



# TRENCH SOLUTIONS

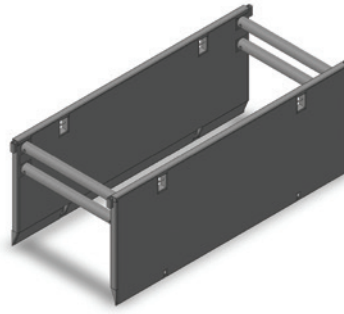
FOR UNDERGROUND SAFETY

Call 877-597-3687  
for rates and reservations

**HercRentals**<sup>®</sup>

# SHIELDS

Reinforcements providing protection at greater lengths in the deepest job sites.



OUTSIDE DIMENSIONS				ALLOWABLE DEPTH BY SOIL TYPE				MAX. SPREADER LENGTH	CAT-CLASS
LENGTH	WIDTH	HEIGHT	WEIGHT	A-25	B-45	C-60	C-80		
12 ft	4 in	4 ft	2769 lb	69 ft	39 ft	30 ft	23 ft	15 ft	310-2005
12 ft	4 in	6 ft	3649 lb	64 ft	37 ft	29 ft	22 ft	15 ft	310-2025
12 ft	4 in	8 ft	4575 lb	79 ft	46 ft	35 ft	27 ft	15 ft	310-2050
12 ft	6 in	10 ft	6942 lb	83 ft	48 ft	38 ft	29 ft	20 ft	310-2080
16 ft	4 in	4 ft	3964 lb	59 ft	34 ft	26 ft	20 ft	20 ft	310-2010
16 ft	4 in	6 ft	5419 lb	62 ft	36 ft	28 ft	21 ft	20 ft	310-2030
16 ft	4 in	8 ft	6919 lb	60 ft	35 ft	27 ft	22 ft	20 ft	310-2055
16 ft	4 in	10 ft	8419 lb	42 ft	26 ft	21 ft	17 ft	20 ft	310-2085
20 ft	4 in	4 ft	4740 lb	35 ft	20 ft	16 ft	12 ft	20 ft	310-2015
20 ft	4 in	6 ft	6522 lb	36 ft	21 ft	17 ft	13 ft	20 ft	310-2035
20 ft	4 in	8 ft	8371 lb	37 ft	22 ft	18 ft	14 ft	20 ft	310-2060
20 ft	4 in	10 ft	10221 lb	35 ft	22 ft	17 ft	14 ft	20 ft	310-2090
24 ft	6 in	4 ft	7137 lb	53 ft	30 ft	23 ft	18 ft	20 ft	310-2020
24 ft	6 in	6 ft	10007 lb	26 ft	16 ft	13 ft	10 ft	20 ft	310-2040
24 ft	6 in	8 ft	12929 lb	26 ft	16 ft	13 ft	11 ft	20 ft	310-2065
24 ft	6 in	10 ft	15850 lb	55 ft	33 ft	26 ft	21 ft	18 ft	310-2095

# RUMBLE PLATES/ TIRE CLEANERS

Shake off loose mud, dirt, and stones before entering the roadway.

DIMENSIONS		STYLE	CAT-CLASS
WIDTH	LENGTH		
8 ft	10 ft	Solid Rumble Plate	932-7500
8 ft	12 ft	Solid Rumble Plate	932-7505
12ft	16 ft	Slatted	932-7520
12ft	16 ft	Slatted	
10ft	16 ft	Slatted	932-7510



# STEEL PLATES

Keep roadways open during non-construction periods or to cover a utility trench.

**Features include:**

- Non-skid option available

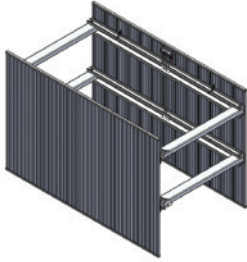


WIDTH	DIMENSIONS		WEIGHT	CAT-CLASS
	LENGTH	THICKNESS		
4 ft	4 ft	1 in	654 lbs	932-7060
4 ft	8 ft	1 in	1,307 lbs	932-7080
5 ft	8 ft	1 in	1,634 lbs	932-7170
6 ft	10 ft	1 in	2,450 lbs	932-7260
6 ft	12 ft	1 in	2,941 lbs	932-7250
6 ft	12 ft	1.5 in	4,411 lbs	932-7266
8 ft	10 ft	1 in	3,267 lbs	932-7320
8 ft	12 ft	1 in	3,920 lbs	932-7330
8 ft	12 ft	1.5 in	5,881 lbs	932-7336
8 ft	16 ft	1 in	5,227 lbs	932-7350
8 ft	16 ft	1.5 in	7,841 lbs	932-7356
8 ft	20 ft	1 in	6,534 lbs	932-7370
8 ft	20 ft	1.5 in	9,803 lbs	932-7376



# ALUMINUM SHIELDS

Lightweight reinforcements providing protection at greater lengths in the deepest job sites.

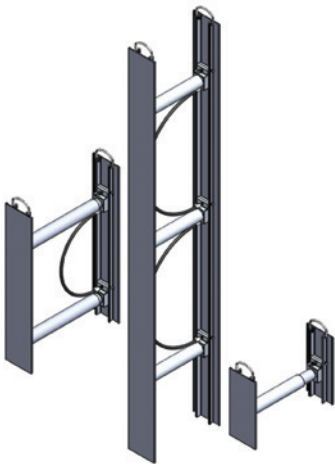


STYLE	HEIGHT	WIDTH	WEIGHT	CAT-CLASS
Aluminum Solid	4 ft	10 ft	637 lb	310-4000
Aluminum Corrugated	6 ft	6 ft	602 lb	310-4040
Aluminum Corrugated	6 ft	8 ft	805 lb	310-4045
Aluminum Solid	6 ft	8 ft	1150 lb	310-4005
Aluminum Corrugated	6 ft	10 ft	968 lb	310-4030
Aluminum Corrugated	6 ft	12 ft	1144 lb	310-4035
Aluminum Corrugated	8 ft	8 ft	914 lb	310-4070
Aluminum Solid	8 ft	8 ft	1400 lb	310-4020
Aluminum Corrugated	8 ft	10 ft	1116 lb	310-4055
Aluminum Solid	8 ft	10 ft	1625 lb	310-4010
Aluminum Corrugated	8 ft	12 ft	1330 lb	310-4060
Aluminum Solid	8 ft	12 ft	1848 lb	310-4015
Aluminum Corrugated	8 ft	14 ft	1525 lb	310-4065
Aluminum Corrugated	10 ft	10 ft	1400 lb	310-4025



# ALUMINUM SHORES

The uses of hydraulic pressure supports side walls to prevent cave-ins where unstable soil conditions exist.



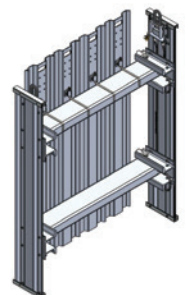
SIZE	OPERATING RANGE	CYLINDERS	CAT-CLASS
1.5 ft	17-27 in	1	800-7196
1.5 ft	22-36 in	1	800-7198
1.5 ft	28-46 in	1	800-7200
1.5 ft	34-55 in	1	800-7202
1.5 ft	40-64 in	1	800-7204
1.5 ft	52-88 in	1	800-7206
1.5 ft	76-112 in	1	800-7208
1.5 ft	94-130 in	1	800-7210
1.5 ft	108-144 in	1	800-7212
1.5 ft	144-180 in	1	800-7214
3.5 ft	17-27 in	2	800-7216
3.5 ft	22-36 in	2	800-7218
3.5 ft	28-46 in	2	800-7220
3.5 ft	34-55 in	2	800-7222
3.5 ft	40-64 in	2	800-7224
3.5 ft	52-88 in	2	800-7226
3.5 ft	76-112 in	2	800-7228
3.5 ft	94-130 in	2	800-7230
3.5 ft	108-144 in	2	800-7232
3.5 ft	144-180 in	2	800-7234
5 ft	17-27 in	2	800-7236
5 ft	22-36 in	2	800-7238
5 ft	28-46 in	2	800-7240
5 ft	34-55 in	2	800-7242
5 ft	40-64 in	2	800-7244

SIZE	OPERATING RANGE	CYLINDERS	CAT-CLASS
5 ft	52-88 in	2	800-7246
5 ft	76-112 in	2	800-7248
5 ft	94-130 in	2	800-7250
5 ft	108-144 in	2	800-7252
5 ft	144-180 in	2	800-7254
7 ft	17-27 in	2	800-7256
7 ft	22-36 in	2	800-7258
7 ft	28-46 in	2	800-7264
7 ft	34-55 in	2	800-7262
7 ft	40-64 in	2	800-7264
7 ft	52-88 in	2	800-7266
7 ft	76-112 in	2	800-7268
7 ft	94-130 in	2	800-7270
7 ft	108-144 in	2	800-7272
7 ft	144-180 in	2	800-7274
9 ft	17-27 in	3	800-7276
9 ft	22-36 in	3	800-278
9 ft	28-46 in	3	800-7280
9 ft	34-55 in	3	800-7282
9 ft	40-64 in	3	800-7284
9 ft	52-88 in	3	800-7286
9 ft	76-112 in	3	800-7288
9 ft	94-130 in	3	800-7290
9 ft	108-144 in	3	800-7292
9 ft	144-180 in	3	800-7294

# END SHORES

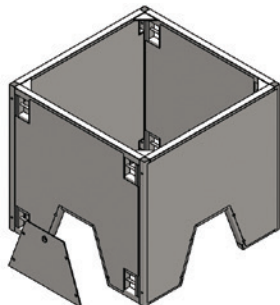
SIZE	CAT-CLASS
End Shore Rail Pair 4 ft	932-2404
End Shore Rail Pair 6 ft	932-2406
End Shore Rail Pair 8 ft	932-2408

SIZE	CAT-CLASS
Hydraulic Spreader 26-40 in	932-2230
Hydraulic Spreader 32-50 in	932-2235
Hydraulic Spreader 44-68 in	932-2240
Hydraulic Spreader 56-92 in	932-2245
Hydraulic Spreader 84-120 in	932-2250
Hydraulic Spreader 108-144 in	932-2225



# MANHOLE BOXES

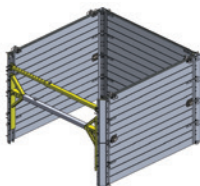
Designed for personal protection during installations, inspections, and repair work.



OUTSIDE DIMENSIONS				ALLOWABLE DEPTH BY SOIL TYPE				CAT-CLASS
HEIGHT	WEIGHT	LENGTH	WIDTH	A-25	B-45	C-60	C-80	
2 ft	1200 lb	6 ft 8 in	6 ft 8 in	80 ft	44 ft	33 ft	25 ft	310-1000
2 ft	1950 lb	8 ft 8 in	8 ft 8 in	58 ft	32 ft	24 ft	18 ft	310-1005
4 ft	1735 lb	6 ft 8 in	6 ft 8 in	80 ft	44 ft	33 ft	25 ft	310-1015
4 ft	2150 lb	8 ft 8 in	8 ft 8 in	58 ft	32 ft	24 ft	18 ft	310-1020
4 ft	3938 lb	10 ft	10 ft	46 ft	25 ft	19 ft	14 ft	310-1010
6 ft	2150 lb	6 ft 8 in	6 ft 8 in	80 ft	44 ft	33 ft	25 ft	310-1025
6 ft	3575 lb	8 ft 8 in	8 ft 8 in	40 ft	40 ft	40 ft	30 ft	310-1030
8 ft	6300 lb	8 ft 8 in	8 ft 8 in	58 ft	32 ft	24 ft	18 ft	310-1040
8 ft	7875 lb	10 ft	10 ft	46 ft	25 ft	19 ft	14 ft	310-1035

# ALUMINUM PANEL SHIELD

Can be configured in a variety of ways to accommodate different trench end conditions and pipe clearances.



SHIELD HEIGHT	SHIELD LENGTH	CAPACITY (PSF.)	ALLOWABLE DEPTH				ALLOWABLE WIDTH		VERTICAL CLEARANCE			
			A-25	B-45	C-60	C-80	NO END LOADING	END LOADING	4 FT	6 FT	8 FT	10 FT
2 ft	6 ft	2400	25 ft	25 ft	25 ft	25 ft	12 ft	8 ft	14 in	26 in	38 in	38 in
2 ft	8 ft	1800	25 ft	25 ft	25 ft	19 ft	12 ft	8 ft	14 in	26 in	38 in	38 in
2 ft	10 ft	1241	25 ft	25 ft	19 ft	15 ft	12 ft	8 ft	14 in	26 in	38 in	38 in
2 ft	12 ft	830	25 ft	17 ft	13 ft	9 ft	12 ft	8 ft	14 in	26 in	38 in	38 in
2 ft	14 ft	595	21 ft	12 ft	9 ft	6 ft	12 ft	8 ft	14 in	26 in	38 in	N/A
2 ft	16 ft	447	15 ft	8 ft	6 ft	5 ft	12 ft	8 ft	14 in	26 in	38 in	N/A

# PIPE TESTING EQUIPMENT

Test/block plugs, bypass plugs, high pressure plugs, vacuum testing, and pipe deflection mandrels.



PIPE SIZE	REQ. INFLATION PRESSURE	MAX TEST PRESSURE	LENGTH	CAT-CLASS
4-6 in	35 psi	10 psi	13 in	920-9756
6-10 in	35 psi	15 psi	22 in	920-9760
8-12 in	35 psi	15 psi	22 in	920-9762
12-18 in	35 psi	15 psi	28 in	310-4200
15-21 in	35 psi	10 psi	31 in	310-4208
15-30 in	25 psi	10 psi	57 in	310-4210
20-36 in	25 psi	10 psi	65 in	310-4225
24-48 in	25 psi	10 psi	90 in	310-4240
36-60 in	20 psi	8 psi	90 in	310-4250
48-72 in	20 psi	8 psi	90 in	310-4255
60-96 in	12 psi	6 psi	110 in	310-4260

# CONTAINERS

Protect your tools, equipment, and building materials with Herc Rentals' storage containers.

MAKE	MODEL	DIMENSIONS (LWH)	EMPTY WEIGHT	CAT-CLASS
Waterfront	20 ft	20 ft / 8 ft / 8 ft 6 in	4,800 lb	610-2810
Waterfront	40 ft	40 ft / 8 ft / 8 ft 6 in	8,400 lb	610-2845



# CONFINED SPACES



## AC AXIAL BLOWER

8 inch axial blower is an all-in-one ventilation system, built-in storage canister and 15 or 25 feet of ducting



## GAS DETECTOR

Multi gas leak detector



## TRIPOD SYSTEM

Entry system with a 7 foot aluminum tripod capable of withstanding a 5,000 lb. load

# TRAFFIC SAFETY



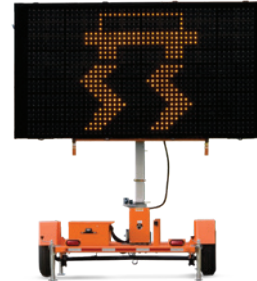
## CRASH CUSHION

Shield permanent and temporary barriers and crash barrels



## BARRIER

Concrete barriers and water filled barricades



## MESSAGE AND ARROW BOARDS

3 line and full matrix message boards

# OTHER PRODUCTS AND SERVICES AVAILABLE

Slide-Rail Systems

Arch Spreaders

Bedding Boxes

Dirt Sifter Boxes

Hoist and Rigging Products

Site Specific Engineering

Traffic Control Products

Construction Lasers

Additional Contractor Supplies

# LIGHT TOWERS

Light up dark areas and add a layer of safety to your job site.

## Also offer:

- Electric light towers
- Solar light towers



MAKE	MODEL	TYPE	MAST HEIGHT	GENERATOR	POWER	LIGHTS	RUN TIME	FUEL BURN	WIND SPEED RATING	CAT CLASS
Generac Mobile	MLT6SK	Metal Halide - Towable	23 ft	6 kW	Diesel	(4) 1,050W	90 hr max	.42 gph	65 mph	510-1030
Generac Mobile	G4 ECO	LED - Towable	26 ft	4 kW	Diesel	(4) 320W	205 hr max	.20 gph	68 mph	510-1055
Generac Mobile	Cube+ Hyper	LED - Skid	27.5 ft	4 kW	Diesel	(4) 320W	300 hr max	.20 gph	50 mph	510-1160
National	LTS 160	Solar - Towable	20 ft	NA	Solar	(4) 160W	NA	0 gph	60 mph	510-1015

# DEFINITIONS

## Competent person

One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which is unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate the unsafe conditions.

## Intent

A “competent person” for the purpose of this standard means one must have had specific training in, and be knowledgeable about soil analysis and the use of protective systems.

Requirements of this standard and must be designated by the employer.

# GENERAL REQUIREMENTS

- Protecting surface encumbrances that may create a hazard to employees.
- Locating underground installations prior to opening an excavation.
- Reducing employee’s exposure to vehicular traffic with the use of warning vests.
- Employee exposure to failing loads shall be eliminated.
- Providing a warning system for mobile equipment operating adjacent to or near an excavation.
- Testing the air in excavations to identify potentially hazardous atmospheres greater than 4 ft.
- Protection from hazards associated with water accumulation.
- Ensuring the stability of adjacent structures.
- Adequate protection of employees from loose rock or soil that may fall from or roll into an excavation.
- Daily inspections by a competent person (see definition).
- Appropriate fall protection near excavations greater than 6 ft.
- Providing appropriate access and egress greater than 4 ft.

# INSPECTIONS

Daily inspection of excavation, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indication of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspection shall also be made after every rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

# REQUIREMENTS FOR PROTECTIVE SYSTEMS

Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when excavations are less than 5 ft. in depth and examination of the ground by a competent person provides no indication of potential cave-in.

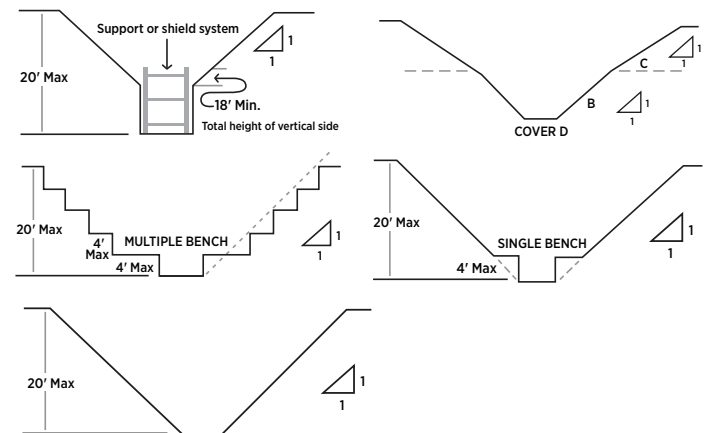
*NOTE: For use by the trained and knowledgeable “competent person” only. Refer to appropriate local, city, state, federal regulations, or manufacturer’s tabulated data and engineering for further clarification.*

# SOIL CLASSIFICATION

## Type “B” Soil

- Equivalent weight effect to 45 psf per foot of depth.
- Cohesive soil with an unconfined compressive strength greater than .5 tsf but less than 1.5 tsf;
- Granular cohesion-less soils including angular gravel, silt, silt loam, sandy loam, and in some cases silty clay loam and sandy clay loam;
- Previously disturbed soils except those which would otherwise be classed as Type C; soil that meets requirements for Type A, but is fissured or subject to vibration;
- Dry rock that is unstable;
- Material that is part of a layered system where layers dip into the excavation on a slope less steep than four (4) horizontal to one (1) vertical (4H:1V Ratio), but only if the material would otherwise be classified as Type B.

## B Soils

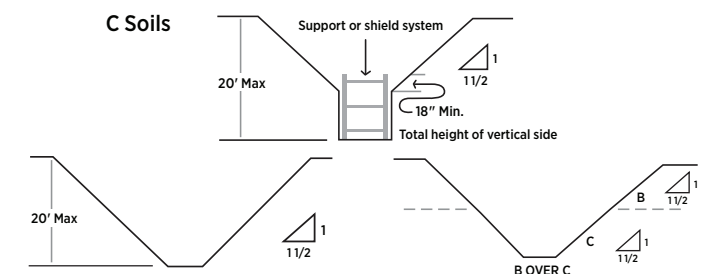


## Type “C-60” Soil

- Equivalent weight effect of 60 psf per foot of depth.
- Soft cohesive to moist soil with an unconfined compressive strength less than .5 tsf;
- Moist cohesive soil or moist dense sand, which is not flowing or submerged. When cut with near vertical sidewalls, soil can stand with unsupported vertical sidewalls long enough for shoring installation.

## Type “C” Soil

- Equivalent weight effect of 80 psf per foot of depth. SHORES SHALL NOT BE USED IN THIS TYPE OF SOIL.
- Cohesive soil with an unconfined compressive strength of .5 tsf or less — granular soils including gravel, sand and loamy sand.
- Submerged soil or soil from which water is freely seeping.
- Submerged rock that is not stable.
- Material in a sloped, layered system where the layers dip into the excavation on a slope of four (4) horizontal to one (1) vertical (4H:1V Ratio) or steeper.





## SOIL TESTING

### Visual Tests

- Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.
- Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
- Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
- Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spill off a vertical side, the soil could be fissured. Small spills are evidence of moving ground and are indications of potentially hazardous situations.
- Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
- Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
- Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, seeping water from the sides of the excavation, or the location of the level of the water table.
- Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

## MANUAL TESTS

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

- **Plasticity:** Mold a moist or wet sample of soil into a ball and attempt to rolled into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.
- **Dry strength:** If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps and do not break up into smaller clumps (or can only be broken with difficulty) and there is no visual indication the soil is fissured, the soil may be considered un-fissured.
- **Thumb penetration:** The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. The thumb can penetrate several inches into Type C soils with an unconfined compressive strength of 0.5 tsf. This soil can also be molded by light finger pressure.

## APPROVED SHEETING

- 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 HDO- American Plywood Association, high density overlay exterior
- 3/4" thick Ply-form - American Plywood Association B-B Class I Exterior
- 3/4" thick Combi Exterior Plywood
- 3/4" Omni Form
- 2x6, 2x8, 2x10, and 2x12 Hardwood sheeting or equivalent
- GME Aluminum Sheeting
- Steel Plate 1/2" minimum thickness

## NOTES FOR HYDRAULIC SHORING

- The top strut of the Hydraulic Shore shall be no less than 12 inches and no more than 24 inches below the top of the trench.
- The lowest strut of a Hydraulic Shore shall be no more than 48 inches above the bottom of the excavation.
- If sheeting is required, the sheeting shall extend from the top of the excavation to a maximum of 2 ft. off the bottom of the excavation and the maximum horizontal gap between sheeting members shall be 2 ft. Some soils may require sheeting be extended to the full depth of the excavation.

*NOTE: In some applications, sheeting may not be required, but it may be desired to prevent random sloughing or raveling of the soil.*

- When an oversleeve is required, the oversleeve shall be a structural steel tube (3.5" x 3.5" x 3/16") and shall extend the full collapsed length of the cylinder. The oversleeve is only applicable to a vertical shore.

## TEN COMMANDMENTS OF TRENCHING

1. A competent person must inspect the trench prior to the start of work and prior to employee entrance.
2. Proper sloping or trench protection must exist at 5 ft. or deeper.
3. Spoils must be at least 2 ft. from edge of trench.
4. Ladders or ramps are required when trenches are 4 ft or more in depth.
5. 25 ft is the maximum distance a person can be from a ladder or ramp.
6. Ladders must be tied off.
7. All trench shields must at least extend to ground surface.
8. A trench shield must be within 2 ft. of bottom of the trench.
9. Class B soils must be sloped 1:1.
10. Class C soils must be sloped 1.5:1.

# TRENCHING AND EXCAVATION BY THE NUMBERS

<p><b>6</b></p> <p>Depth at which fall protection is required.</p>	<p><b>4</b> Maximum height in feet a bench is allowed in 8-soils. Maximum vertical distance in feet between 2- and 3-inch hydraulic shores in C-60 soils. Depth in feet at which a ladder is mandatory. Depth in feet which atmosphere must be tested for hazardous environment.</p>	<p><b>10</b> Minimum vertical distance in feet required from 50,000 volt power lines.</p>
<p><b>7</b></p> <p>Number of components for a visual test for soil classification.</p>	<p><b>18</b> Minimum distance in inches from the grade to the top of a trench shield with sloping above it.</p>	<p><b>19.5</b> Level at which oxygen concentration is classified as an oxygen deficient atmosphere.</p>
<p><b>23.5</b></p>	<p><b>20</b> Maximum depth in feet that OSHA allows: sloping, benching, and timber shoring to be used without site specific engineering.</p>	<p><b>25</b> Maximum distance in feet a worker may travel to reach a ladder or means of egress.</p>
<p><b>23.5</b> Level at which oxygen concentration is classified as an oxygen enriched atmosphere.</p>	<p><b>30</b> Maximum distance in inches allowable to step across an excavation or trench before a bridge is required.</p>	
<p>Maximum distance in feet the center of a 2 inch hydraulic vertical shore cylinder can be below grade.</p> <p><b>2</b> Maximum distance in feet to excavate below a trench shoring or shielding system. Minimum distance in feet the spoil pile must be set back.</p>	<p>Maximum distance in feet the center of a 3 inch dual action hydraulic shore can be below grade.</p> <p><b>3</b> Minimum distance in feet a ladder must extend above trench shoring, trench shield, and/or grade. Minimum number of points of contact on a ladder with climbing down.</p>	<p><b>12</b></p> <p>Number of general requirements.</p>



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