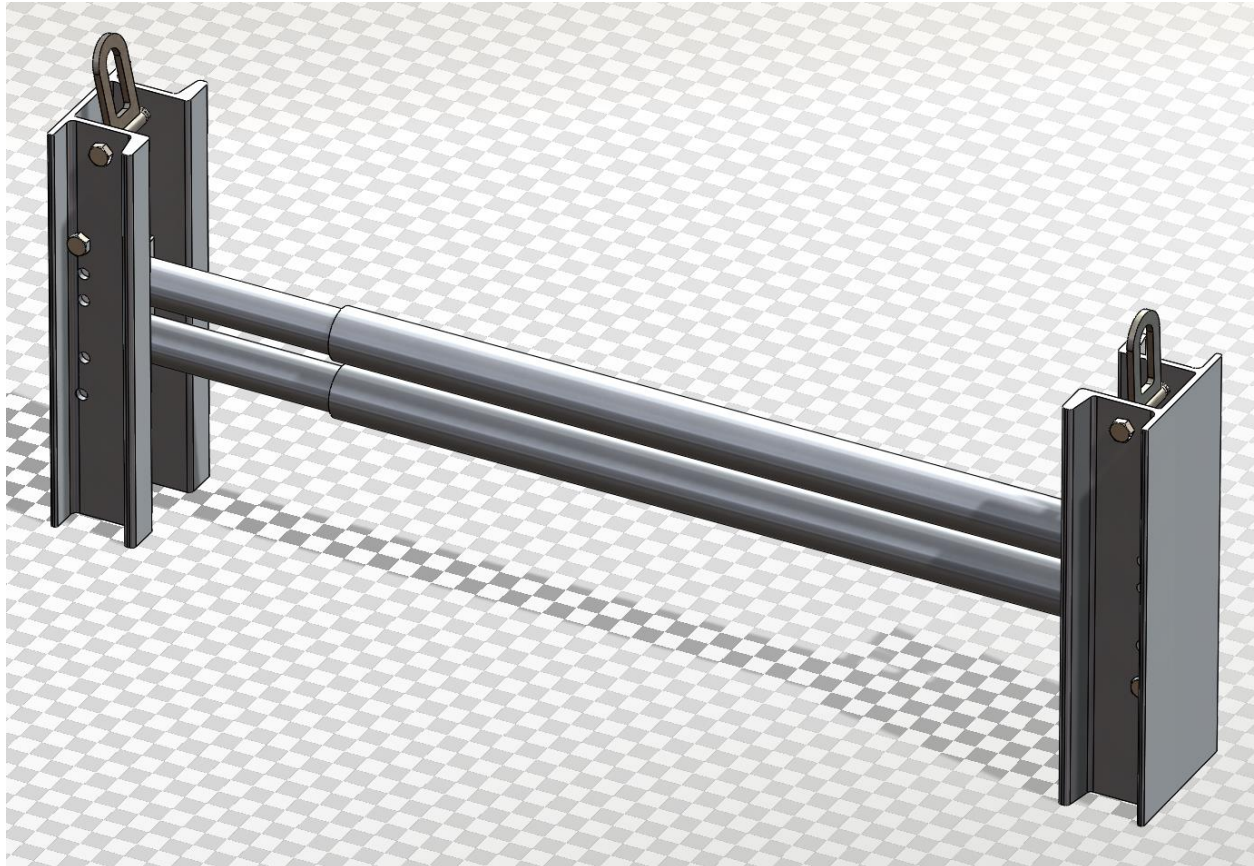


## End Shoring with Double 2" Cylinders

TABULATED DATA  
Effective April 12, 2016



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## Description

Pacific Shoring Double 2" Cylinder packs are used when more pressure is needed in a concentrated area of an excavation wall. One application of this is for shoring the ends of a trench.

When used in trench end shoring, these cylinders require a 3x3x3/16" tube steel oversleeve constructed with ASTM A500 grade B or equivalent.

## General Information for use of Double 2" Cylinder Packs

1. The Double 2" Cylinder Pack tabulated data presented here is based on requirements of Federal OSHA 29CFR, Part 1926, Subpart P-Excavations and Trenches  
**1926.652(c)(2)-Option(2) – Designs Using Manufacturer’s Tabulated Data.**  
1926.652(c)(2)(i) – Design of support systems, shield systems, or other protective systems that are drawn from manufacturer’s tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.  
All provisions of Subpart P apply when utilizing this tabulated data. The contractor’s competent person shall use this data to select allowable trench depth, strut configuration and end condition. The competent person utilizing this tabulated data shall be experienced and knowledgeable of all requirements of Subpart P, and trained in the use and safety procedures for shoring shield applications.
2. Use of this tabulated data is dependent on first classifying the soil in accordance with OSHA Appendix A, Soil Classification. Classification shall be just prior to installing the shoring shield. Soil conditions may change at a later date and require reevaluation of the strength and allowable depth.
3. Double 2" Cylinder Pack is tabulated based on the effect of a 20,000lb surcharge load set back 2ft from the edge of the trench and the equivalent weight effect of the OSHA soil type, see classification of soil types, 2.2.
4. The allowable depth given in **Tables 1, 2, and 3** govern the use of Double 2" Cylinder Packs. This tabulated data applies to cylinders manufactured by Pacific Shoring, LLC.
5. Any alterations to the cylinders or variance from this tabulated data shall be indicated in a site-specific plan prepared and approved by a registered engineer.

6. Faces of excavations shall be vertical.
7. Double 2" Cylinder Packs shall be installed and removed from outside the trench.
8. The competent person shall continually monitor the shored excavation for changed conditions such as water seepage, soil movement cracks at the surface, sloughing or raveling, proper surcharge load weight less than 20,000lbs and setback a minimum of 2ft that may damage the shores.
9. Workers shall always enter, exit, and work inside the shored area of the trench.

## Classification of Soil Types

- 2.1 Soil classification shall be in accordance with OSHA Appendix A and classified just prior to installing hydraulic vertical shores. Soil conditions may change at a later date and require hydraulic vertical shores to be reset at a different spacing.
- 2.2 The equivalent weight of OSHA soil types\* is assumed to be as follows:
  - OSHA Type 'A' Soil      25 PSF per ft of depth
  - OSHA Type 'B' Soil      45 PSF per ft of depth
  - Type 'C-60' Soil          60 PSF per ft of depth
  - OSHA Type 'C' Soil      80 PSF per ft of depth

\* These equivalent weights were adapted from OSHA 1926 Subpart P App C, Timber Shoring for Trenches, Tables C-1.1, C-1.2, and C-1.3

\*\* Type C-60 soil is not identified or classified in OSHA Appendix A
- 2.3 Type C-60 soil is soil that does not qualify as OSHA Type A, or Type B, can be cut with vertical walls and will stand up long enough to safely insert and pressurize the hydraulic shore.

## Allowable Usage

The following tables govern the usage of Pacific Shoring Double 2" Cylinder Packs for End Shore Use:

Table 1: Vertical Spacing for A Soil (in)					
Soil Type					A-25
Depth (ft)	Trench Length				
	8	10	12	14	16
8	48	48	36	32	24
9	48	36	36	28	22
10	44	36	30	24	20
11	44	34	26	22	19
12	36	29	24	18	16
13	31	26	19	17	16
14	28	24	19	17	14
15	25	23	18	16	13
16	24	19	16	13	N/A

Table 2: Vertical Spacing for B Soil (in)					
Soil Type					B-45
Depth (ft)	Trench Length				
	8	10	12	14	16
8	32	24	19	16	13
9	28	22	18	13	N/A
10	24	17	16	N/A	N/A
11	22	17	13	N/A	N/A
12	18	14	N/A	N/A	N/A
13	17	13	N/A	N/A	N/A
14	16	N/A	N/A	N/A	N/A
15	16	N/A	N/A	N/A	N/A
16	13	N/A	N/A	N/A	N/A

Table 3: Vertical Spacing for C-60 Soil (in)					
Soil Type					C-60
Depth (ft)	Trench Length				
	8	10	12	14	16
8	24	16	13	N/A	N/A
9	18	16	N/A	N/A	N/A
10	17	13	N/A	N/A	N/A
11	14	N/A	N/A	N/A	N/A
12	13	N/A	N/A	N/A	N/A
13	13	N/A	N/A	N/A	N/A

Tables 1-3 Notes:

1. All dimension are in inches. Measurements shall be taken from the centerline of each double cylinder pack and shall never exceed 4ft (48in).
2. 3" x 3" x 3/16" High Strength Steel Oversleeve must be used when end shoring with double 2" shores.
3. Tabulated spacing assumes at least 1 shore at the bottom of excavation under any pipeline work, and 1 shore directly above pipe. Pipe diameter shall not exceed 36".
4. Spacing between top shore and top of excavation shall never exceed 2ft.

## Allowable Sheeting

Sheeting must be used on the end face of the excavation. Sheeting along the trench shall follow the sheeting requirements of the tabulated used for shoring of the entire trench. Allowable sheeting is as follows:

- 1" Steel Plate
- 1½" Plywood
- ¾" Finland Form
- Pacific Shoring Aluminum Sheeting