

**Colorado Procedure – Laboratory 3201-21**  
*Standard Method of Test for*  
**Continuous Penetration Test**

**1. SCOPE**

- 1.1 This method describes a procedure to measure of the resistance of the soil to penetration and the soil's relative density.

**2. APPARATUS**

- 2.1 A disposable drive cone shall be used. The cone will have a minimal diameter no smaller than the diameter of the drive rod and the drive coupling. A drive cone diameter of 2 inches in diameter is typical as shown in Figure 1.
- 2.2 The drive coupling for the cone shall be of the same diameter as the drive rod and shall be only long enough to allow for secure connection to the drive rod, to hold the drive cone, and be of sufficient material to not be damaged during the driving and retrieval process. See Figure 1.
- 2.3 A drill rig with an automatic 140 lb. hammer with a consistent freefall drop of 30 inches, a drive anvil, drive rod (typically "A" rod), and a winch and mast with sufficient strength to extract the drive rod and drive coupling.

**3. PROCEDURE**

- 3.1 Attach the drive coupling onto the drive rod, and place a drive cone into the drive coupling. These components make up the drive assembly. Place the drive assembly so the cone is on the ground surface pointing down.
- 3.2 Mark each foot from the ground surface (or the last foot mark from the previous drive) the length of the drive rod. Mount a drive anvil to the drive rod and place the hammer fully on the anvil. Adjust drive cone, drive rod, and hammer as needed so the entire assembly is vertical.
- 3.3 Drive the rod into the ground. Care must be taken to ensure the rod remains vertical while driving and is in line with the hammer; otherwise, the drive assembly may deviate and equipment extraction may become difficult and potentially dangerous.
- 3.4 Count and record the number of blows required to drive each foot of penetration on CDOT Form #334, *Penetrometer Log*. Add drive rods and repeat steps 3.2 and 3.3 until desired total depth is obtained or the rate of penetration exceeds 120 blows per foot.

**Note 1:** If the drive rod is pushed down a foot by the weight of the hammer when it is resting on the anvil, the blow count will be recorded as zero.

**Note 2:** If less than 1 foot is penetrated at the end of the drive, the log shall state the number of blows and the fraction of 1 foot penetration.

- 3.4 When the desired total depth has been reached, the drive rod and attached drive coupling shall be pulled from the ground and retrieved for future use. The drive cone will be left in the ground.

3.5 Any hole left as the result of performing the penetrometer will be backfilled with native material removed as a result of the penetrometer process. If native material is not available, bentonite chips shall be used to prevent potential subsurface impacts from surface operations.

#### 4. REPORT

4.1 Report data from the test in boring log, geology sheet, or graph form showing depth at which each blow count was obtained as a function of the blow count obtained, for each foot of penetration.

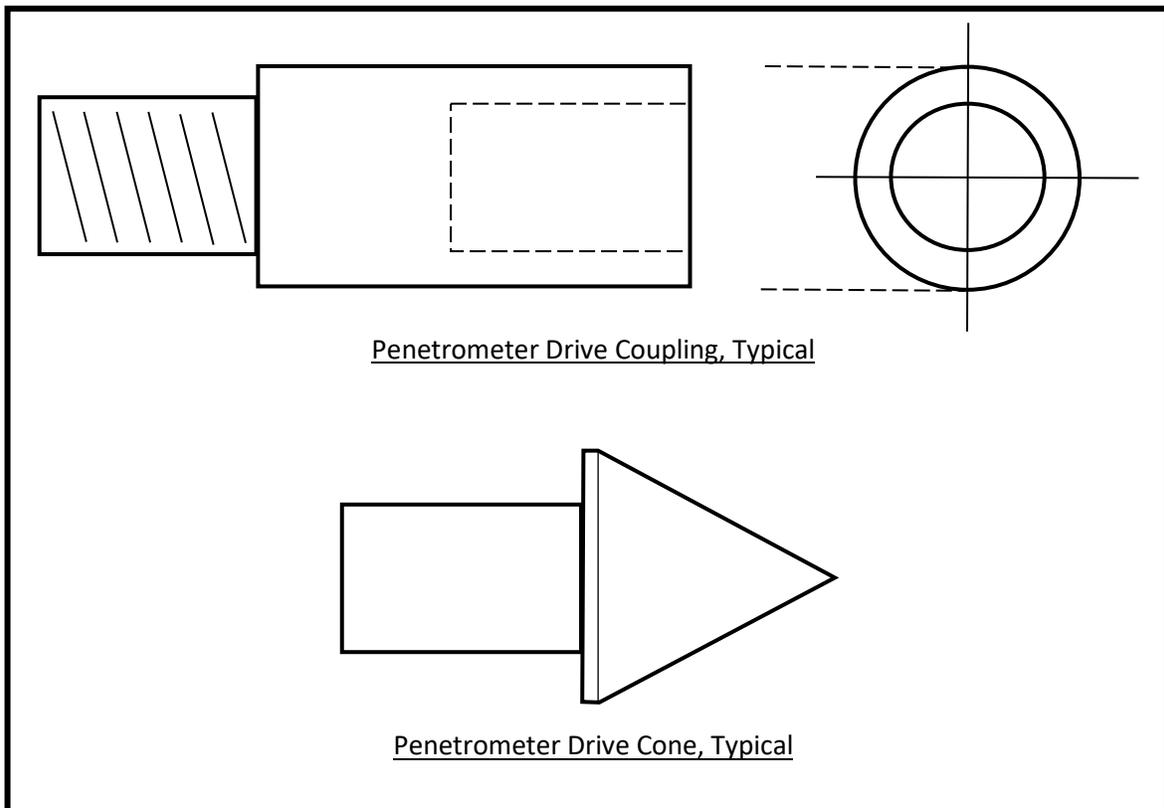


Figure 1