

# Dome Deck Methods

Erecting the dome on a pre-existing deck can be problematic. Please contact us if you plan to do so. Also contact us if your dome has a pre-hung door placement that may require modifications to the deck outline.

Our shelter domes are designed with a hem that connects to the side of a raised deck, below the floor level. We suggest the following options for building decks to interface with our shelter dome hem:

## 1. Portable “Pie Piece” or “Star” Method

The portable “Pie Piece” (16’, 20’, and 24’) and “Star” (30’ and 36’) methods allow the deck to be disassembled in sections and moved easily. You can take it apart, load it up and move it all in a day’s work. It costs a little more than the joist method and is more complex to build.

## 2. Stationary Joist Method

This method requires less time and materials to build than the portable methods. We recommend a joist deck for people that don’t expect to move their dome. You can make this method semi-portable by using screws instead of nails.

## 3. Perimeter Boards

We recommend this method for domes with earthen floors. The perimeter board will anchor your dome and keep the fabric off the ground. You can also use the perimeter board as a mold to lay tiles or pour concrete. Concrete floors can be painted beautifully. Coat the concrete with marine varnish for easy cleaning. If perimeter boards are used as forms for concrete, we recommend using pressure-treated, rot-resistant wood, and leaving the boards in place to receive the shelter hem. 16-penny, galvanized nails started into the inside of the perimeter boards will secure the boards to the slab.

## 30 ft. Dome Floor – Pie Method

1. From 40 of the 10 ft. boards cut 40 “A” boards.  
From 10 of the 10 ft. boards cut 20 “C” boards.  
From 110 of the 8 ft. boards cut all remaining boards.

*NOTES:* All boards are measured on longest side.

2. Assemble the 20 pie piece frames as per drawing.
3. Level one pie piece frame on high side of land with center of pie pointing downhill. Place 1' x 1' x 3/4" pine or plywood on top of center post to support 15 pie pieces. Outer piers and posts may be about half a foot from the B boards and will support two adjacent pieces.  
*NOTE:* The door goes on a point.
4. Set the second pie piece frame on the center post and one post of the first pie piece frame. Level the second piece and set the fourth pier and post for the other side.
5. Measure your decking material and calculate where three bolts should be located for easy access upon removal of specific decking boards.
6. Drill three 5/16" holes through the adjacent A boards and bolt them together.  
*NOTE:* A “C” clamp may be useful here.
7. Repeat the procedure adding one more pier and post and bolting one more frame until all the piers are set, the posts are cut and the frames are bolted.  
*NOTES:* The last frame may need to be pounded into place and other bolts may need to be loosened for placement of the last frame.

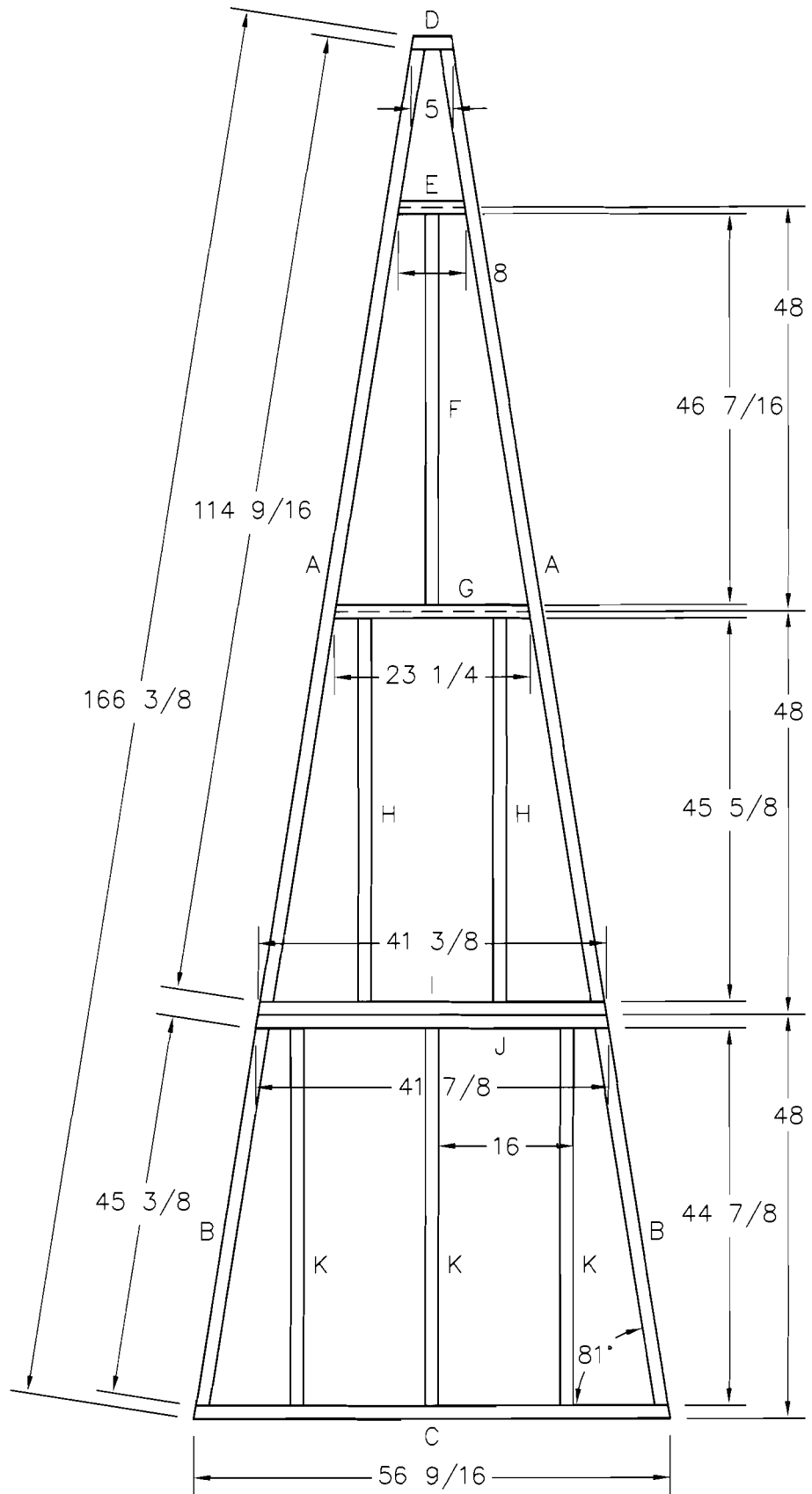
# 30 ft. Dome Floor – “Pie Piece” Method

## Materials

45	Wood-topped pier blocks
1	4 x 4 post to level
50	2” x 6” x 10 ft.
110	2” x 6” x 8 ft.
60	5/16” x 3-1/2” hex bolts
60	5/16” hex nuts
120	5/16” washers
15#	16d galvanized box nails
25	3/4” Plywood
30#	Deck nails or screws
3 gal.	Marine varnish

Cut List	Amounts	Length
A:	40	114 <sup>9/16</sup> ”
B:	40	45 <sup>3/8</sup> ”
C:	20	56 <sup>9/16</sup> ”
D:	20	5”
E:	20	8”
F:	20	46 <sup>7/16</sup> ”
G:	20	23 <sup>1/4</sup> ”
H:	40	45 <sup>5/8</sup> ”
I:	20	41 <sup>3/8</sup> ”
J:	20	41 <sup>7/8</sup> ”
K:	60	44 <sup>7/8</sup> ”

\*All angles 9°



MAKE TWENTY

## 30 ft. Dome Floor – “Star” Method

1. Purchase the items on the materials list.

*NOTE:* If floor is being set up on level land with no crawl space, then 2" zinc chromate plated (brass colored) hardened screws should be used to access some of the hex bolts from above.

2. Cut the boards on the cut list from 2x4x8' fir.

*NOTES:* All boards are measured on longest side. The lengths of most of the boards will vary when non-standard lumber is used.

The dimensions shown on the drawings and the diagonals shown on the cut list are most important. If your lumber is not 1 9/16" (two stacked should be 3 1/8") wide or if you have your own method for filling in the sections, the other dimensions will be different.

Angles shown on the cut list are the angle of the material cut off. For angles less than 45°, this is the angle of the saw cut. Angles greater than 45° may be cut with either a regular circular saw or with a chop saw. To use a circular saw, mark board all the way around, cut top and bottom. To use a chop saw, set up a jig (board clamped to back fence) to assist alignment of the boards entered perpendicular to the back fence and set the miter at 90° minus the designated angle.

3. Assemble the frame pieces as per the drawing.

**Section A:** A9 is in the middle of A1 and A4.

The other boards are offset 16".

**Section B:** B9 is in the middle of B1 and B2. The other boards are offset 16". Check the diagonals to insure proper shape.

**Section C:** C7 is in the middle of 1 and 4. The other boards are offset 16".

**Section D:** D6 is in the middle of and perpendicular to D1. The other boards are offset 16".

**Sections E and F:** 2 is at the end of 1. The other boards are offset 16". Check the diagonals on E to insure proper shape

4. Level one frame piece on the high side of land. Place a 1' x 1' x 3/4" piece of pine or plywood on top of the 4x4 posts to support the corners of this frame piece and adjacent pieces. One pier will be shared at each corner of each pie piece.

*NOTE:* The door goes on a point.

5. Set an adjacent frame piece on two of the same posts, level, and set more piers on the other side.

6. Drill two 5/16" holes through the adjacent boards and bolt them together. *NOTE:* A 'C'-clamp may be useful here.

7. Repeat the procedure adding one or two more piers and post and bolting one more frame until all the piers are set, the posts are cut and the frames are bolted.

*NOTES:* The last frame may need to be pounded into place and other bolts may need to be loosened for placement of the last frame.

Sway brace any posts over 3 feet tall.

8. Cover with suitable decking. Leave 1/2" of decking overhanging around perimeter of framing. If you are covering each pie piece individually, set circular saw to the depth of the decking and cut along a chalk line, 3/8" to the side of where frames are bolted. Nail all boards down except those above bolts. Screws may be left out of some boards for access to firewood, storage or in-ground cooler, and screw eyes may be handy to lift loose boards out. If you are not covering each pie piece individually (full sheets of plywood or long planks), then use only screws on the decking.

9. Rasp edges, lightly sand and finish with two coats of exterior varnish.

# 30 ft. Dome Floor – Star Method

## Frame Cut List

	<u>Length</u>	<u>Angle 1</u>	<u>Angle 2</u>		<u>Length</u>	<u>Angle 1</u>	<u>Angle 2</u>
<b>Section A, quantity = 5</b>				<b>Section D, quantity = 10</b>			
A1	81	36	36	D1	56-1/2	27	16-1/2
A2	65	36	18	D2	69	16-1/2	46-1/2
A3	67	18	36	D3	76-1/2	46-1/2	27
A4	16	36	36	D4	20-1/2	0	63
A5	8-1/2	0	54	D5	36-1/2	0	63
A6	8-1/2	0	54	D6	52	0	73-1/2
A7	30-1/2	0	54	<b>Section E, quantity = 10</b>			
A8	30-1/2	0	54	E1	72-11/16	50-1/2	40
A9	40-1/2	0	0	E2	51-13/16	40	36
<b>Section B, quantity = 5</b>				E3	53-3/32	36	46-1/2
B1	81	18	18	E4	67-31/32	46-1/2	50-1/2
B2	49-1/2	18	18	E5	24-9/16	40	79-1/2
B3	49-1/2	18	18	E6	55-1/2	40	36
B4	49-1/2	18	18	E7	53-1/2	40	36
B5	21-1/2	0	72	Diagonal	49		
B6	21-1/2	0	72	Diagonal	116-1/2		
B7	47	0	0	<b>Section F, quantity = 10</b>			
B8	47	0	0	F1	56-1/2	41	9
B9	47	0	0	F2	52	9	40
Diagonal	81-1/2			F3	70-1/2	40	41
<b>Section C, quantity = 5</b>				F4	4	9	40
C1	48-1/2	18	18	F5	20	9	40
C2	74	18	54	F6	36	9	40
C3	76-1/2	54	18				
C4	16	18	18				
C5	21	0	72				
C6	21	0	72				
C7	43	0	0				

### Material List

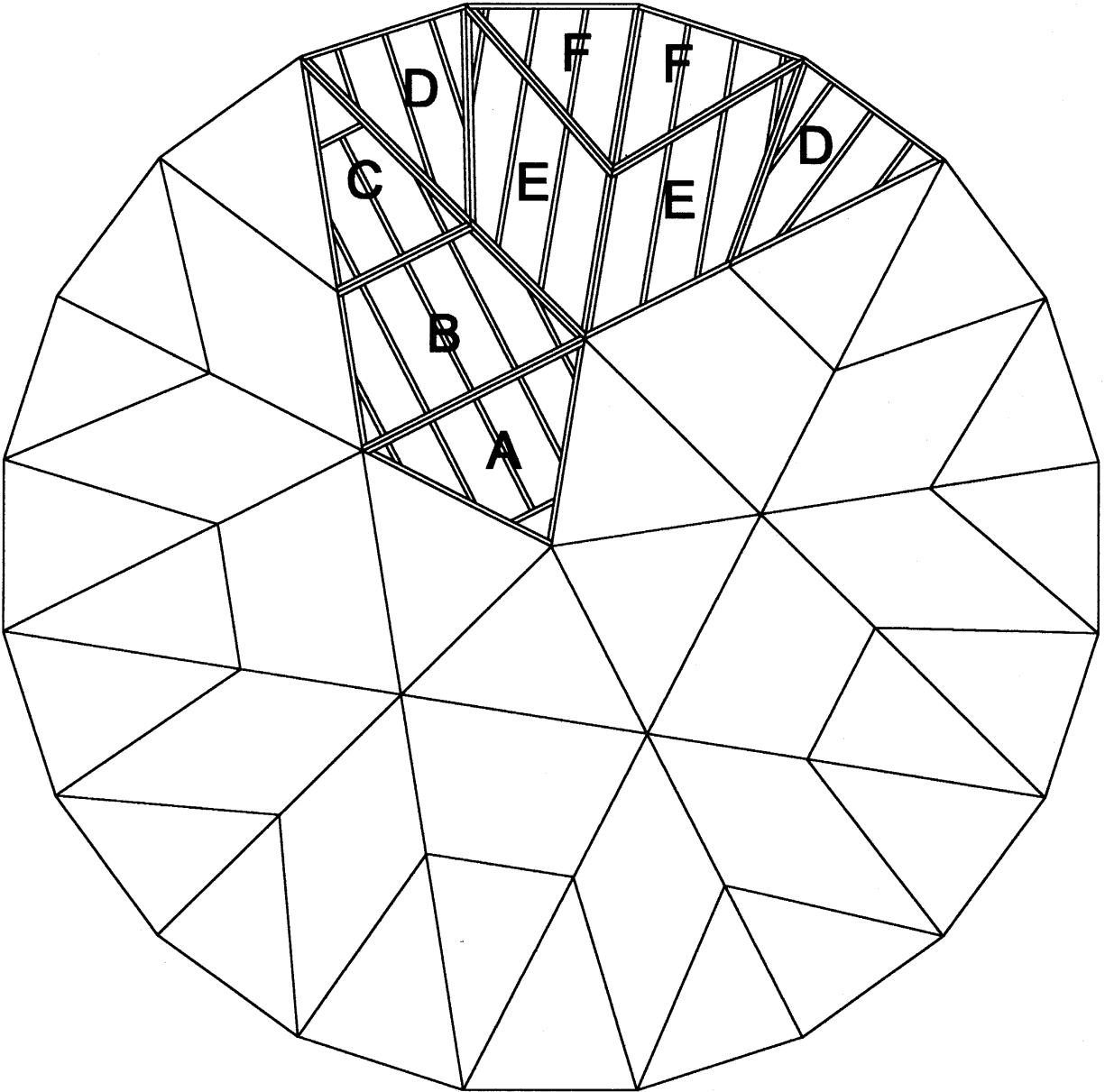
Qty.	Item
210	2" x 4" x 8 ft. fir
1	50# box of 16d galvanized box nails
41	Wood-topped pier blocks
A/R*	4 x 4 cedar, redwood or pressure treated fir
130	5/16" x 3-1/2" long hex bolts
130	5/16" hex nuts
260	5/16" flat washers
700+	Square feet of suitable decking
A/R*	Fasteners for decking
5	Gallons exterior varnish

\* As required

All lengths are shown for the long side of the board and assume standard width (1-9/16") lumber. Angles shown are the angle of the material cut off. For angles less than 45°, is the angle of the saw settings.

# 30 ft. Dome Floor – Star Method

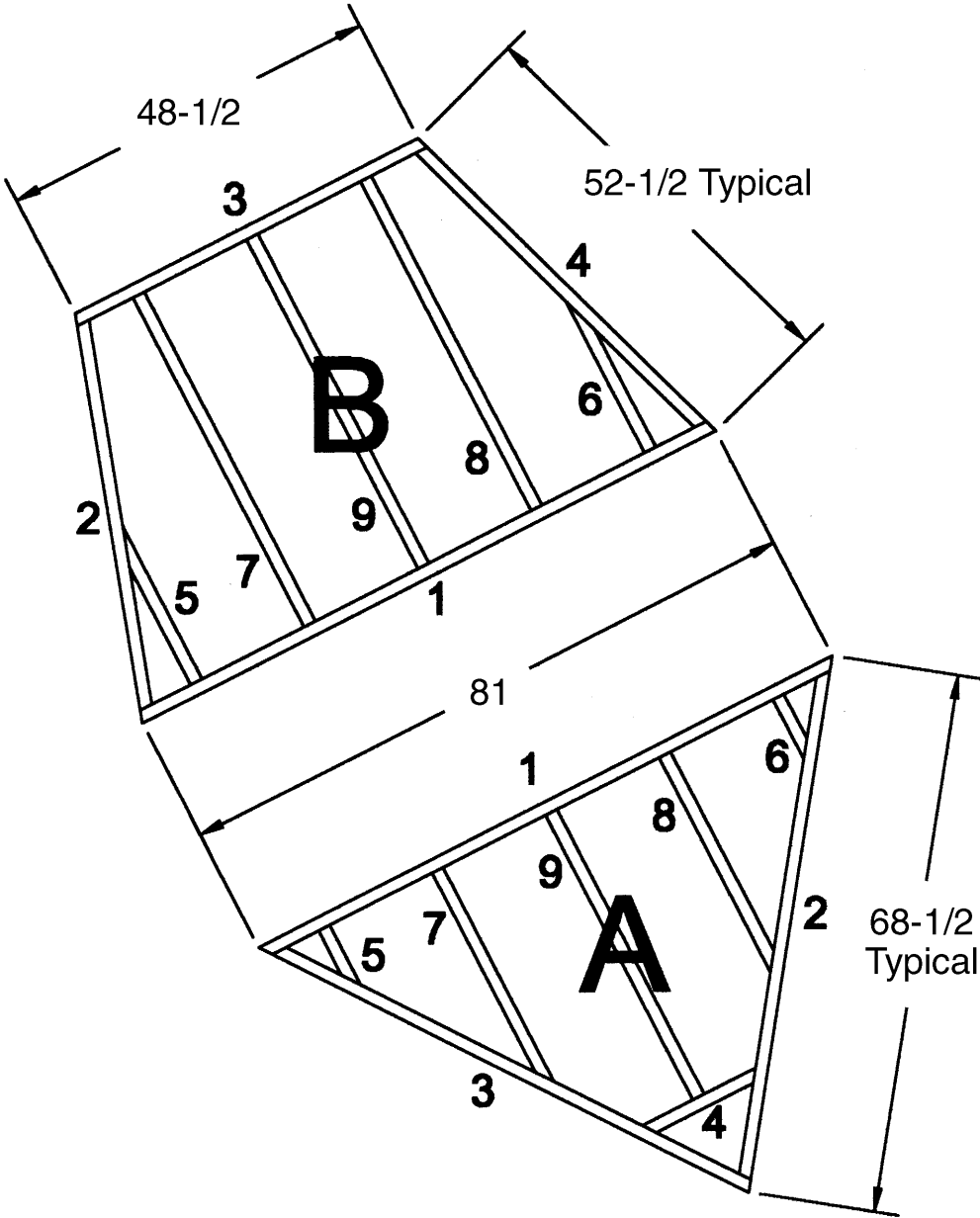
(figure 1)





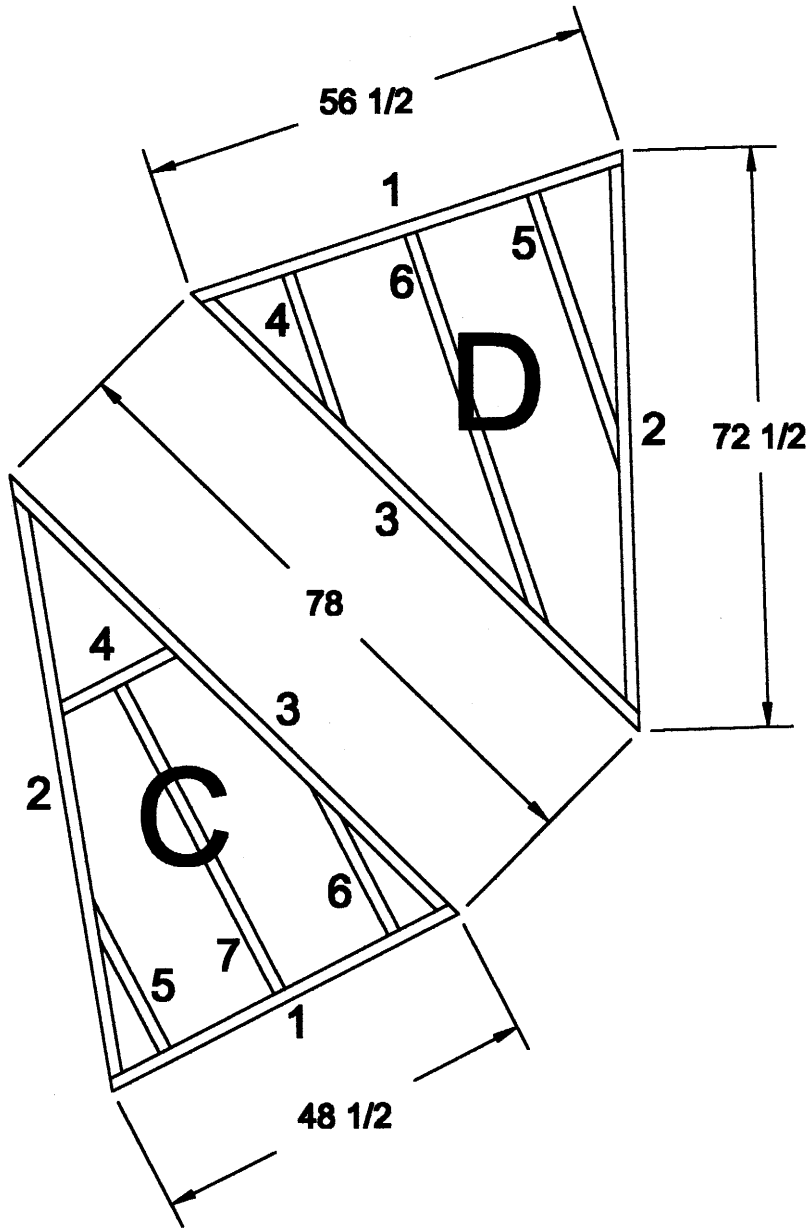
# 30 ft. Dome Floor – Star Method

(figure 2)



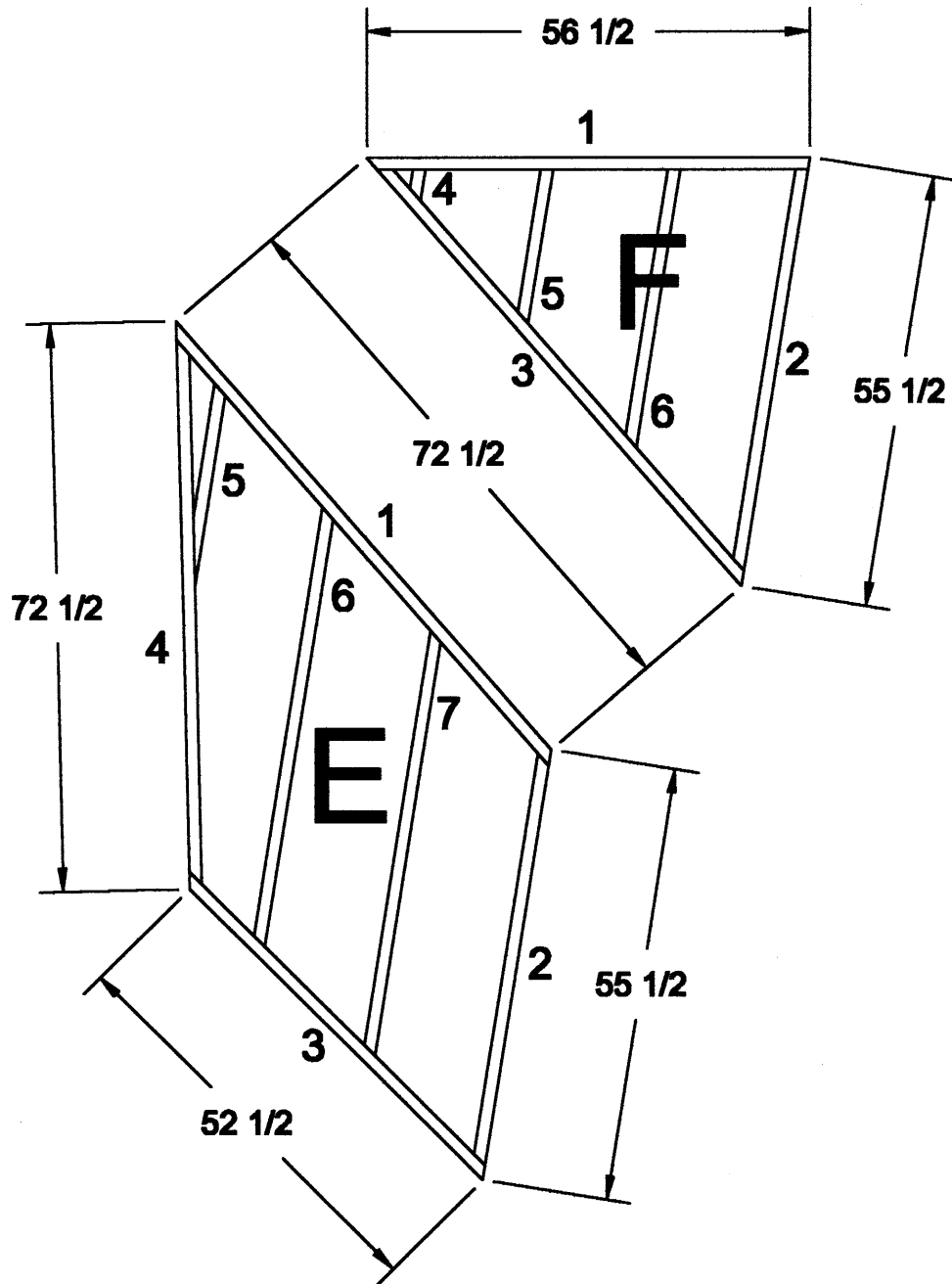
# 30 ft. Dome Floor – Star Method

(figure 3)



# 30 ft. Dome Floor – Star Method

(figure 4)



## 30 ft. Dome Floor – Joist Method

1. Lay out the pier blocks according to *Figure 1*. Dig each pier block into the ground an inch or two and make each level with itself.
2. Cut and lay out beams according to *Figure 1*. Leave the ends of the beams long (extending past the perimeter of the floor). Cut them later.
3. Level the beams with lengths of 4"x4" atop the piers.
4. From 10 of the 10ft. boards, cut 20 "C" boards.  
From 2 of the 24ft. boards, cut 2 "I" boards.  
From 2 of the 24ft. boards, cut 2 "J" boards.  
From 2 of the 20ft. boards, cut 2 "K" boards.  
From 2 of the 16ft. boards, cut 2 "L" boards.  
From 2 of the 10ft. boards, cut 2 "M" boards.  
From 1 of the 20ft. boards, cut 1 "N" board.  
From 4 of the 8ft. and 24ft. boards, cut 4 "D" boards.  
From 2 of the 8ft. and 24ft. boards, cut 2 "E" boards.  
From 2 of the 8ft. and 24ft. boards, cut 2 "F" boards.  
From 2 of the 8ft. and 24ft. boards, cut 2 "G" boards.  
From 2 of the 8ft. and 24ft. boards, cut 2 "H" boards.  
*Note:* All board length dimensions refer to the long side of the board.
5. Frame according to fig. 2. All joists are 16" centers.
6. Cover with plywood according to fig. 3.

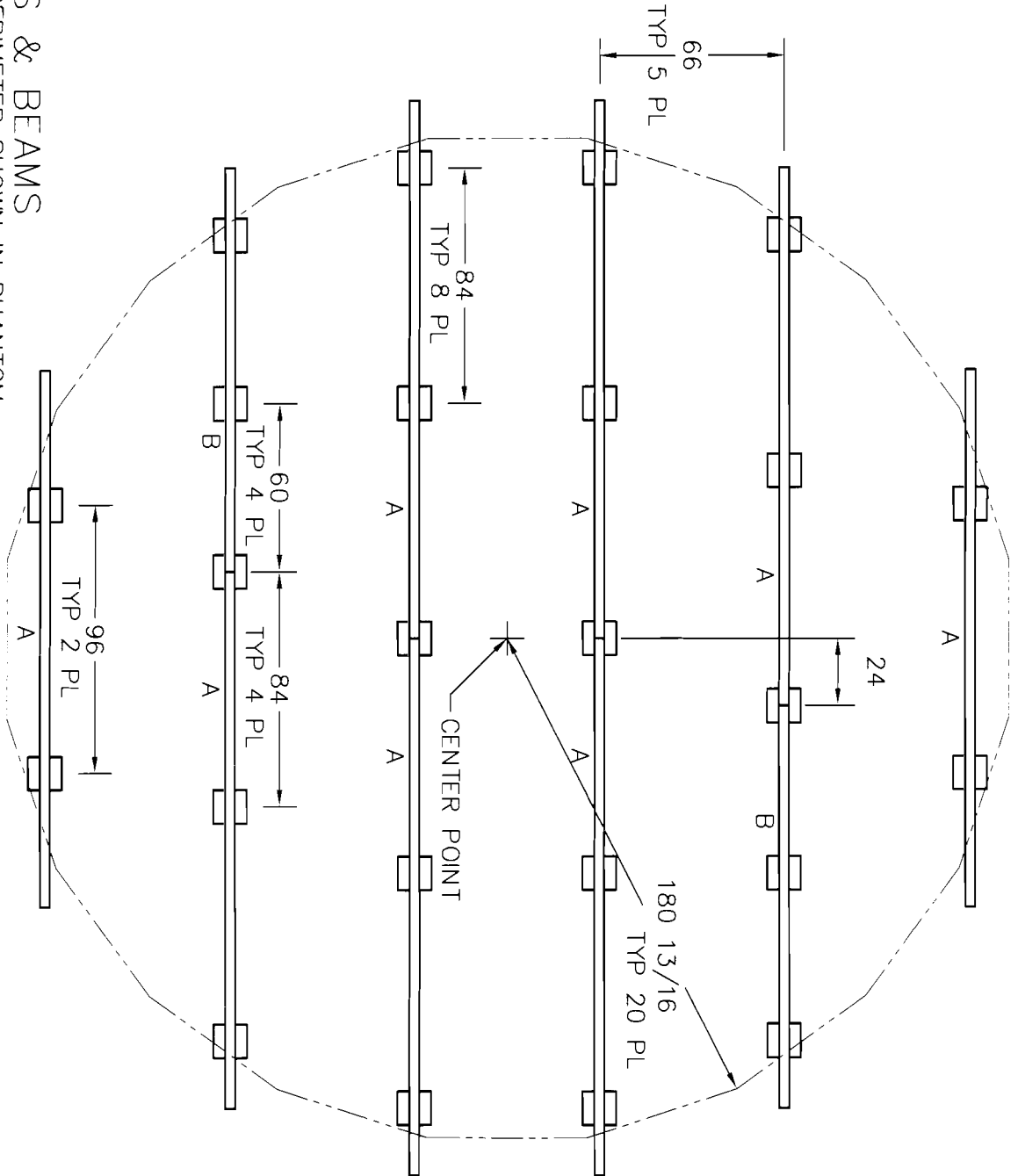
## 30 ft. Dome Floor – Joist Method

Material List	
Qty.	Item
23	Wood-topped pier blocks
A/R*	4" x 4"
12	2" x 6" x 8ft.
12	2" x 6" x 10ft.
2	2" x 6" x 16ft.
3	2" x 6" x 20ft.
16	2" x 6" x 24ft
25#	16d galvanized box nails
25#	8d galvanized nails
25	$\frac{3}{4}$ " plywood
4 Gal.	Exterior varnish
*As Required	

Frame Cut List				
Letter	Qty.	Size	Length <sup>1</sup>	Ends
A	8	4" x 6"	16ft.	0
B	2	4" x 6"	12ft.	0
C	20	2" x 6"	56 <sup>9/16</sup> ,"	9° both ends
D	8	2" x 6"	4 @ 275 <sup>3/16</sup> ," & 4 @ 77 <sup>3/16</sup> ,"	0° both ends
E	4	2" x 6"	2 @ 271 <sup>9/16</sup> ," & 2 @ 73 <sup>9/16</sup> ,"	18° one end
F	4	2" x 6"	2 @ 266 <sup>3/8</sup> ," & 2 @ 68 <sup>3/8</sup> ,"	18° one end
G	4	2" x 6"	2 @ 261 <sup>3/16</sup> ," & 2 @ 63 <sup>3/16</sup> ,"	18° one end
H	4	2" x 6"	2 @ 253 <sup>5/8</sup> ," & 2 @ 55 <sup>5/8</sup> ,"	36° one end
I	2	2" x 6"	287 <sup>9/16</sup> ,"	36° both ends
J	2	2" x 6"	264 <sup>5/16</sup> ,"	36° both ends
K	2	2" x 6"	230"	54° both ends
L	2	2" x 6"	186"	54° both ends
M	2	2" x 6"	116 <sup>1/4</sup> "	72° both ends
N	1	2" x 6"	206 <sup>7/16</sup> ,"	0° both ends

All lengths are shown for the long side of the board.

PIERS & BEAMS  
 JOIST PERIMETER SHOWN IN PHANTOM



PACIFIC DOMES

DRAWING NAME:  
 30 JOIST DECK

DRAWING NUMBER:  
 SD-30-16

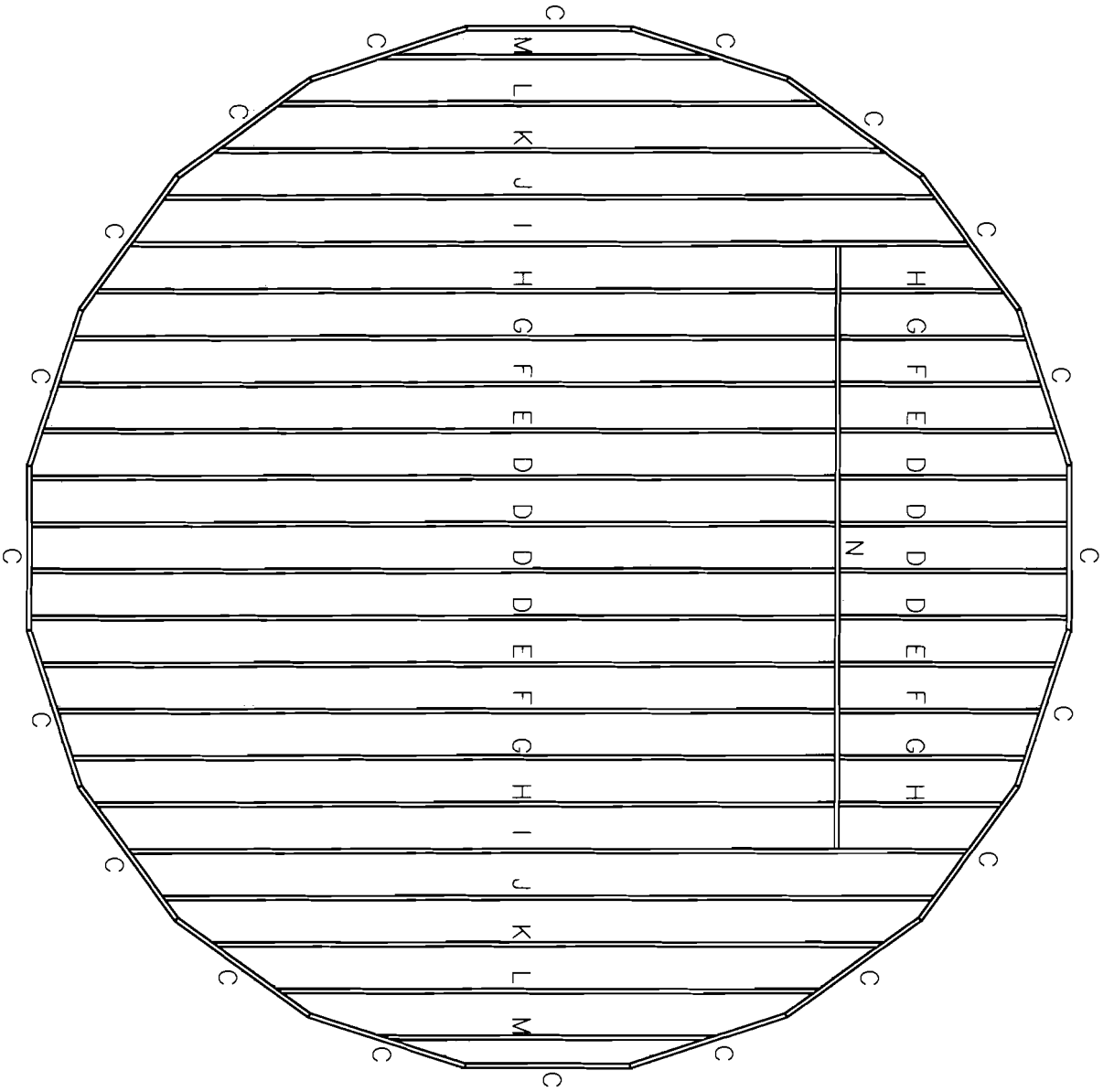
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JOISTS



PACIFIC DOMES

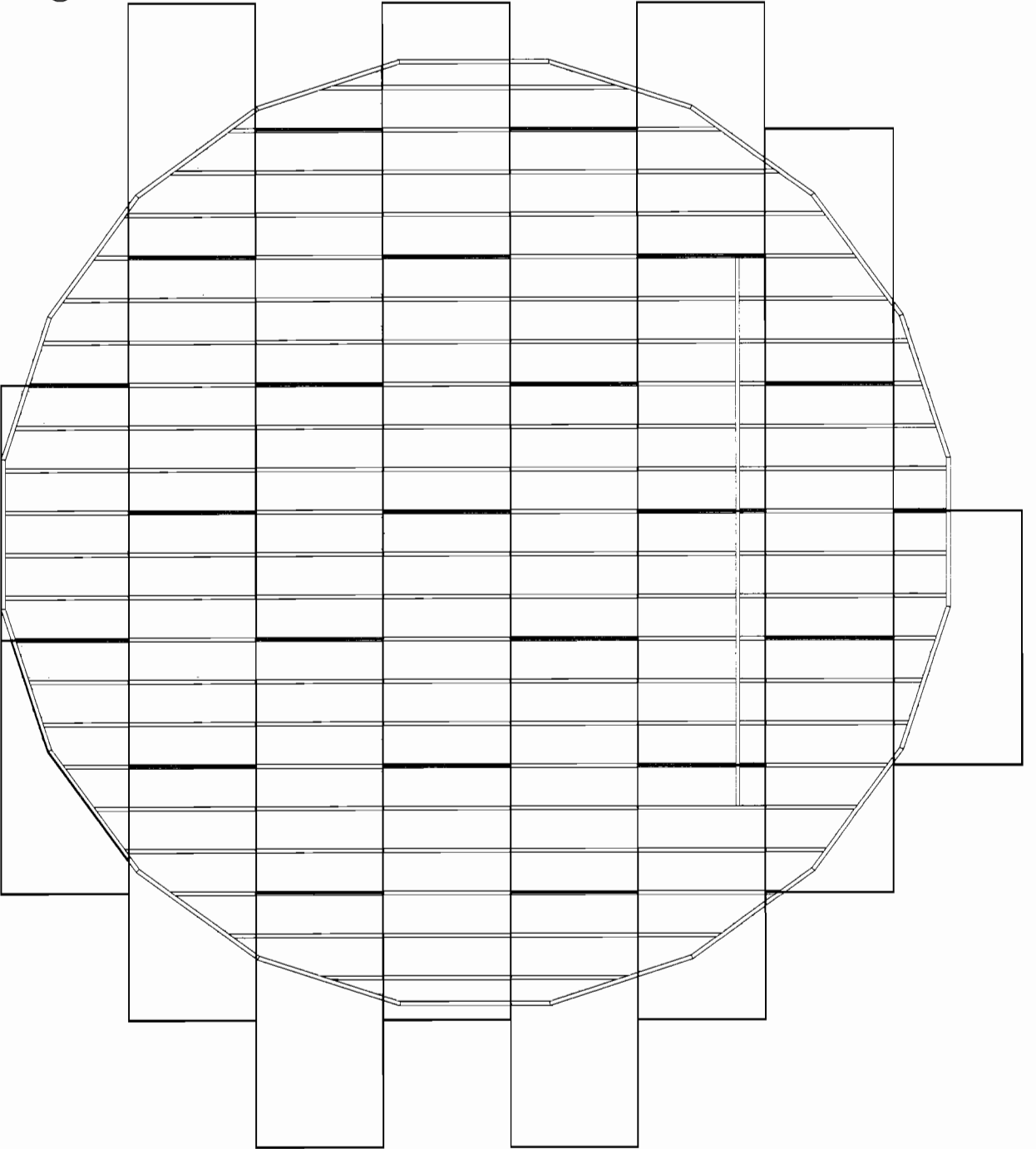
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PLYWOOD

PACIFIC DOMES

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30 JOIST DECK

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# **30 ft. Dome Perimeter Boards**

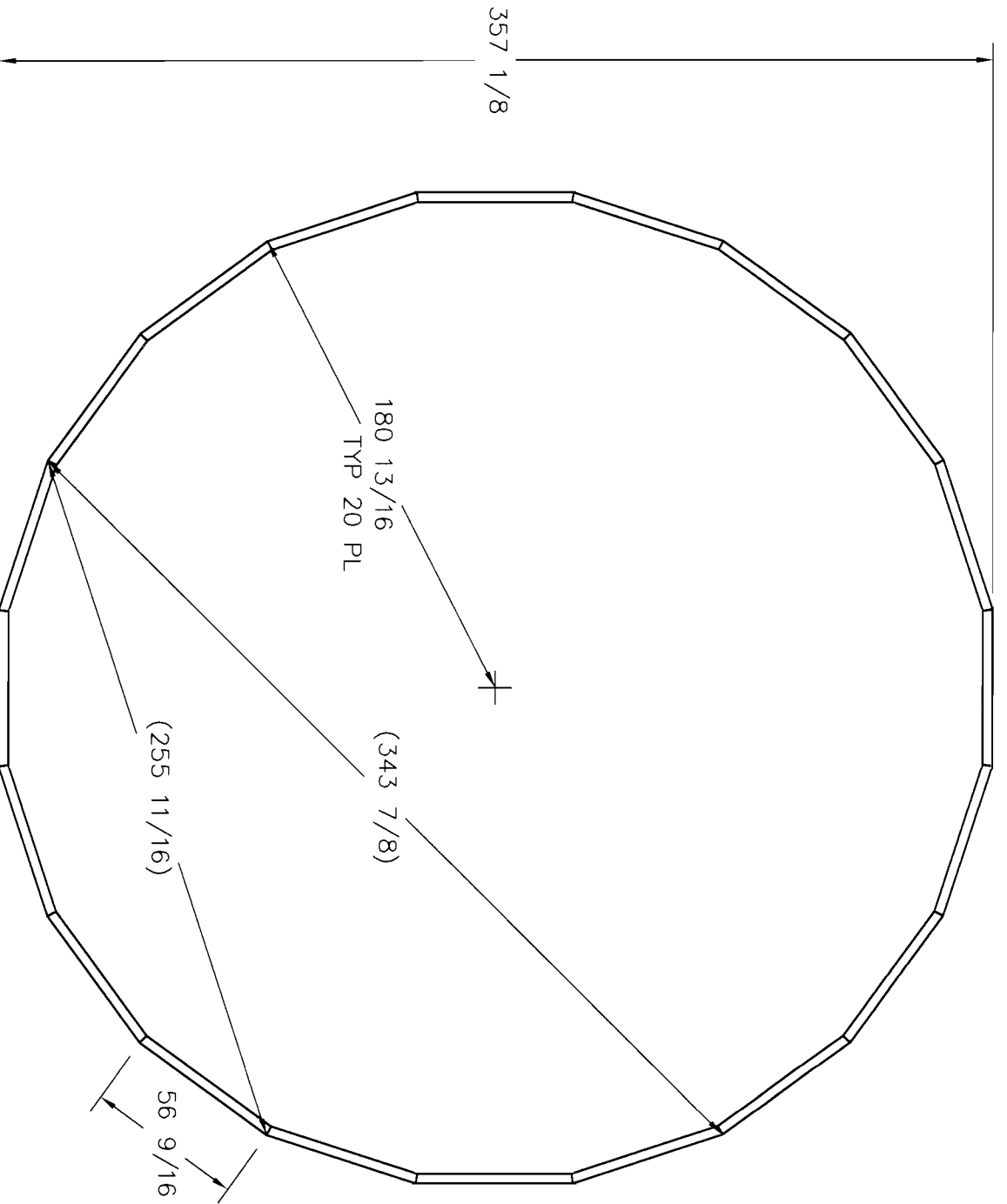
## **For Setup on Earthen or Pre-existing Floor**

1. **Cut twenty pieces of lumber 56-9/16" long on the long side, with 9° angles on each end (see *diagram*).**

**You may use 2x6, 2x8, 2x10, 2x12, 4x4, etc., cedar, redwood, or fir.**

**In the diagram the dashed line represents the width of 4" lumber. Shorter boards leave the dome skin close to the ground and, in moist situations this may cause premature failure of the skin. Taller boards will make the dome taller and will be harder to step over when you enter the dome. Cedar, redwood or pressure treated fir is required to ensure resistance to rot in cases where the wood is in contact with the earth or moisture for extended periods of time.**

2. **Pre-drill pilot holes and screw adjacent perimeter boards together, from the outside, with galvanized or zinc chromate plated drywall screws, 3" or longer. For assembly on pre-existing floor, seal between the boards with a quality caulk/sealant. We do not encourage setting up on a pre-existing floor because if it is not done properly, moisture will get in.**
3. **Measure and adjust the diameter in several places to resemble those shown in the diagram.**
4. **Make the perimeter boards coplanar with a visual check and the back of a hammer or other digging tool. Coplanar means "on the same plane." This is not necessarily level. Place your dome frame on the top of the perimeter board, placing the hubs on the outer edge of perimeter board points.**
5. **To anchor your dome against high winds drill a hole through each perimeter board and pound rebar through the hole and into the ground.**
6. **Assemble the dome struts and cover with the skin. Fasten the skin to the perimeter boards through the grommets with the provided screws.**



30' DOME PERIMETER BOARDS  
 FOR EARTHEN OR  
 PRE-EXISTING FLOORS

PACIFIC DOMES

DRAWING NAME:  
 30' PERIMETER

DRAWING NUMBER:  
 SD-30-17

DATE:  
 15 FEB 2006

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# Cob Floors For Domes

\*Use in conjunction with our wooden perimeter plans

## **General Info.**

Cob is a natural building material made from clay, sand, straw and water. Cob is an inexpensive alternative to wood or cement. Cob floors have an earthy and organic feel and can often be made from materials already available.

## **Siting and designing a cob floor:**

Choose a site for a cob floor at the top of a small rise or ridge where water will flow away from your dome. If your ground is sloped, you might consider having a multi-leveled floor. A multi-leveled floor can help define different areas, by stepping or gently sloping the cob-floor cold air can be directed, like water, to the lowest point. In some climates it is possible to use this method for cold storage, even instead of a refrigerator. Yet you should plan for your finished floor to be at least two inches above the ground.

## **Temperature:**

The temperature in the ground below the frost line is the same as the average yearly air temperature. This temperature is constant throughout the year. If this is a comfortable temperature, you can build your cob floor directly on the ground, and your floor will stay approximately the same temperature as the average air temperature. If the ground temperature is really cold, you may need to insulate underneath and around the edge of the floor. This will reduce the time it takes for heat from the sun or wood stove to reflect back into your space. You can get information from your local builders and building department about the optimum thickness of your cob floor and how deep the insulation should be. (Pretend its concrete as they probably wont understand cob yet.)

## **Passive solar:**

By facing your bay window to the south/southeast, you can optimize your floor's ability to gather heat from the sun in the winter. Cob floors have plenty of thermal mass and can effectively store this energy. Cob can also be used to make benches and wood stoves, which will increase thermal mass generated by your living space.

## **Radiant floor heating systems:**

Running hot water through pipes that are buried in the floor makes radiant floor heating systems. The water can be heated with a modified wood stove or a conventional water heat. This system is compatible with earthen and wood floors. If you choose this method, plan for the cob to be thick enough to cover the hot water pipes. You can find detailed information about radiant floor heating on the Internet.

## **Building a Cob Floor:**

### **Step 1: Site preparation**

First remove the topsoil from your site. Put it where your garden will be! Then level and tamp the sub soil. A base is necessary under the cob unless the soil on site is stable, the area is very dry, and the water runoff from the dome can drain well. In any case you will want a good drainage system to keep your floor from being flooded. A few inches of hard gravel makes a good base, but the more gravel you can put under your perimeter the better. Using hard rock is important, as water will wick through soft rock. Sand or silty soil with a bit of clay also makes a good base, roughly level it. If you use a gravel base either sprinkle it with straw or place old sheets over the gravel. This is necessary to keep the dirt and cob from seeping down into the gravel.

### **Step 2: The cob mix**

The standard cob floor mix is made from 75-85% sand, and 15-25% clay, finely grated straw, and water. An alternative to straw is 15-25% horse or cow manure sifted through a 1/2 inch mesh, and water. Mix the ingredients together well, using your feet. Then put the mixture in a tarp and roll it like dough. The mixture should be stiff like dry brownie dough. You can also add school or carpenter's glue, ground psyllium seed husk, manure, blood, wood ash, oil, or flour to harden, add bounce, or color.

### **Step 3: Applying the cob**

Trowel the mix onto the base in big swaths 1/2" to 1 1/2" thick. You can do one or multiple layers with a final 1/2" finish layer. Start applying the cob on the far side of the dome and work your way toward the door. The floor will need to dry for up to three weeks before it can be sealed. Drying time depends on the size, thickness, and wetness of the floor, air moisture and movement. Open up the windows and door to speed drying. It can take a month to dry in the winter.

This is a summary of cob floor building. It is not intended to be complete instructions. Please refer to [The Cob Builders Handbook](#) for more detailed instructions.

[The Cob Builder's Handbook](#) by Becky Bee is available from Groundworks, PO Box 381, Murphy, OR, 97533. They can also be contacted by email at [cobalot@hotmail.com](mailto:cobalot@hotmail.com), and their website is [www.cpros.com/~sequoia](http://www.cpros.com/~sequoia).

### **Other Earthen Floor Possibilities:**

Flat stones, brick, heavy clay, rammed earth, soil cement, and tiles can all be used to make an earthen floor. Depending on your artistic preference and the landscape you are building on, you can combine different earthen floors. A one piece cob floor is the most durable type of earthen floor.