
10. FIELD MEASUREMENTS - USING BURIAL WAVEGUIDES OR THE SLAMMER HEAVY-DUTY WAVEGUIDE

Installing Buriable Waveguides

The standard 6005L series Buriable Waveguides (Fig. 10-1) and the 6005CL Series Coated Buriable Waveguides are 20 cm long with a 2-meter cable attached. Extension cables for use with the buriables come in a variety of lengths, up to 45 meters long.

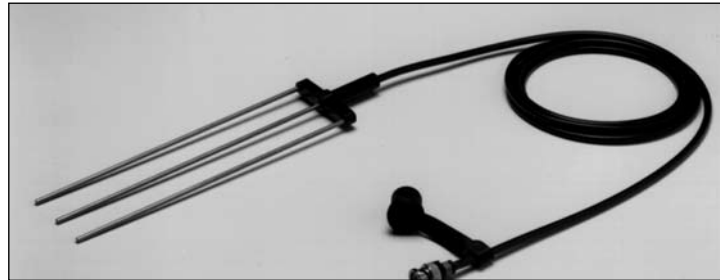


Fig. 10-1

The Buriable Waveguide is designed to be buried permanently in the soil. The waveguides can be buried and accessed by the MiniTrase from the surface. The cable can simply run up to a designated access point in the sampling area or they can be better protected by first inserting them into PVC tubing and then buried (Fig. 10-2). Extension cables up to 45 meters are available. These are constructed of special Soilmoisture “low loss” RG-58 type cable.

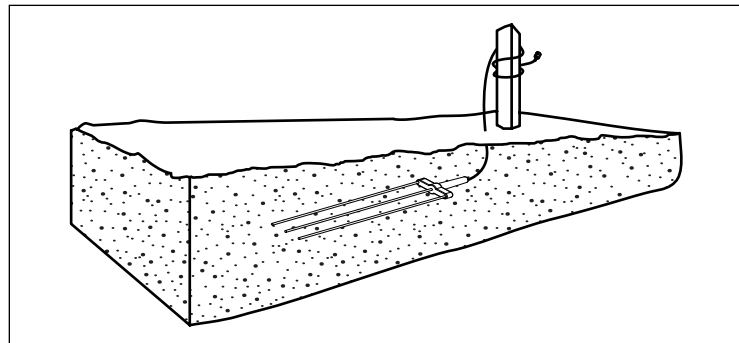


Fig. 10-2

A group of buriable waveguides can be installed at various depths to monitor moisture in the soil horizon to program irrigation frequency and amount (Fig. 10-3).

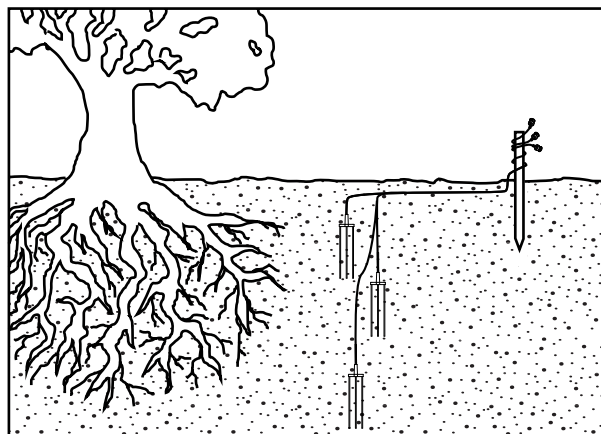


Fig 10-3

In light soils, and in many containers used in the nursery business and in research work, the Buriable Waveguide can be inserted from the surface by hand to its full depth for rapid evaluation of the moisture content (Fig. 10-4).

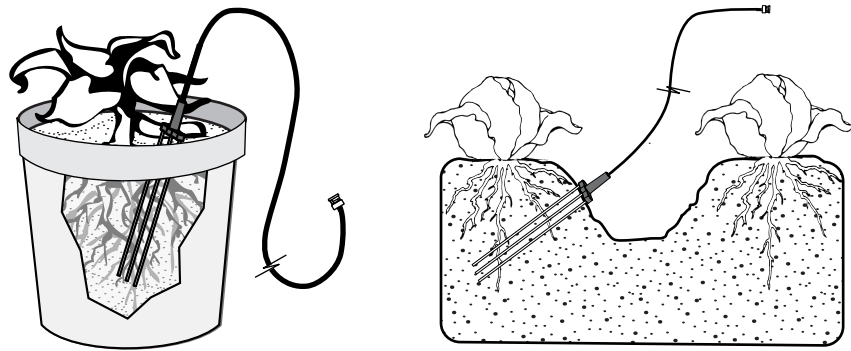


Fig. 10-4

**Precautions
When Installing
Buriable
Waveguides**

To secure an accurate moisture measurement it is essential that the metal rods of the buriable waveguide be in tight, intimate contact with the soil. This means that rods be inserted directly into the soil to retain bulk density characteristics or tightly packed around with native soil taken from the hole. In deep installations, a heavy slurry of water and native soil may be poured down the hole after inserting the buriable waveguide. Sufficient slurry should be used to completely cover the buriable waveguide. This should be followed by a small amount of soil which is then tamped in place with a small diameter rod.

CAUTION

When packing around the buriable waveguide, never use silica flour or other materials that differ in dielectric or volumetric character from the native soil in your location, since this can result in readings that are not representative of your soil.

When installing one buriable waveguide above another, make sure that the coaxial cable from the lower unit is kept at least 2 inches away from the metal rods of the upper unit (Fig. 10-5).

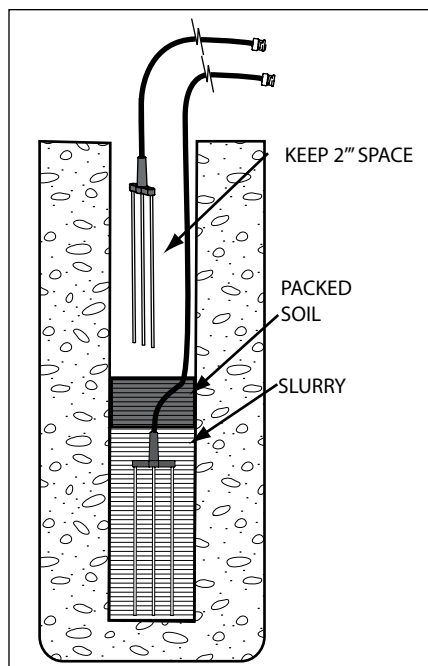


Fig. 10-5

When installing buriable waveguides horizontally near the surface, such as in seed beds, make sure that the metal rods are at least 2 inches below the surface in order to obtain accurate volumetric moisture content readings (Fig. 10-6).

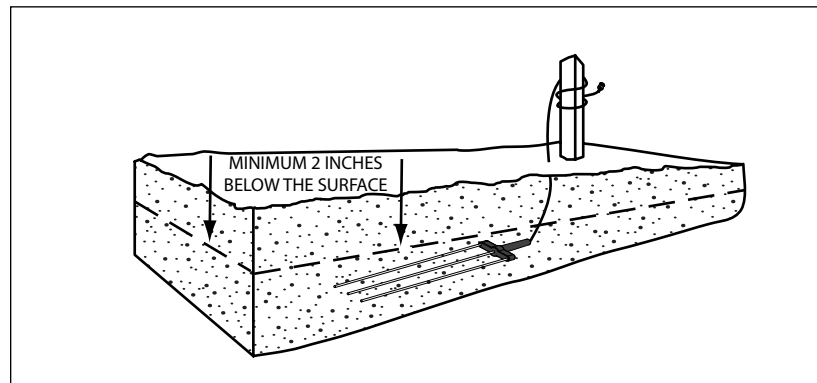


Fig. 10-6

Using the Handheld Terminal

From the Trase Setup Screen, select the appropriate Waveguide Length. From the Waveguide Type drop down menu, select Buriable.

Next, select the appropriate Capture Window Size. Note that the 10 nS length set at the factory since this give the greatest resolution when working with waveguides of 20 or 30 cm lengths. When using longer (40-60 cm) waveguides, you must select the 20 nS window. The 40 nS window size is used for saturated soils or unusual conditions.

Finally, select the Moisture Table. Select either BUN (Buriable, Uncoated) or BCT (Buriable, Coated) depending on the type of waveguide being used.

Now that the TraseTerm software has been properly set for making measurements with the buriable, tap the Home button on your handheld terminal.

Zero Set Not Required for Buriable Waveguides

When you are using the Buriable waveguides, the Zero Set Process, previously described for use with the standard Waveguide Connector, is NOT required. The Buriable Waveguide has a built-in electronic feature, which the Trase software recognizes, for its computation of percent of moisture. Therefore, after entering the desired parameters and synchronizing the time between the Palm and the MiniTrase in the Trase Setup Screen, tap the Home button.

Before proceeding, be sure that the Buriable Waveguide is attached to the Mini-Trase and inserted in the soil. The BNC fitting on the cable of the Buriable Waveguide is protected by a soft plastic cap. The cap provides the BNC fitting protection in the field from soil, water, and other possible contaminants. To make a reading, remove the protective cap from the end of the BNC fitting, connect the fitting to the BNC Port on the front of the MiniTrase. Then, skipping the Zero Set Process, tap the Measure button to immediately initiate the measurement process.

As described earlier, once the measurement has been successfully taken, the reading may now be tagged for identification purposes and then either only the moisture reading may be stored or both the Reading and Graph together may be stored.

Making Measurements with the Slammer

Insertion of the Slammer Waveguides into the Soil

For assembly and use of the Slammer, please refer to the separate instructions for the Slammer. The Slammer was designed for rough use in agricultural environments where the soils vary in texture, structure, hardness, or moisture content. In moist soils, Waveguides up to 40 cm may be pushed into the soil without much difficulty. Most or all of the insertion may be achieved in one or two pushes.

NOTE

It is important to apply the “pushing” force directly over and vertical to the Waveguides, as all of this force is translated to the Waveguides (Fig. 10-7).



Fig. 10-7

If rapid insertion is not permitted by the soil, then it is best to use the sliding Hammer to aid in the insertion process. Move the Hammer up and down the Handle Stem to “drive” the Waveguides into the soil. (See Figure 10-8).

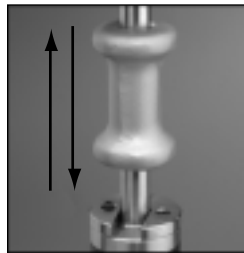


Fig. 10-8

In the toughest situations, we have found it most effective to almost sit on the T-handle while using the sliding Hammer. The Hammer Plate must be attached to the Top Cap of the Handle Assembly to prevent damage to the welded Handle Assembly. Make sure to grasp the Hammer tightly with **all** your fingers to prevent a finger being smashed under the Hammer’s blow (Fig 10-9).



Fig. 10-9

**Making a
Measurement**

From the Trase Setup Screen, select the appropriate Waveguide Length. From the Waveguide Type drop down menu, select Field.

Next, select the appropriate Capture Window Size. Note that the 10 nS length set at the factory since this give the greatest resolution when working with waveguides of 20 or 30 cm lengths. When using longer (40-60 cm) waveguides, you must select the 20 nS window. The 40 nS window size is used for saturated soils or unusual conditions.

Finally, select the Moisture Table. Select either FUN (Field, Uncoated) or FCT (Field, Coated) depending on the type of waveguide being used.

Now that the TraseTerm software has been properly set for making measurements with the Slammer, tap the Home button on your handheld terminal.

**Zero Set
Required**

Attach the Slammer Connector Cable to your MiniTrase unit and to the Slammer.

Unlike our standard connector-type waveguide, the waveguides **MUST** be inserted in the Slammer during the zero setting process. With the waveguides in air, tap the ZeroSet key. The process takes a number of seconds. When the process is complete, the message “Zero set” is displayed.

If for any reason you need to change the configuration of your Slammer setup, either changing cables, resetting the Capture Window Size, etc. you **MUST** zero set the system again.

If you have not already done so, tap the Sync Trase Time button in the top right hand corner of the terminal screen. This will ensure that the MiniTrase time/date stamp is synced with the handheld terminal.

From the Home Screen, tap the Measure button. Once the measurement has been made, you may now choose to tag and store your reading.