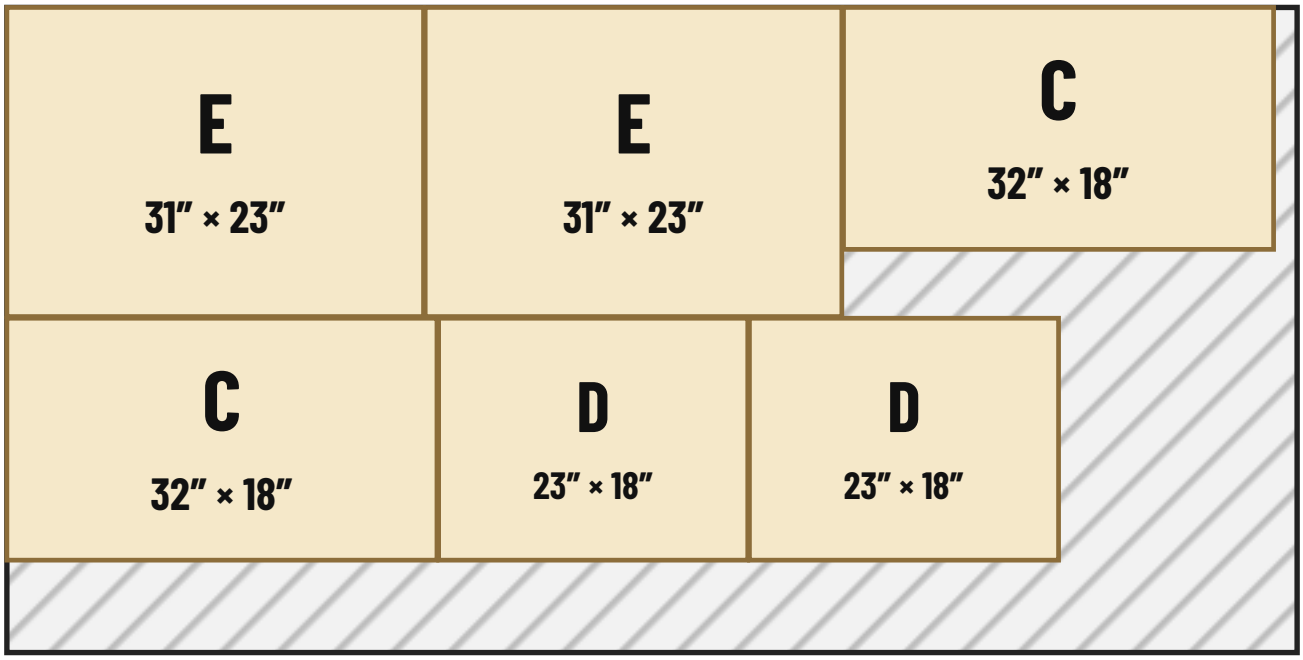
Sheet cutting layouts

1/8″ allowed for each saw cut. Hatched areas are leftover.

Plywood: buy 1 sheet (4×8 ft)

Make the long rip cuts first, then crosscut each strip.

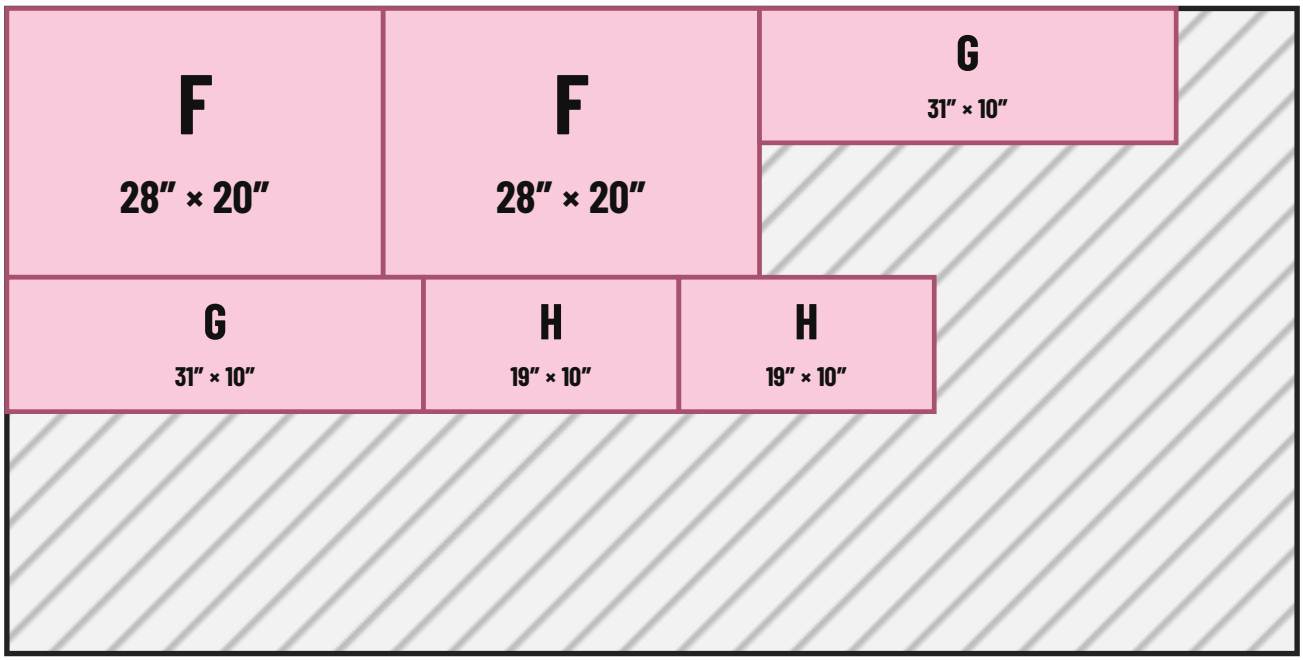
Sheet 1



Foam board: buy 1 sheet (4×8 ft)

Score with a utility knife against a straightedge and snap, or use a fine-tooth handsaw.

Sheet 1



Shopping list

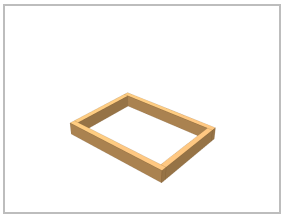
What	Qty	Notes
Lumber		
2×4, 8 ft	**3**	Pressure-treated holds up best near the ground; let it dry before painting
1/2″ exterior plywood, 4×8 ft	**1**	CDX or sanded exterior grade. Many stores will make the rip cuts for you
Insulation		
2″ pink XPS foam board, 4×8 ft	**1**	Owens Corning Foamular or similar
Fasteners		
3″ exterior wood screws	**16**	2 per frame corner
1-1/4″ exterior wood screws	**68**	About 68 for plywood to frame; a 1 lb box covers it
Adhesive		
Exterior wood glue	**1 bottle**	Titebond III or similar, for frame joints and plywood
Foam-board adhesive	**1 tube**	Must say safe for polystyrene
Finish		
Exterior caulk	**1 tube**	Outside corner seams and roof edge
Exterior primer + paint	**1 quart**	Outside surfaces only
Foil tape	**1 roll**	Optional: covers foam edges at the entry
Bedding		
Straw	**1 small bale**	Not hay, not blankets
Tools		
Circular saw or table saw, jigsaw (for the round entry), drill/driver, tape measure, speed square, clamps, utility knife and straightedge, caulk gun.		

Notes

Assembly

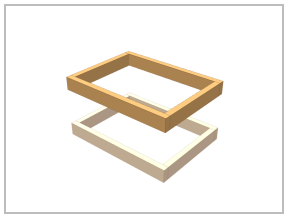
In each picture, the parts added in that step are in full color; earlier parts are faded.

1. Build the bottom frame



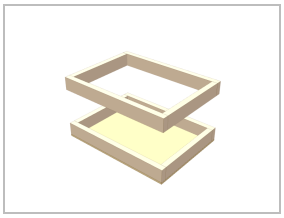
Stand two **A** rails and two **B** rails on edge (3-1/2″ tall), B rails between the A rails, making a 31″ × 23″ rectangle. Glue each joint and drive two 3″ screws through the A rail into the end of the B rail. Check square: both diagonals should be about 38-5/8″.

2. Build the top frame



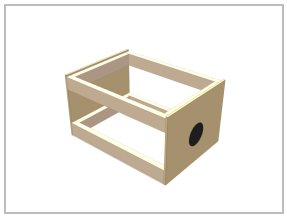
Build a second, identical frame from the remaining **A** and **B** rails.

3. Attach the floor



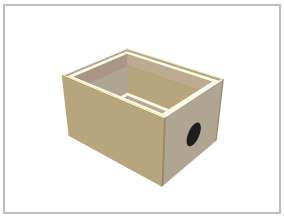
Glue and screw one **E** panel to the underside of the bottom frame, flush on all edges, 1-1/4″ screws about every 8″.

4. Attach the end walls



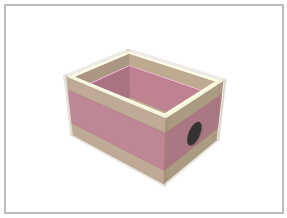
Cut the entry hole in **D** first. Cut two scrap spacers exactly 10″ long and stand them on the bottom frame to hold the top frame at height. Glue and screw each **D** to the end rails, flush with the bottom of the floor. Its top edge sits 1/2″ above the top frame so the roof drops in.

5. Attach the front & back walls



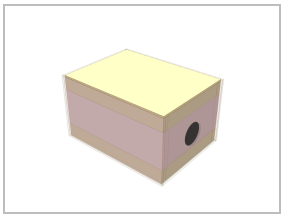
Glue and screw both **C** walls to the long rails every 6″, flush at the bottom and covering the edges of the end walls. Remove the spacers.

6. Insulate floor & walls



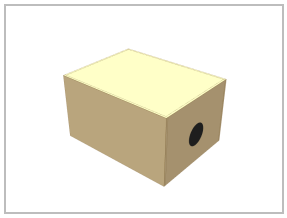
With foam-board adhesive, set one **F** inside the bottom frame on the floor. Glue the **G** pieces to the long walls between the frames, then fit the **H** pieces between them, lining up the hole in **H** with the hole in **D**.

7. Insulate & attach the roof



Glue the second **F** to the underside of the second **E**, centered with a 1-1/2″ border all round. Set it on so the foam drops into the top frame, and screw it down without glue.

8. Finished box



Caulk the outside corners and roof seam, then prime and paint the outside. Fill with straw and set it off the ground, entry away from the wind.