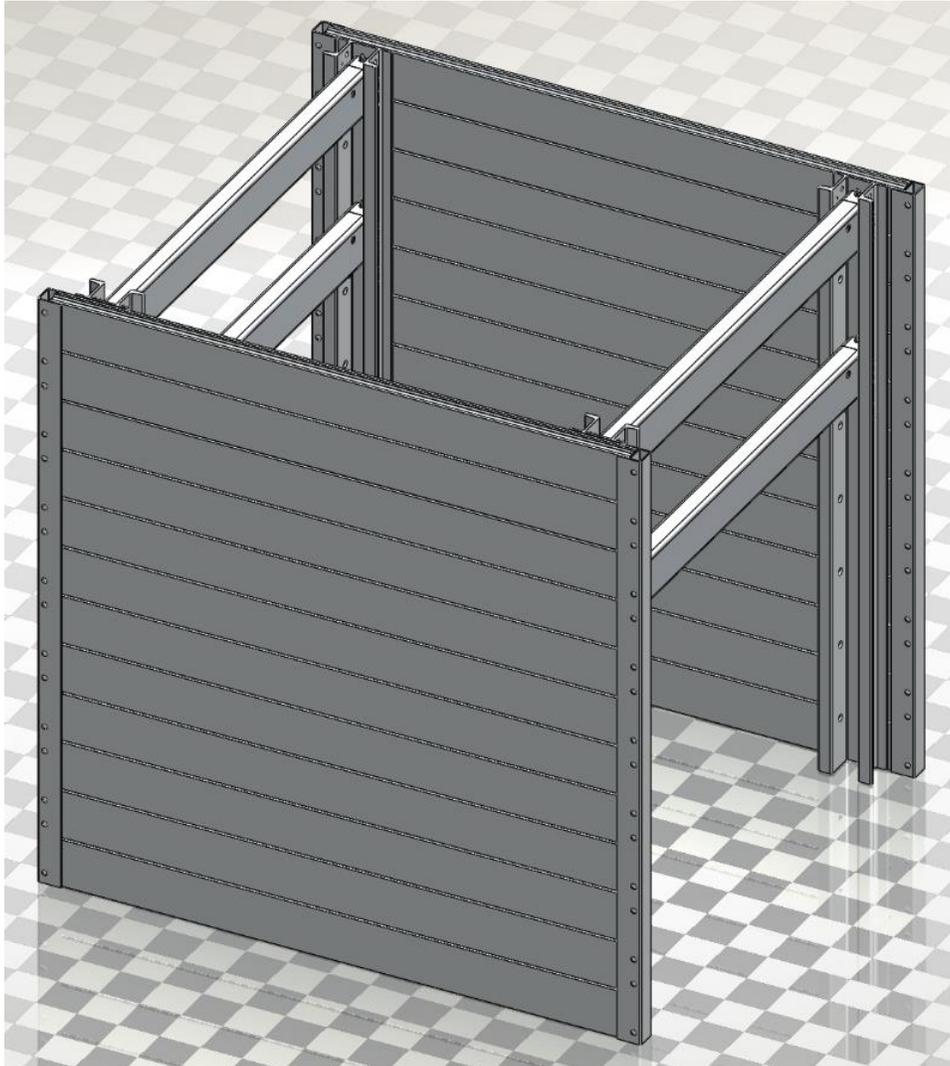


ALUMINUM PANEL SHIELDS HORIZONTAL APS – RED/YELLOW

TABULATED DATA
Effective August 9, 2016



PACIFIC SHORING, LLC

265 Roberts Avenue
Santa Rosa, CA 95407
(707) 575-9014

Construction Engineering Resource

1837 Wright Street
Santa Rosa, CA 95404
Jmtengr2@aol.com
(707) 484-4704



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Description

Pacific Shoring Aluminum Panel Shields are a smooth wall, welded aluminum trench shield. They are modular and can be configured in a variety of ways to accommodate different trench end conditions and pipe clearances. Both static and hydraulic pressurized applications are available. They are easily handled with a backhoe or light excavator. Please refer to the following pages for diagrams and charts detailing the various approved methods of configuring these shields.

General Usage Information

1. This Aluminum Panel Shield (APS-H-Red/Yellow) tabulated data 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 manufacturerAll 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. Refer to the following section, 'Classification of Soil Types' for guidance.
3. Aluminum Panel Shields (APS-H-Red/Yellow) 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.
4. The allowable depth given in Tables 1 and 2 governs the use of Pacific Shoring Aluminum Panel Shields (APS-H-Red/Yellow). This tabulated data applies to aluminum panel shields manufactured by Pacific Shoring, LLC.
5. Any alterations to the shields 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 and the shoring walls shall be within 12 inches of the excavation wall for static applications. For hydraulic applications fill all voids between shield panel and excavation to ensure arching occurs.

7. Aluminum Panel Shields (APS-H-Red/Yellow) may be stacked or longitudinally connected. Provided they are pinned together. Hydraulic shields are not required to be pinned, as long as they are fully pressurized against trench walls during use and periodically checked.
8. Aluminum Panel Shields (APS-H-Red/Yellow) shall be installed and removed from outside the trench, see installation and removal procedure.
9. 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 shields.
10. Workers shall always enter, exit, and work inside the shored area of the trench.
11. Aluminum Panel Shields (APS-H-Red/Yellow) may be set a maximum of 2ft from the bottom of the excavation in A and B soil. The trench depth is the full distance to the bottom of the excavation.
12. Aluminum Panel Shields (APS-H-Red/Yellow) may be used with wheel kits.
13. If excavation is combined with sloping or benching, the maximum depth without site-specific plans is 20ft.

Classification of Soil Types

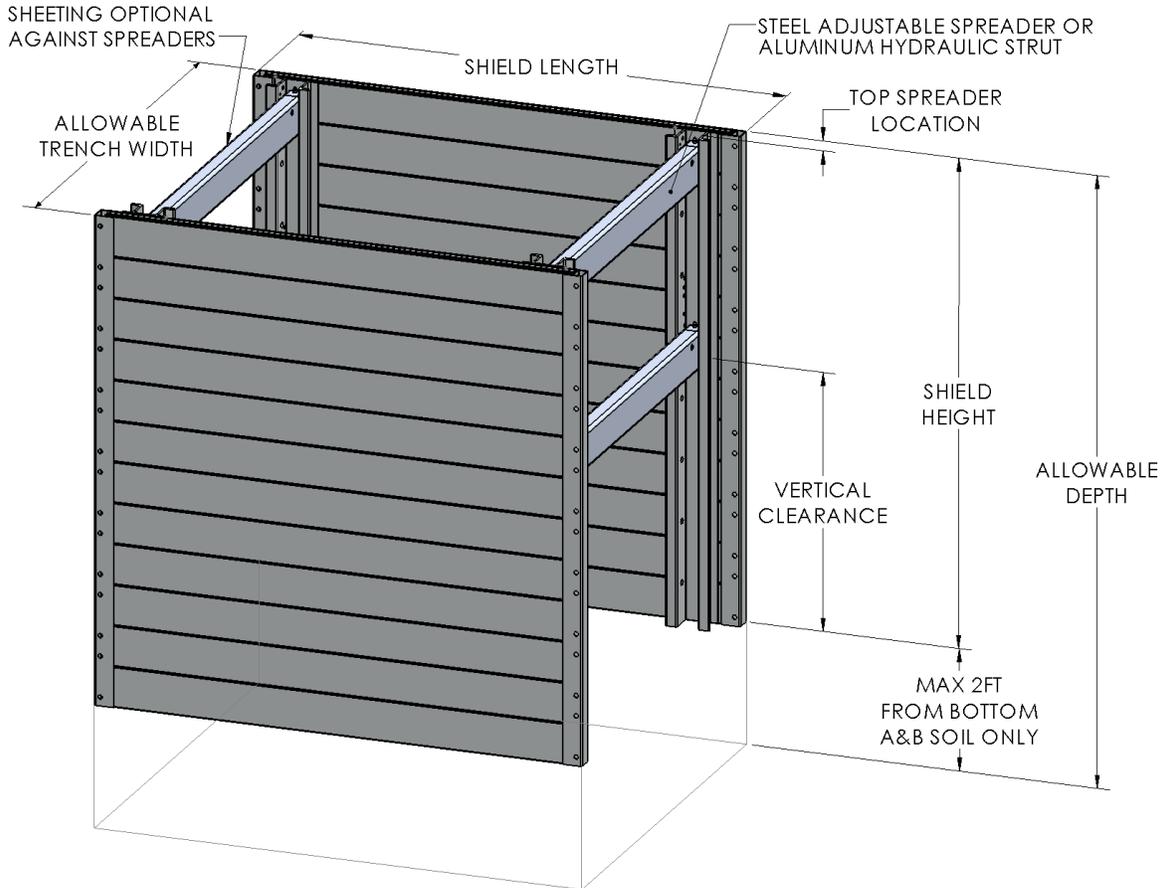
1. Soil classification shall be in accordance with OSHA Appendix A and classified just prior to installing shoring or shielding. Soil conditions may change at a later date and require a change in shield configuration.
2. The equivalent weight of OSHA soil types* is assumed to be as follows:
 - a. OSHA Type 'A' Soil 25PSF per ft of depth
 - b. OSHA Type 'B' Soil 45PSF per ft of depth
 - c. Type 'C-60' Soil 60PSF per ft of depth
 - d. OSHA Type 'C' Soil 80PSF 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, if applicable, the shield.
4. Aluminum Panel Shields can be used in OSHA type 'C' (C-80) soil provided they are dug into the excavation and not driven into the soil.
5. In C-80 soil it is recommended that this equipment be utilized with site-specific plans designed by a registered civil engineer.

Case 1: Standard APS Usage



Applicable to 4, 6, 8, and 10ft High Shields		Measurements for Each Shield Height													
Shield Length (ft)	Capacity (PSF)	Allowable Depth (ft)				Allowable Trench Width (ft)		Vertical Clearance (in)				Top Spreader Location (in)			
		A-25	B-45	C-60	C-80	Without End Loading	With End Loading	4ft	6ft	8ft	10ft	4ft	6ft	8ft	10ft
6	2400	25	25	25	25	12	8	14	26	38	38	2	2	14	14
8	1800	25	25	25	19										
10	1241	25	25	19	15										
12	830	25	17	13	9										
14	595	21	12	9	6										
16	447	15	8	6	5										

Pacific Shoring Corrugated Sheeting
Steel Sheet Piling
1/2" Thick Steel Plate
2" Thick Timber
1 1/8" Thick Plywood
3/4" Finnform

Notes:

1. This data applies to Pacific Shoring shields with steel 4" x 4" x 3/16" spreaders or Pacific Shoring aluminum power struts.
2. Clearances are based on power struts. Steel static spreaders have 2in more clearance.
3. Allowable end sheeting can be found in table 1-1. Note reduced trench width with end sheeting.
4. In A and B soils, if the shield is held 2ft off of the bottom of excavation, end sheeting shall be embedded a minimum of 2ft into bottom of excavation.
5. End sheeting can only be used with static spreaders if shield is fully confined by either:
 - a. Filling in area between shield sides and excavation walls with soil.
 - b. End loading shield on both ends, with less than 6 inches between sheeting and excavation wall.
6. All information on pages 2, 3, and 8 apply to this table.

Case 2: High Clearance APS Usage

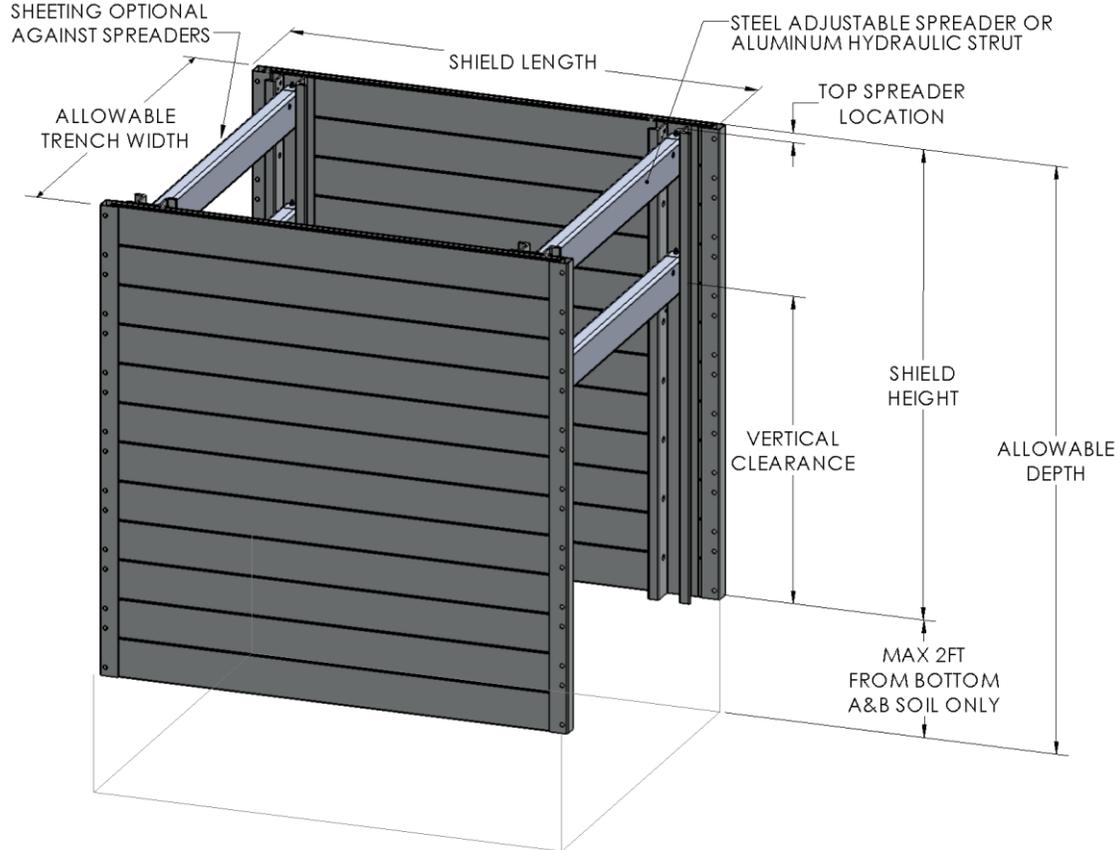
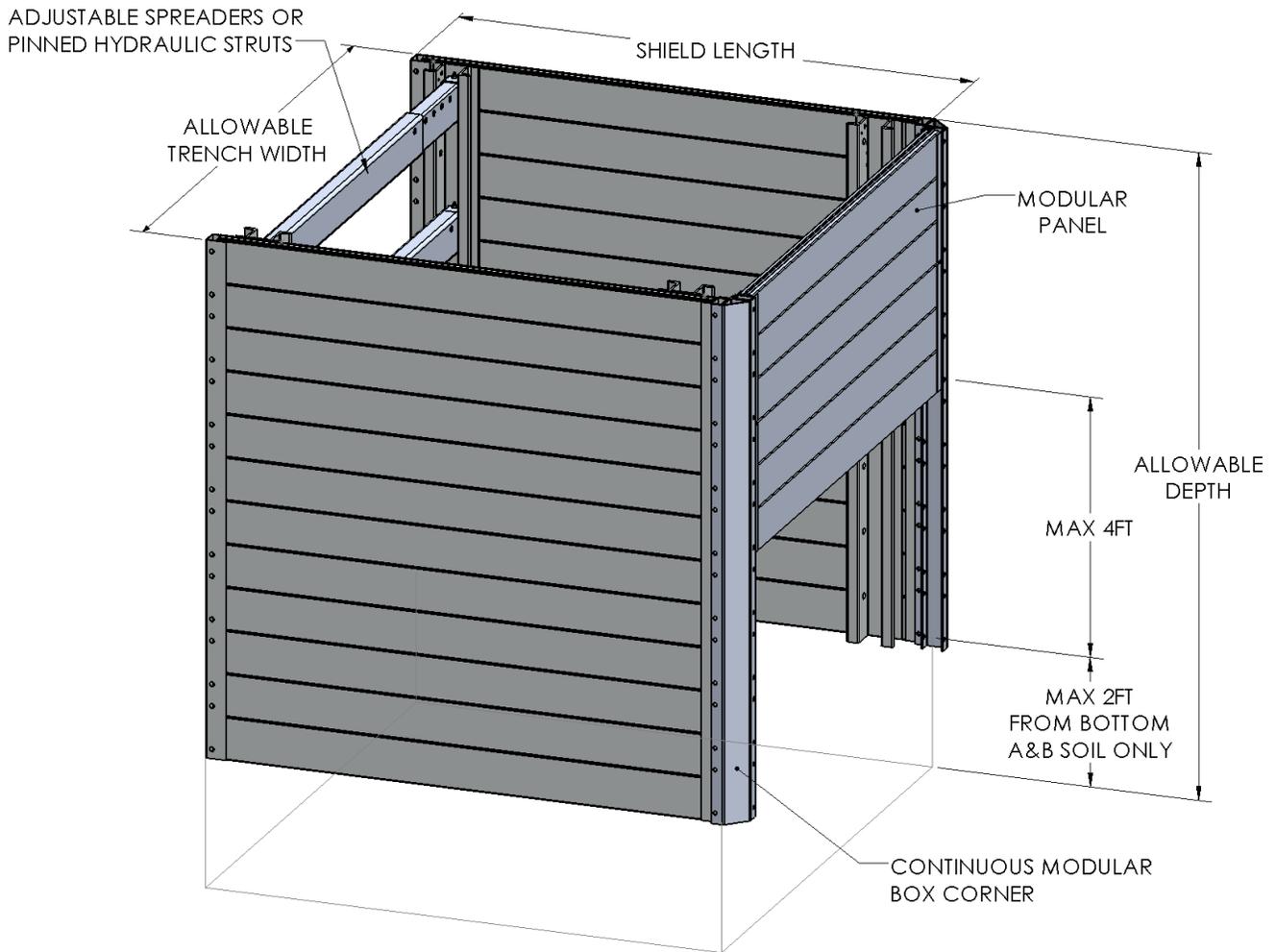


Table 2: High Clearance APS Usage										Table 2-1: Allowable Sheeting							
Applicable to 4, 6, 8, and 10ft High Shields								Measurements for Each Shield Height						Pacific Shoring Corrugated Sheeting			
Shield Length (ft)	Capacity (PSF)	Allowable Depth (ft)				Allowable Trench Width (ft)		Vertical Clearance (in)			Top Spreader Location (in)			Steel Sheet Piling			
		A-25	B-45	C-60	C-80	Without End Loading	With End Loading	6ft	8ft	10ft	6ft	8ft	10ft	1/2" Thick Steel Plate			
6	2400	20	20	14	12	12	10	50	62	2	2" Thick Timber						
8	1800	20	18	12	10						Table 2-2: Toe In Requirements (in)						
10	1241	20	16	10	8						A-25	B-45	C-60	C-80			
12	830	20	12	8	6						8	12	12	24	36		

Notes:

1. This data applies to Pacific Shoring shields with Pacific Shoring aluminum power struts only. This data applies only to shields in full hydraulic configuration.
2. Allowable end sheeting can be found in table 2-1. Note reduced trench width with end sheeting.
3. If end loading, follow toe-in requirements listed in table 2-2
4. All information on pages 2, 3, and 8 apply to this table.

Case 3: APS Shield with Modular Box Panels

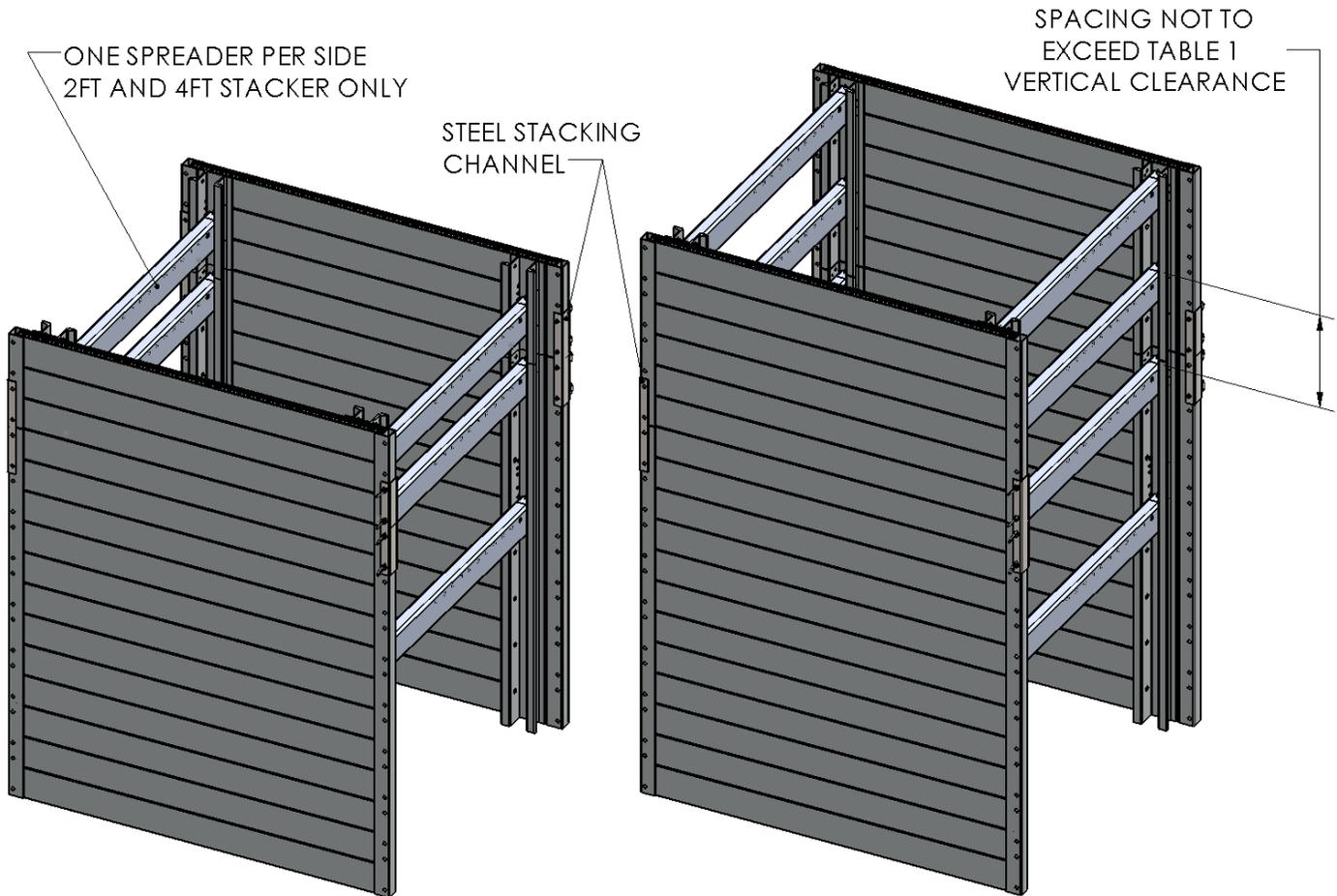


Pacific Shoring modular box panels and corners may be used with the APS system.

Notes:

1. Modular Box Panels with corners may be used in lieu of spreaders. When configuring a shield this way, refer to **Table 1** on page 3. Panels may not be placed higher than 48" from the bottom of the shield.
2. When using modular box corners to stack on top of an APS box, you must refer to the modular box tabulated data and examine the depth rating for the resulting size shield. Compare this depth rating to the depth rating listed in **Table 1**. The smaller of the two rated depths is the correct depth rating for this configuration.
3. If hydraulic struts are used with this configuration, they must be extended to the correct length to match the modular box panel, and pinned. Using hydraulic struts that are not pinned with this configuration can result in damage to the shield.
4. All information on pages 2, 3, and 8 apply to this configuration.

Stacking Shields



Pacific Shoring Aluminum Panel Shields may be stacked. When stacking shields, observe the following rules:

1. When shields are stacked, it is required for them to be pinned together with a stacking bracket along the shield end cap.
2. The strut spacing of the stacked shield must not exceed the measurement for 'vertical clearance,' on **Page 4, Table 1**.
3. When a 2ft or 4ft stacker shield is used, only one strut is required per end (2 struts total). All other stacked shields require at least 2 spreaders per end (4 struts total)
4. All information on pages 2, 3, and 8 apply to this configuration.

Shield Weights

Shield Height (ft)	Shield Length (ft)	Capacity (PSF)	Weight (lbs)	Shield Height (ft)	Shield Length (ft)	Capacity (PSF)	Weight (lbs)
4	6	2400	480	8	6	2400	960
4	8	1800	640	8	8	1800	1280
4	10	1241	800	8	10	1241	1600
4	12	830	960	8	12	830	1920
4	16	447	1280	8	16	447	2560
6	6	2400	720	10	10	1241	2000
6	8	1800	960	10	12	830	2400
6	10	1241	1200				
6	12	830	1440				
6	16	447	1920				

Notes:

1. Use a factor of safety of 5 for rigging cables and connections.
2. Shield weights are approximate. If the shield is wedged in, the lifting force will be higher than tabulated weight.

APS Installation and Removal

Installation

1. Shields will be assembled and properly rigged for lifting prior to setting inside the excavation
2. Set shield inside the trench. Workers are not allowed under moving loads at any time.
3. If trench walls are more than 6" from the wall of the shield, back fill the void with crush rock or excavated soil a minimum of ½ the shield wall area.
4. If the shield is held 2ft off the bottom of the trench, the bottom of the shield shall rest on a bench or be otherwise supported so that it cannot fall to the bottom of the trench.

Removal

1. If shields are stacked, attach lifting equipment to the bottom shield prior to removing the top shield.
2. If the shield is wedged by soil, the additional pulling force may exceed the strength of the lifting harness or the connection of the lifting eyes. Use extreme caution when forcing shields out of an excavation.

Safe Handling and Use of Aluminum Panel Shields

A competent person shall inspect the shield on a daily basis while it is in use. Check for:

1. Lift hooks are properly connected and holes are not rounded or bent.
2. Check for broken welds at all weld locations.
3. Check strut pins for safety lock pin in place, and for excessive wear.
4. Check strut pin holes for elongation and tearing.
5. Check strut to make sure it is not bent or unreasonably dented.
6. Workers may be inside shield when it is being horizontally, but not when it is being lifted or set.
7. Workers shall stay back a minimum of 10ft when a shield wedged in an excavation is being forced out. In some cases, an increased distance may be appropriate to protect workers from flying lift cables if one were to break under load.
8. If shields need repairs, the shield shall be taken out of service until it is re-certified by a Registered Civil Engineer.