

## **TEMPE CELL SAMPLE PREPARATION PROCEDURE**

### ***For Aggregate Base, Fine grained, and Subgrade Soils***

***\*Samples are compacted at optimum water content and max density***

#### **1. PREPARING THE SAMPLES**

- A. Obtain **Maximum Dry Density** and **Optimum Moisture Content** from test report
- B. Determine amount of soil and water needed for 4 soil samples (see spreadsheet)
- C. Mix soil and water in large mixing bowl
- D. Place soil in sealed plastic container with a damp paper towel
- E. Let the soil sit for 24 hours

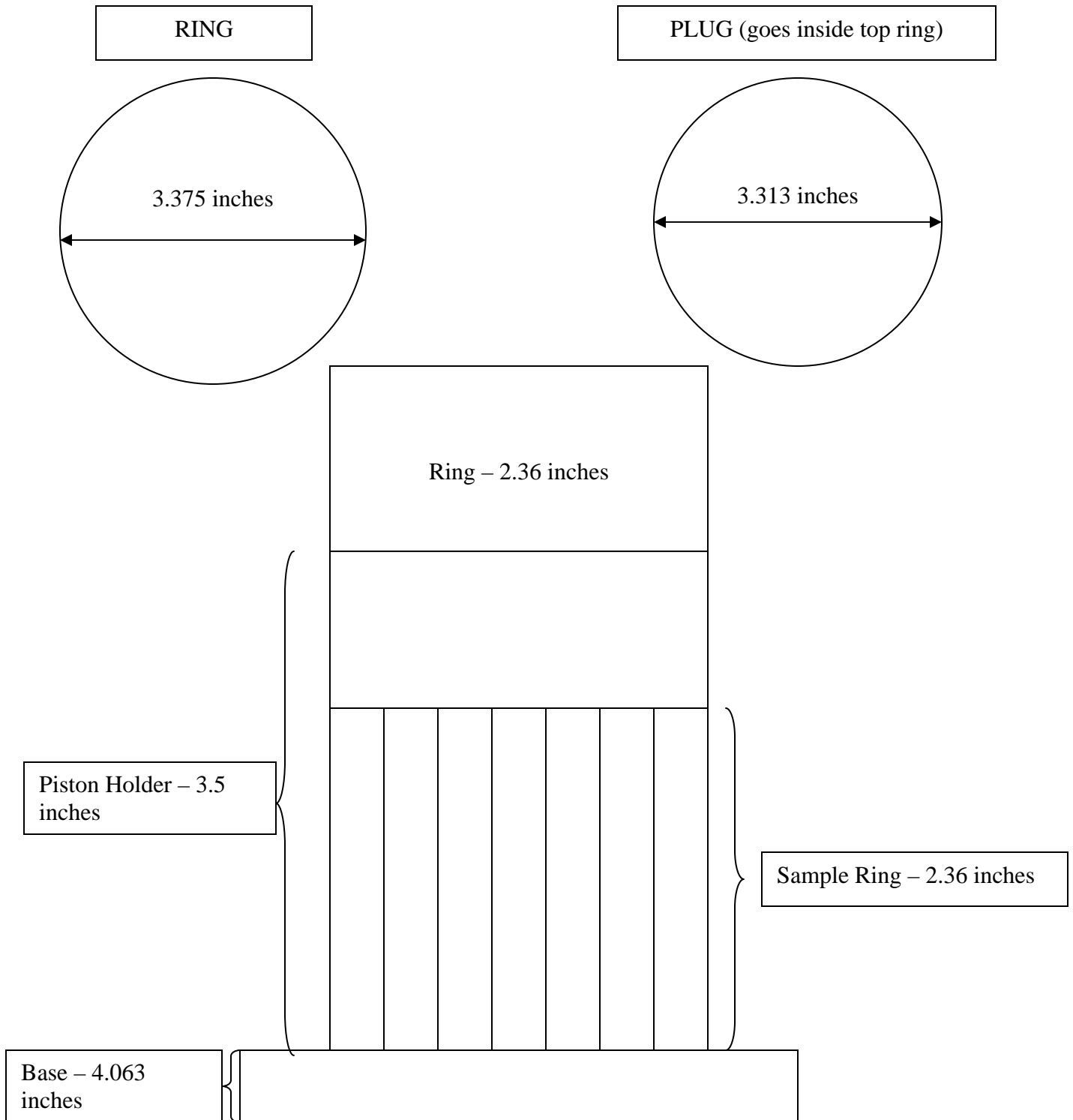
#### **2. WEIGHING THE SOIL AND SAMPLE RINGS**

- B. Weigh out the amount of wet soil needed for 1 sample (see spreadsheet)

#### **3. PACKING THE RINGS (see Figure 1)**

- A. Cover the base with a piece of plastic wrap
- B. Place 1, 2.36 inch ring on top of the base
- C. Place another 2.36 inch ring on top of the bottom ring
- D. Slide the piston compressor over the rings and tighten with a hex key
- E. Put 1/3 of the soil in the bottom ring
- F. Pack the soil down and score the top with a knife or spatula
- G. Repeat the procedure 2 more times with the remaining soil
- H. Place a piece of filter paper on top of the soil
- I. Put a 2.36 inch plug inside the top ring
- J. Compress the sample in the soil press (see Figure 2) until the top of the plug is level with the top ring
- K. Loosen the piston holder and remove the sample
- L. Repeat the process 2 more times

**Figure 1**  
**COMPACTION SETUP AND DIAGRAM FOR PREPARING**  
**TEMPE CELL SAMPLES**





**Figure 2: Soil Press**

#### **4. SATURATING THE SAMPLES**

- A. Remove the top from a tempe cell
- B. Check to make sure the ceramic plate is not cracked and the cell is clean (If the plate is cracked, see section 8)
- C. Take one sample and press it into the bottom half of the cell using firm and steady pressure, the sample is secure when the ring snaps into the rubber ring on the bottom of the cell
- D. Place the top of the cell on the sample
- E. Place a 1 inch ring on the bottom of a large, rectangular tub
- F. Set the tempe cell inside of the ring
- G. Repeat for other 2 samples
- H. Fill the tub with **deionized water** until the water is approximately  $\frac{1}{2}$  way up the side of the rings
- I. Let the samples saturate for 4 days or until the tops of the samples glisten

## 5. USING THE TEMPE CELLS

- A. Place a layer of vacuum grease on the rubber ring on the inside of the top of the tempe cell
- B. Place the top of the cell on the sample and tighten down using washers and wing nuts
- C. Connect the pressure hose to the top of the cells
- D. Empty out any excess water from flasks beneath cells
- E. Weigh and record the weight of empty flasks (see data recording sheet)
- F. Set cells to desired pressure using water manometer for pressures <100 cm water column, use gauge on compressor for pressures >100 cm water column

**Disconnect hose from water manometer to compressor when setting pressures higher than 100 cm, or water will blow out of manometer**

- G. Weigh flasks daily and record weights (see data recording sheet)
- H. When there is no change in the flask weights, approximately 4 days, set the cell to next pressure until all pressures have been measured  
**(10, 30, 70, and 100 cm water column)**

## 6. DRYING THE SAMPLES

- A. After all the pressures have been measured, remove the samples from the tempe cells
- B. Obtain 2 drying cans for each of the samples
- C. Record the weight of each empty drying can (see data recording sheet)
- D. Remove the soil from the rings
- E. Place one sample into 2 cans
- F. Dry each soil sample at 105° for 24 hours in the lab oven
- G. Record the weight of the dry soil and can for each sample (see data recording sheet)

## 7. DEVELOPING MOISTURE CURVES

- A. Enter data into tempe cell calculation spreadsheet
- B. Obtain gravimetric and volumetric moisture for each soil
- C. Enter data into **Soil Vision** and generate moisture curves for samples

## 8. CLEANING CELLS AND REPLACING CERAMIC PLATES

- A. Remove rubber ring on bottom ½ of cell using a spatula or another flat object
- B. Flip the bottom of the cell over and gently tap until ceramic plate comes out
- C. Remove the rubber ring on top ½ of tempe cell using a spatula or other flat object
- D. Clean plate, rubber rings, bottom and top of tempe cell, getting all soil out
- E. If ceramic plate is cracked, place a new one in the bottom ½ of the cell
- F. Replace rubber rings