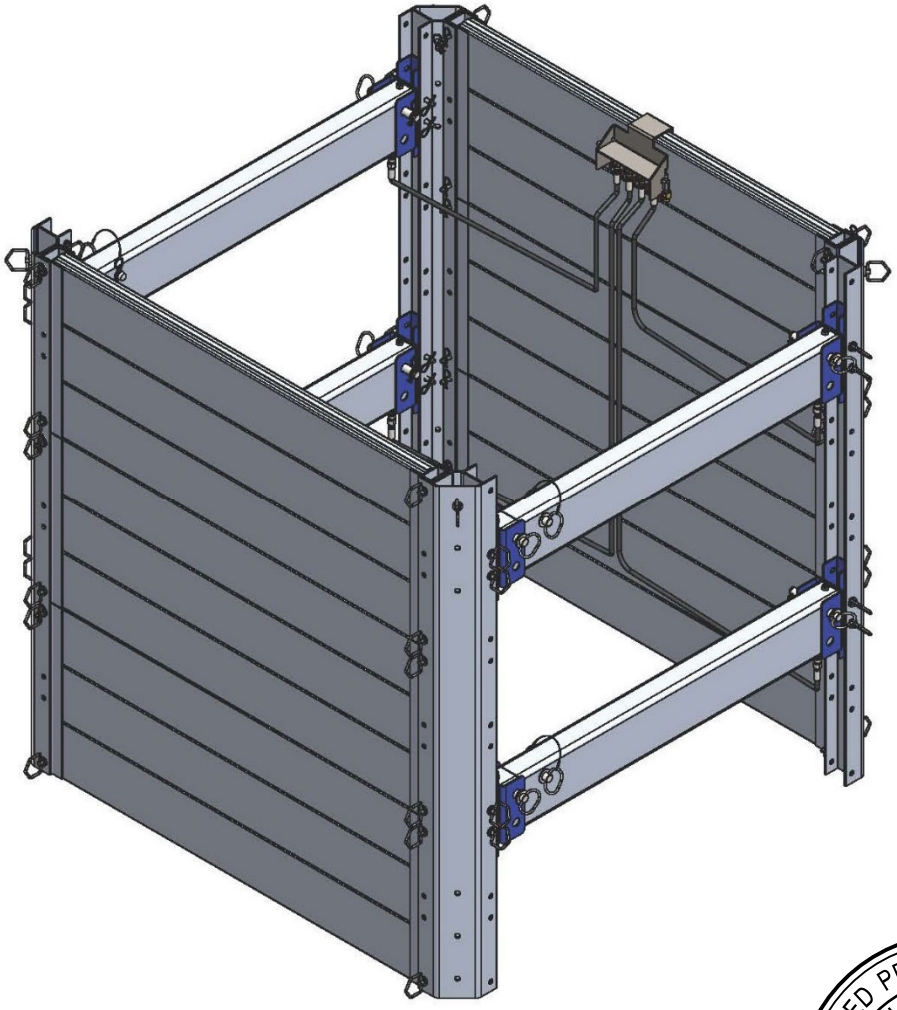
MAPS End Loading Addendum

TABULATED DATA
Effective February 18th, 2025



Signed 2/18/2025

General Information for the use of the MAPS End Loading Addendum

1. The MAPS End Loading Addendum tabulated 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 the appropriate MAPS end loading configuration. 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 trench and shoring 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 systems. The soil conditions may change at a later date and require revaluation of the strength of the system and allowable depth.

3. The MAPS End Loading Addendum is tabulated based on the effect of a 20,000 lb. surcharge load set back 2 ft. from the edge of the trench and the equivalent weight effect of the OSHA soil type, see classification of soil types on **Page 3.**

4. The allowable depths and spacings given in **Tables 1 - 6** govern the use of Pacific Shoring Products MAPS End Loading Addendum and not tabulations given by other manufacturers. This tabulated data applies to Red-Blue MAPS, Yellow MAPS, and Orange MAPS Systems manufactured by Pacific Shoring Products, LLC; Any alterations to the boxes or variance from this tabulated data shall be indicated in a site-specific plan prepared and approved by a registered professional engineer.

5. The MAPS End Loading Addendum is tabulated based on the use of 2-Sided Modular Aluminum Panel Systems in the hydraulic configuration with Pacific Shoring Products Power Struts and the use of continuous corner posts in each application.

6. MAPS End Loading applications may be stacked, Hydraulic shields are not required to be pinned, as long as they are fully pressurized against trench walls during use and periodically checked.

7. MAPS End Loading applications are not designed to support vertical loads and should not be used as a means of access or egress to the trench. Workers shall always enter, exit, and work inside the shored area of 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 20,000 lbs. and setback a minimum of 2 ft. that may damage the MAPS System.

9. If the excavation is combined with sloping or benching, the maximum excavation depth without a site-specific plan is 20 ft. If MAPS Systems are set in trenches that are sloped above, extend the box 18 in. above the hinge point. Slopes shall be in accordance with OSHA Appendix B sloping and benching.

10. The faces of the end and corner of the excavations shall be vertical and the end wall shall be within 6" of the sheeting. If the soil face is greater than 6" backfill the void with excavated soil or crushed rock.

11. The MAPS End Loading Addendum is intended to be used in conjunction with the Applicable MAPS Tabulated Data for the systems in use. All allowable depth and spacings limitations shall be followed in strict compliance.

12. Modular Aluminum Panel Systems may be set a maximum of 2 ft. from the bottom of the excavation. Provided the vertical clearance of 4 ft. is not exceeded and the allowable corner post cantilever does not exceed the allowable limits outlined in the corresponding MAPS tabulated data. The trench depth is considered to be the full distance to the bottom of the excavation.

13. The Hydraulic Power Struts must be used in conjunction with Pacific Shoring Products Adapter Brackets. Hydraulic Power Struts from other manufacturers may be used provided they meet or exceed the minimum capacity requirements.

Classification of Soil Types

1. Soil classification shall be in accordance with OSHA Appendix A and classified just prior to installing Modular Aluminum Panel Systems. Soil conditions may change at a later date and require the competent person to check soil conditions periodically and adjust accordingly.

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.

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 system.

4. Modular Aluminum Panel Systems may be used in C-80 soil provided they are dug into the excavation and not driven into the soil.

Allowable Width Spans, (Horizontal Power Strut Orientation)

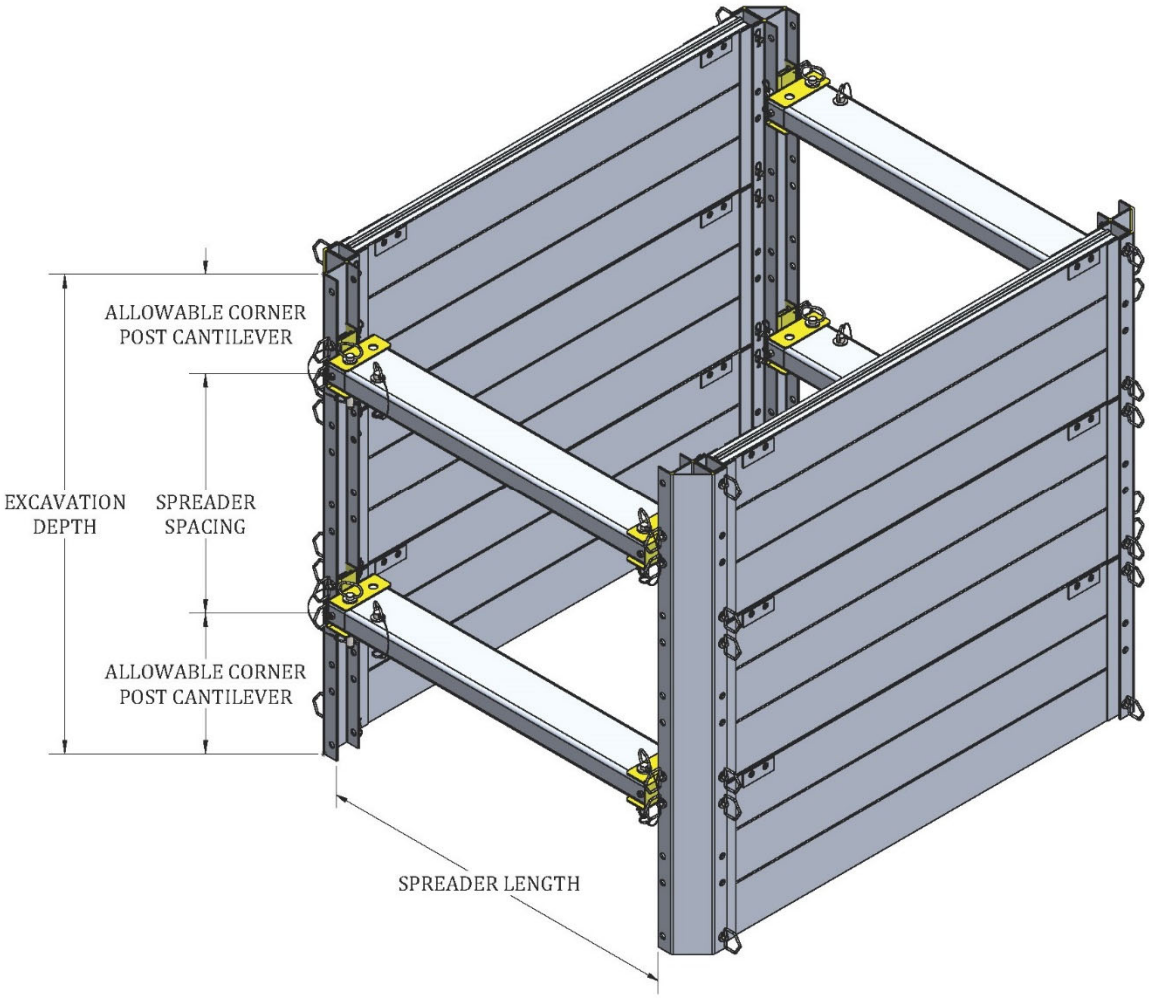


Table 1. (4 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Horizontal	6	10.0	10.0	10.0	9.5
	8	10.0	10.0	9.5	8.4
	10	10.0	9.8	8.6	7.6
	12	10.0	9.0	7.9	7.0
	14	10.0	8.4	7.4	6.5
	16	10.0	7.9	7.0	6.1
	18	9.8	7.5	6.6	5.7
	20	9.3	7.2	6.3	5.5
	22	9.0	6.9	6.0	5.2
	24	8.6	6.6	5.7	5.0
	25	8.5	6.5	5.6	4.9

Table 2. (3 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Horizontal	6	10.0	10.0	10.0	10.0
	8	10.0	10.0	10.0	9.7
	10	10.0	10.0	10.0	8.7
	12	10.0	10.0	9.2	8.0
	14	10.0	9.7	8.5	7.5
	16	10.0	9.2	8.0	7.0
	18	10.0	8.7	7.6	6.6
	20	10.0	8.3	7.2	6.3
	22	10.0	7.9	6.9	6.0
	24	10.0	7.6	6.6	5.8
	25	9.8	7.5	6.5	5.7

Table 3. (2 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Horizontal	6	10.0	10.0	10.0	10.0
	8	10.0	10.0	10.0	10.0
	10	10.0	10.0	10.0	10.0
	12	10.0	10.0	10.0	9.8
	14	10.0	10.0	10.0	9.2
	16	10.0	10.0	9.8	8.6
	18	10.0	10.0	9.3	8.1
	20	10.0	10.0	8.9	7.7
	22	10.0	9.7	8.5	7.4
	24	10.0	9.3	8.1	7.1
	25	10.0	9.1	8.0	6.9

Tables 1 – 3. Notes

1. Modular Aluminum Panels and Hydraulic Power Struts must use a minimum of four connecting pins and keepers to secure them to the corner posts.
    a. **(Two per side.)**
2. Tabulated depths are limited to 25 ft. deep. Additional depth may be achieved when the design is by a registered professional engineer.
3. The allowable spreader length is limited to 10 ft.

Allowable Width Spans, (Vertical Power Strut Orientation)

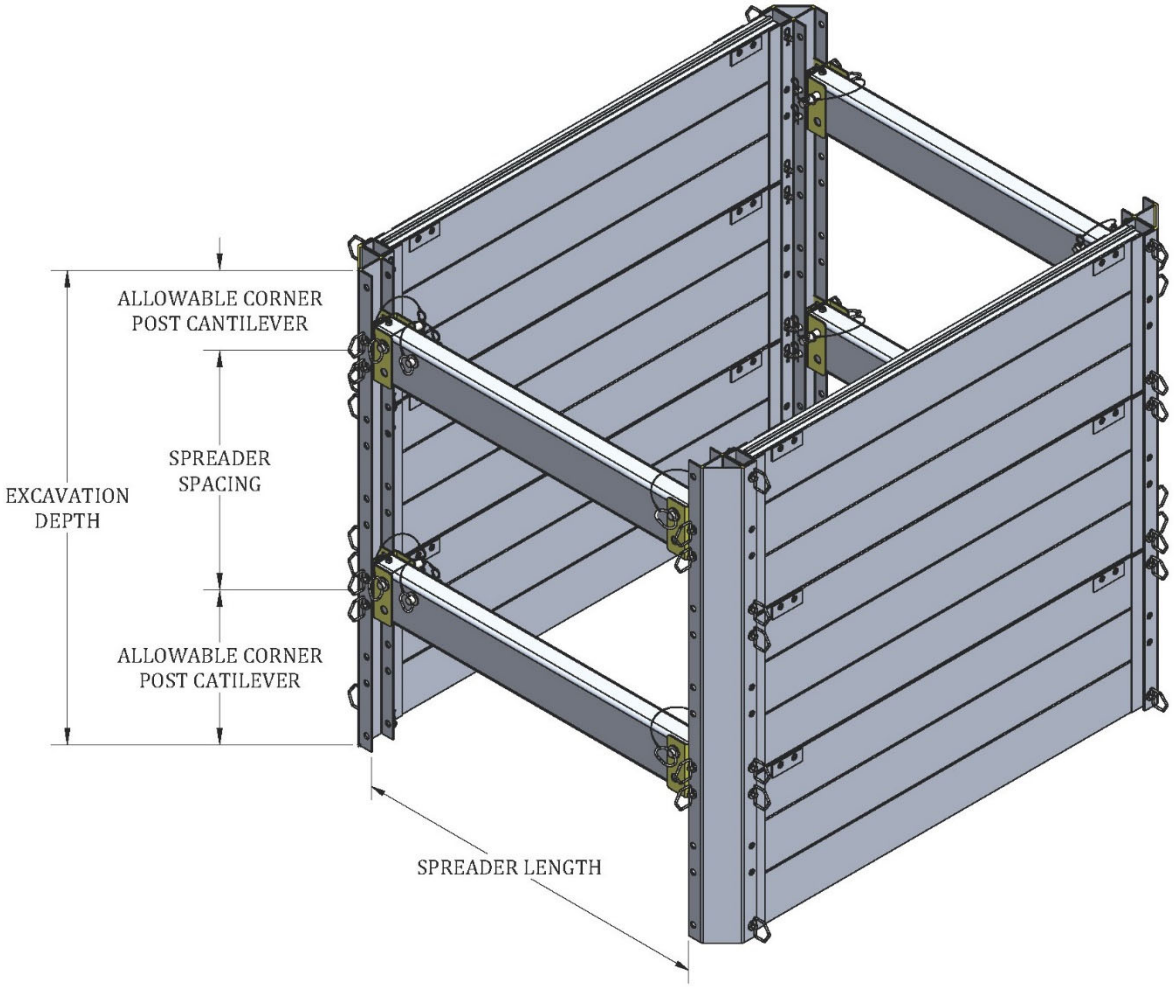


Table 4. (4 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Vertical	6	10.0	9.7	8.7	7.7
	8	10.0	8.7	7.7	6.7
	10	10.0	7.9	6.9	6.1
	12	9.3	7.3	6.4	5.6
	14	8.8	6.8	6.0	5.2
	16	8.3	6.4	5.6	4.9
	18	7.9	6.1	5.3	4.6
	20	7.5	5.8	5.0	4.4
	22	7.2	5.5	4.8	4.2
	24	6.9	5.3	4.6	4.0
	25	6.8	5.2	4.5	4.0

Table 5. (3 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Vertical	6	10.0	10.0	10.0	8.8
	8	10.0	10.0	8.8	7.8
	10	10.0	9.1	8.0	7.0
	12	10.0	8.4	7.4	6.5
	14	10.0	7.8	6.9	6.0
	16	9.6	7.4	6.5	5.7
	18	9.1	7.0	6.1	5.3
	20	8.7	6.7	5.8	5.1
	22	8.3	6.4	5.6	4.9
	24	8.0	6.1	5.3	4.7
	25	7.9	6.0	5.2	4.6

Table 6. (2 ft. On Center) Maximum Spreader Spacing					
Power Strut Spreader Orientation	Depth (ft.)	Allowable Spreader Length (ft.)			
		OSHA Soil Type			
		A-25	B-45	C-60	OSHA Type C
Vertical	6	10.0	10.0	10.0	10.0
	8	10.0	10.0	10.0	9.5
	10	10.0	10.0	9.8	8.6
	12	10.0	10.0	9.0	7.9
	14	10.0	9.6	8.4	7.4
	16	10.0	9.0	7.9	6.9
	18	10.0	8.6	7.5	6.5
	20	10.0	8.2	7.1	6.2
	22	10.0	7.8	6.8	5.9
	24	9.8	7.5	6.5	5.7
	25	9.6	7.4	6.4	5.6

Tables 4 – 6. Notes

1. Modular Aluminum Panels and Hydraulic Power Struts must use a minimum of four connecting pins and keepers to secure them to the corner posts.
    a. **(Two per side.)**
2. Tabulated depths are limited to 25 ft. deep. Additional depth may be achieved when the design is by a registered professional engineer.
3. The allowable spreader length is limited to 10 ft.

Allowable Sheeting

Acceptable sheeting to be used in conjunction with MAPS End Loading applications is as follows.

Table 7: Allowable Sheeting for MAPS End Loading
Material
Two sheets of 3/4" thick CDX Plywood placed back-to-back
1 1/8" thick CDX Plywood
3/4" thick 14 ply Arctic White Birch (Finland Form)
3/4" thick Plyform - APA B-B Class I Exterior
3/4" thick Combi Exterior Plywood
3/4" thick HDO-American Plywood Association, high density overlay exterior
3/4" thick Omni Form
Pacific Shoring Products Aluminum Sheeting
Timber Lagging, Douglas Fir # 1, S4S Nominal Dimension, 1 1/2" x 7 1/2" and 2 1/2" x 7 1/2"
Timber Lagging, Mixed Oak, Rough Cut, 2" x 8", 3" x 8" and 4" x 8"
Minimum 1/2" thick steel plates

Allowable Sheeting Notes

1. When sheeting is used, it must extend to the top of the excavation.
2. Sheeting shall never exceed the maximum allowable spreader lengths specified in **Tables 1 - 6.**
3. If the soil face is greater than 6 in. backfill the void at least 2/3 of its height with excavated soil or crushed rock securing the sheeting.
4. Sheeting may be skipped a maximum of 6 in. provided the soil does not slough or ravel.
    a. **If sloughing or raveling occurs reduce or close the gap until it is prevented.**
5. Sheeting can rest against or can hang over the Hydraulic Power Struts.
6. The maximum cantilever allowed on 3/4" plywood or finnform end sheeting elements is 38 in. provided the end sheeting extends to the top of the excavation.
7. The maximum cantilever allowed on all other end sheeting elements listed in **Table 7.** is 4 ft. provided the end sheeting extends to the top of the excavation.
8. End sheeting can only be used if the shield is fully confined by:
    a. Backfilling the area between the shield outer walls and excavation walls with soil.
9. When the end sheeting is placed directly above or beside a crossing utility, the sheeting must be secured in place.
10. In applications where the end sheeting is above a crossing utility the maximum allowable cantilever spans mentioned in **Note 6 & 7**. shall not be exceeded.
11. In applications where the end sheeting is straddling a crossing utility the allowable cantilever spans mentioned in **Note 6 & 7**. shall not be exceeded.