Determining Water Content In Soil – Calcium Carbide Method

This test is done to determine the water content in soil by calcium carbide method as per IS: 2720 (Part II) – 1973. It is a method for rapid determination of water content from the gas pressure developed by the reaction of calcium carbide with the free water of the soil. From the calibrated scale of the pressure gauge the percentage of water on total mass of wet soil is obtained and the same is converted to water content on dry mass of soil.

Apparatus required :-

i) Metallic pressure vessel, with a clamp for sealing the cup, alongwith a gauge calibrated in percentage water content

ii) Counterpoised balance, for weighing the sample

iii) Scoop, for measuring the absorbent (Calcium Carbide)

iv) Steel balls – 3 steel balls of about 12.5mm dia. and 1 steel ball of 25mm dia.

v) One bottle of the absorbent (Calcium Carbide)

PREPARATION OF SAMPLE

Sand – No special preparation. Coarse powders may be ground and pulverized. Cohesive and plastic soil – Soil is tested with addition of steel ball in the pressure vessels. The test requires about 6g of sample.

Procedure to determine Water Content In Soil By Calcium Carbide Method

i) Set up the balance, place the sample in the pan till the mark on the balance arm matches with the index mark.

ii) Check that the cup and the body are clean.

iii) Hold the body horizontally and gently deposit the levelled, scoop-full of the absorbent (Calcium Carbide) inside the chamber.

iv) Transfer the weighed soil from the pan to the cup.

v) Hold cup and chamber horizontally, bringing them together without disturbing the sample and the absorbent.

vi) Clamp the cup tightly into place. If the sample is bulky, reverse the above placement, that is, put the sample in the chamber and the absorbent in the cup.

vii) In case of clayey soils, place all the 4 steel balls (3 smaller and 1 bigger) in the body along with the absorbent.

viii) Shake the unit up and down vigorously in this position for about 15 seconds.

ix) Hold the unit horizontally, rotating it for 10 seconds, so that the balls roll around the inner circumference of the body.

x) Rest for 20 seconds.

xi) Repeat the above cycle until the pressure gauge reading is constant and note the reading. Usually it takes 4 to 8 minutes to achieve constant reading. This is the water content (m) obtained on wet mass basis.

xii) Finally, release the pressure slowly by opening the clamp screw and taking the cup out, empty the contents and clean the instrument with a brush.

REPORTING OF RESULTS

The water content on dry mass basis,

$w=m/[100-m] * 100\%$

Source: http://www.engineeringcivil.com/determining-water-content-in-soil-calcium-carbide-method.html