



Tabulated Data **Waler Rails**

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CAUTION

EXCAVATION PROCEDURES

MAY CAUSE INJURY OR DEATH!

A COMPETENT PERSON WHO SATISFIES THE DEFINITION AND INTENT OF THE 1926 CONSTRUCTION STANDARD SUBPART P EXCAVATIONS SHALL: ENSURE THAT ALL EMPLOYEES ARE WORKING IN SAFE CONDITIONS AND THAT ALL EMPLOYEES HAVE BEEN TRAINED IN CORRECT EXCAVATION PROCEDURES AND THE PROPER USE OF THE PROTECTIVE EQUIPMENT CHOSEN.

EXCAVATIONS AND PROTECTIVE EQUIPMENT SHALL BE INSPECTED A MINIMUM OF ONCE EACH WORKING DAY AND WHENEVER THERE IS A CHANGE IN THE SOIL CONDITIONS AND/OR OTHER CHANGES SUCH AS AN INCREASE OR DECREASE IN WATER OR VIBRATIONS.

EMPLOYEES SHALL NOT BE ALLOWED TO ENTER AN EXCAVATION THAT IS NOT PROPERLY SHORED, SHIELDED, OR SLOPED.

EMPLOYEES SHALL ALWAYS ENTER, WORK, AND EXIT WITHIN THE SHORED, SHIELDED, OR SLOPED AREAS OF THE EXCAVATION AND/OR TRENCH.

ALL LIFTING AND PULLING EQUIPMENT, INCLUDING CABLES, SLINGS, CHAINS, SHACKLES AND SAFETY HOOKS SHALL BE INSPECTED FOR DAMAGE OR DEFECTS PRIOR TO USE AND SHALL BE EVALUATED FOR SUITABILITY AND CAPACITY.

THIS GME TABULATED DATA PROVIDES A GENERAL SET OF GUIDELINES TO ASSIST THE COMPETENT PERSON IN THE SELECTION OF A PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY. THE RESPONSIBILITY FOR JOB SITE SAFETY AND THE PROPER SELECTION, INSTALLATION AND REMOVAL OF THE SHORING EQUIPMENT BELONGS TO THE COMPETENT PERSON DESIGNATED FOR THAT JOBSITE. THIS TABULATED DATA IS NOT INTENDED TO BE USED AS A JOB SPECIFIC EXCAVATION/ TRENCHING SAFETY PLAN, BUT SHALL BE USED BY THE COMPETENT PERSON. TABULATED DATA IS INTENDED AS A SUPPLEMENT TO HIS/HER TRAINING, EXPERIENCE AND KNOWLEDGE OF SAFE PROCEDURES, JOB SITE CONDITIONS AND SOIL TYPES. TABULATED DATA IS INTENDED TO ASSIST HIM IN THE SELECTION OF AN APPROPRIATE PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY.



**GME® WALER RAILS
TABULATED DATA**

GENERAL:

1. This data has been prepared by a Registered Professional Engineer as required OSHA standard 29 CRF, Part 1926, Subpart P, Excavations.
2. This data is to be used by the “competent person” for the proper use and placement of GME Waler Rails.
3. The term “Waler Rails” refers to both GME Waler Rails with Hydraulic Cylinders and Waler Rails with Hydraulic Struts unless otherwise noted.
4. “Competent person” is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
5. When there is a discrepancy concerning the use of protective systems between this tabulated data and the OSHA standard, this data shall take precedence. Any topic not covered by this data shall be governed by the OSHA standard.
6. GME shall not be liable for damage or injury resulting from improper use of the Waler Rails. Improper use of or modifications to the Waler Rails, or use of components not specifically authorized by GME without the written consent of GME shall void this data and all manufacturers warranty.

SPECIFICATIONS FOR USE OF GME WALER RAILS

1. All personnel involved with the use of GME Waler Rails shall be trained in the proper use and installation procedures and other applicable safety requirements.
2. GME Waler Rails shall be used only in soil conditions indicated in this data.
3. Refer to the installation procedures on page 10 for typical installation figures.
4. The sides or faces of the excavation must be near vertical to allow proper installation of the Waler Rails. The sides of the Waler Rails shall bear continuously and firmly against approved sheeting. The sheeting shall bear against the soil or a solid and stable filler in order to adequately distribute the loads to and from the cylinder struts. **DO NOT** butt rails back to back to span a wider excavation.

5. In excavations that are six foot deep or less, only one Waler Rail is required in each vertical plane.
6. The hydraulic cylinders shall be pumped to a minimum of 750 psi when Waler Rails are used. If the pressure drops below the initial pressure, check for leaks, repair any found, and re - pressurize the system. If the initial pressure still can't be maintained because the soil is too soft, another protective system will be required.
7. Sheeting required with the Waler Rails shall be as follows:

Acceptable Substitutions For Plywood Sheeting for Waler Systems:

1. 3/4" thick 14 Ply Arctic White Birch (Finland Form)
2. 1-1/8" thick CDX Plywood
3. Two sheets of 3/4" thick CDX Plywood placed back to back
4. Steel Plate 1/2" minimum thickness
5. GME Aluminum Sheeting

Acceptable Substitutions For Timber Sheeting for Waler Systems:

1. Douglas Fir (minimum bending strength $F_b = 1,500$ psi) S4S Nominal Dimension 1-1/2" x 7-1/2" and 2-1/2" x 7-1/2"
 2. Oak (minimum bending strength $F_b = 850$ psi) Rough Cut 2" x 8" and 3" x 8"
 3. GME Aluminum Sheeting may be used in place of 2" x 8" or 3" x 8" timber
8. When Waler Rails are used in conjunction with additional Waler Rails, Hydraulic Shores or Hydraulic Shields, the maximum horizontal spacing between the ends of each consecutive unit shall be twenty four inches.

ADDITIONAL SPECIFICATIONS FOR USE OF GME WALER RAILS WITH HYDRAULIC STRUTS

1. The Waler Rails With Hydraulic Struts will support loads across the end of a trench by placing an approved sheeting against the Waler Rail's struts. The sheeting shall be secured in place by utilizing a GME End Panel Bracket or by backfilling against the sheeting at least 2/3 of its height.

NOTE: A minimum of two Waler Rails are required when the system is end loaded.

2. The following materials may be used as sheeting for end loading:
 1. Two sheets of 3/4" thick CDX Plywood placed back to back
 2. 1-1/8" thick CDX Plywood
 3. 3/4" thick 14 Ply Arctic White Birch (Finland Form)
 4. 3/4" thick HDO - American Plywood Association, high density overlay exterior
 5. 3/4" thick Plyform - American Plywood Association B-B Class I Exterior
 6. 3/4" thick Combi Exterior Plywood
 7. 3/4" Omni Form
 8. Steel Plate 1/2" minimum thickness
 9. GME Aluminum Sheeting
 10. 2x6, 2x8, 2x10, 2x12 Hardwood sheeting or equivalent
3. The maximum width of a Waler Rail With Hydraulic Struts is seven feet eleven inches.

SOIL CLASSIFICATION

1. See the OSHA regulations for descriptions of Type A, B, and C soils.
 2. Type C-60 soil is a soft cohesive or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the protective system.
 3. Some OSHA Type C soils may not stand vertically long enough to allow the Waler Rails to be installed. In this case, another protective system will be required.
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DESIGN CRITERIA AND LIMITATIONS

1. The tables include the effect of a three foot high spoil pile within a horizontal distance from the face of the excavation equal to the excavation's depth. Waler Rails are not designed to support heavier surcharge loads, such as those imposed by building foundations. If Waler Rails are used near building foundations, those foundations may need to be underpinned to prevent excessive settlement.
 2. Waler Rail struts are not designed to support vertical loads and shall not be used to provide access or egress to the trench.
 3. This data is valid for Waler Rails in structurally sound condition. Any significant damage will void this data, and all manufacturers warranty. The damaged unit shall not be used.
 4. The competent person shall monitor the excavation and adjacent areas daily, after every rainstorm, and after every event that might threaten the stability of the excavation.
 5. The excavation must be kept free of water while using the Waler Rails. Surface water shall be diverted away from the excavation, and water must be pumped out of the excavation bottom. The competent person shall monitor the excavation in these conditions to prevent the water from generating excessive lateral pressure on the Waler Rails and to check for decreased soil stability.
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NOTES FOR TABULATED DATA

1. The top strut of the Waler Rail shall be no less than twelve inches and no more than twenty four inches below the top of the trench.
2. The lowest strut of a Waler Rail shall be no more than forty eight inches above the bottom of the excavation, unless otherwise noted.
3. The sheeting used with the Waler Rails shall extend from the top of the excavation to a maximum of two feet off the bottom of the excavation. Some soils may require that the sheeting be extended to the full depth of the excavation.
4. When an Oversleeve is required, the Oversleeve shall be a structural steel tube (TS 3-1/2 x 3-1/2 x 3/16) and shall extend the full collapsed length of the cylinder. The Oversleeve is only applicable to a Waler Rails With Hydraulic Cylinders.

Waler Rails – Type “A” and “B” Soils

| Depth of Excavation | Maximum Vertical Spacing | WMD Waler Length | WHD Waler Length | Cylinder Diameter | | | Sheeting Required |
|---------------------|--------------------------|--------------------|--------------------|---------------------|-------------------|-------------------|---|
| | | | | Excavation Width | | | |
| | | | | 0-8 ft. (note 2) | 8-12 ft. | 12-15 ft. | |
| 0 - 12 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. | 2 ft. wide (Minimum) Plywood Closely Spaced or Equivalent |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. | |
| | | 12 ft. | 12 ft. | 2 in. | 2 in. | 2 in. | |
| | | 16 ft. (note 3) | 16 ft. (note 3) | 2 in. | 2 in. | 2 in. (note 1) | |
| 12 - 15 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. | 2 ft. wide (Minimum) Plywood Closely Spaced or Equivalent |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. | |
| | | — | 12 ft. | 2 in. | 2 in. | 2 in. | |
| | | 16 ft. (note 3) | 16 ft. (note 3) | 2 in. | 2 in. (note 1) | 2 in. (note 1) | |
| 15 - 20 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. | 2 ft. wide (Minimum) Plywood Closely Spaced or Equivalent |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. | |
| | | — | 12 ft. | 2 in. | 2 in. (note 1) | 2 in. (note 1) | |
| | | 16 ft. (note 3) | 16 ft. (note 3) | 2 in. | — | — | |

Note 1: Steel oversleeve required.

Note 2: Maximum width for Waler Rails with Hydraulic Struts.

Note 3: Three cylinders are required with the 16-ft. rails.

Waler Rails – Type “C” Soils

| Depth of Excavation | Maximum Vertical Spacing | WMD Waler Length | WHD Waler Length | Cylinder Diameter | | | Sheeting Required |
|---------------------|--------------------------|------------------|------------------|---------------------|----------|-------------------|---|
| | | | | Excavation Width | | | |
| | | | | 0-8 ft. (note 2) | 8-12 ft. | 12-15 ft. | |
| 0 - 12 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. (note 1) | 3" x 8" Timber Closely Spaced or Equivalent (note 4) |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. (note 1) | |
| 12 - 15 ft. | 4 ft. | — | 6 ft. | 2 in. | 2 in. | 2 in. (note 1) | 3" x 8" Timber Closely Spaced or Equivalent (note 4) |
| | | — | 8 ft. | 2 in. | 2 in. | 2 in. (note 1) | |

Note 1: Steel oversleeve required.

Note 2: Maximum width for Waler Rails with Hydraulic Struts.

Note 4: If the sheeting is over driven at least 12", the lowest Waler may be a maximum of 48" above the bottom of the excavation. If the sheeting is NOT over driven, the bottom rail may be a maximum of 30" above the bottom of the excavation.

Waler Rails – Type “C-60” Soils

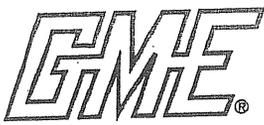
| Depth of Excavation | Maximum Vertical Spacing | WMD Waler Length | WHD Waler Length | Cylinder Diameter | | | Sheeting Required |
|---------------------|--------------------------|--------------------|--------------------|---------------------|-------------------|-------------------|---|
| | | | | Excavation Width | | | |
| | | | | 0-8 ft. (note 2) | 8-12 ft. | 12-15 ft. | |
| 0 - 12 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. (note 1) | 2 ft. wide (Minimum) Plywood Closely Spaced or Equivalent |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. (note 1) | |
| | | 12 ft. | 12 ft. | 2 in. | 2 in. | 2 in. (note 1) | |
| | | 16 ft. (note 3) | 16 ft. (note 3) | 2 in. | 2 in. (note 1) | 2 in. (note 1) | |
| 12 - 15 ft. | 4 ft. | 6 ft. | 6 ft. | 2 in. | 2 in. | 2 in. (note 1) | 2" x 8" Timber Closely Spaced or Equivalent |
| | | 8 ft. | 8 ft. | 2 in. | 2 in. | 2 in. (note 1) | |
| | | — | 12 ft. | 2 in. | 2 in. | 2 in. (note 1) | |
| | | — | 16 ft. (note 3) | 2 in. | — | — | |
| 15 - 20 ft. | 4 ft. | — | 6 ft. | 2 in. | 2 in. | 2 in. (note 1) | 3" x 8" Timber Closely Spaced or Equivalent |
| | | — | 8 ft. | 2 in. | 2 in. | 2 in. (note 1) | |

Note 1: Steel oversleeve required.

Note 2: Maximum width for Waler Rails with Hydraulic Struts.

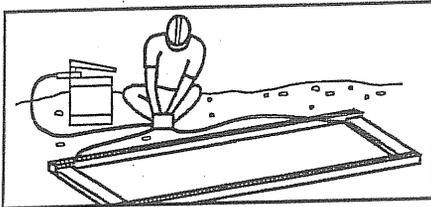
Note 3: Three cylinders are required with the 16-ft. rails.





WALER INSTALLATION AND REMOVAL INSTRUCTIONS

1. Complete the excavation.
2. Select the appropriate hose bridle manifold for the job. (Example: A two-way manifold for a Waler with two hydraulic struts.)

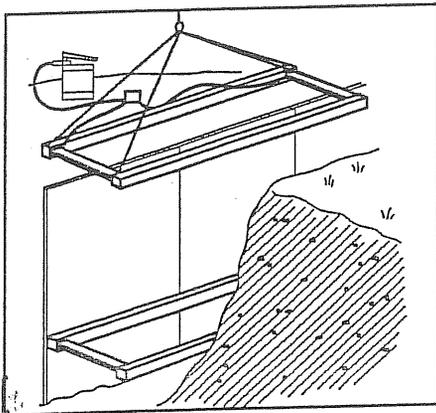


3. Connect the female ends of the manifold to the quick disconnect fittings on the struts. Care should be taken at this point to make sure that you have a good connection. You should also note which 1/4 turn valve on your manifold is connected to which hydraulic strut.

4. It is time to check the manifold for proper valve alignment.
 - A. Inlet valve on manifold should be open and connected to the pump bucket.
 - B. Valves for the strut hoses should be open.
 - C. Discharge valve on the bottom of the manifold should be closed.
 - D. The return valve on the pump bucket should be closed.

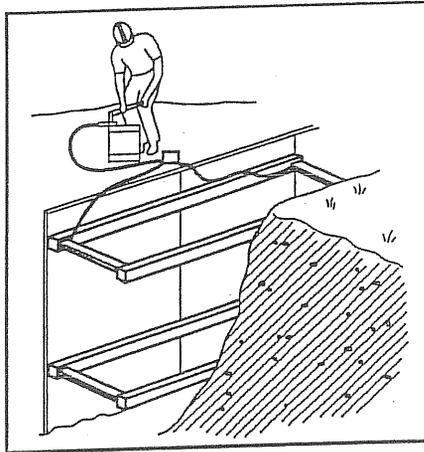
HINT: Valves are open when they are in-line with the hoses.

5. Connect the lifting sling to the Waler lifting eyes.
6. Walers should now be expanded to the size of a few inches narrower than the excavation. Remember to leave room for the sheeting.

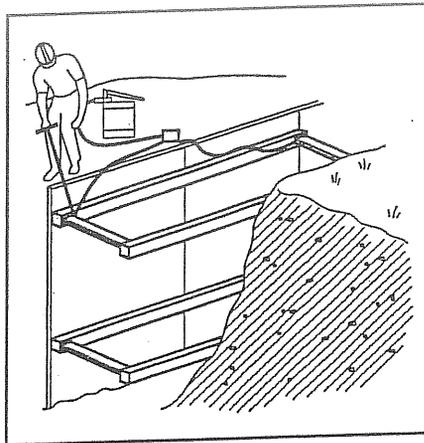


7. Lower the Waler into the excavation in its proper position. (Remember to space the Waler according to the Manufacturer's Tabulated Data.)

8. Position the sheeting around the excavation between the Waler and the excavation side walls.



9. Pump the Waler System to approximately 750 PSI, as indicated by the gauge on the pump bucket.
10. After setting the pressure to 750 PSI, allow the system to set for one minute. Then check to see if the pressure gauge is still in the green zone. If it is, proceed to the next step. If it isn't, re-apply pressure until you reach 750 PSI. Then check the gauge again.

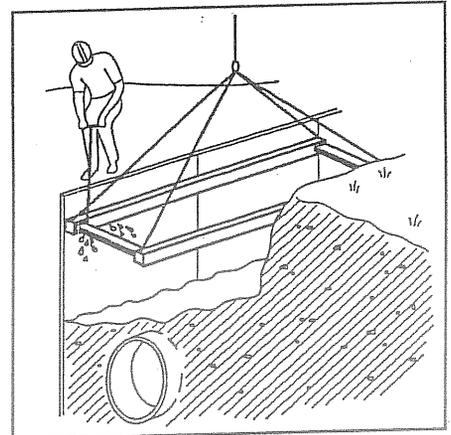


11. Using the Waler release tool, disconnect the hoses from the struts.
12. Release the pressure from the pump and manifold assembly by opening the 1/4 turn valve on the pump bucket.
13. Reconnect the manifold assembly to the next Waler that is to be installed.

14. Lower the next Waler into the excavation. If the Waler is to be positioned below the existing Waler, care should be taken to insure that the waler being installed is narrower than the one in the excavation, to allow passage.
15. Repeat the above steps until all the Waler units are installed and the excavation is properly shored.

REMOVAL

1. Connect the lifting sling to the bottom Waler.



2. Using the Waler Release Tool, release the pressure in the struts a little at a time. While you are releasing the pressure, pay close attention to the ground that you are standing on for movement of the soil. If there is no movement of the soil, continue to release the pressure until the Waler is away from the side-walls of the trench.
3. Lift the Waler up to the next unit in the trench. While the sling is still hooked to the bottom waler (which is now directly below the unit you are about to release pressure on), release the pressure on the unit allowing the bottom waler to support the waler you are removing.
4. Repeat this procedure until all the Walers are out of the trench.
5. Properly store the units until their next use.

NOTE: This procedure is to be used along with GME Manufacturer's Tabulated Data to establish minimum spacing requirements.