How to Size a Trench Shield

Soil Classifications, Calculating Depth Ratings, and Sizing a Shield

How to Size a Trench Box

Depth of cut* _____

Soil conditions*
- Type A (25#) _____
- Type B (45#) _____
- Type C-60 (60#) _____
- Type C-80 (80#) _____
- Hydrostatic _____

** see depth certification chart*

Outside Pipe Diameter_____
(Shield must be a minimum of 12 in. wider than the pipe.)

Pipe Length _____
(Shield must be 2 to 4 ft. longer than the pipe.)

Bucket Width _____
(Inside shield: 12 in. less than shield.)

Machine Lift Capacity_____
(1.5 times shield weight at 20 degree radius.)

The following will explain how to determine the specifications listed above.

How to determine the depth of cut:

- Slope must start 18 in. or 1½ ft. below the top of the Shield

How to determine the width of a trench shield:

- Trench Shield width determined by Outside Diameter (OD) of the pipe or the OD of the excavator bucket
- Allow 6 in. of clearance on each side of pipe bell
- Shield should be a minimum of 12 in. wider than the excavator bucket OD

How to determine the length of a trench shield:

- Inside length clearance of pipe is approximately 2 ft. less than the overall length of the shield
- Shield must be 2 to 4 ft. longer than the pipe

How to determine the machine lift capacity:

- Lift capacity is 1.5 times the shield weight at 20 ft. radius at grade

Calculating Depth Ratings:

PSF ratings and depths are based on temporary loading.

Lateral pressure per foot of depth:

- Type "A" Soil = 25 lbs.
- Type "B" Soil = 45 lbs.
- Type "C-60" Soil = 60 lbs.
- Type "C-80" Soil = 80 lbs.

Depth rating using shield capacity (e.g. 1200 lbs.):

- 1200 / 25 = 48 ft.
- 1200 / 45 = 27 ft.
- 1200 / 60 = 20 ft.
- 1200 / 80 = 15 ft.

Soil Definitions:

- Apparent cohesion
- Cemented soil
- Layered soil
- Plastic
- Saturated soil
- Submerged soil

No soil is Type "A" if:

- It is fissured
- It is subject to vibration
- It has been previously disturbed
- It is part of a sloped, layered system which dips into the excavation on a slope of four horizontal to one vertical [4H:1V] or greater
- It is subject to other factors requiring classification as less stable

Type "B" Soil:

- Cohesive soil with unconfined compressive strength greater than 0.5 tons per square foot (tsf). but less than 1.5 tsf.
- Granular cohesion-less soils, e.g., gravel, silt, silt loam, sandy loam
- Type "A" fissured or subject to vibration
- Unstable dry rock
- It is part of a sloped, layered system which dips into the excavation on a slope less steep than 4H:1V, but only if the material would otherwise be classified as Type "B"

Type "C" Soil:

- Cohesive/non-cohesive soils with unconfined compressive strength of 0.5 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
- Sloped, layered system which slopes into an excavation at an angle of 4H:1V, or steeper

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