Florida Method of Test
for
DISPLACEMENT GROUTING PUMP CALIBRATION WITH A CYLINDRICAL CONTAINER
Designation: FM 5-612

1. SCOPE

    1.1   This method describes the procedure to determine the volume of grout pumped with each pump stroke. This method applies to displacement pumps used in the grouting of cast-in-place piles or elements.

    2.   MATERIALS

    2.1   CONTAINER: Use a carbon steel cylindrical container or drum with a minimum capacity of 55 US gallons.

           GROUT: Use the approved grout mix that will be used in the project.

3. PROCEDURE

    3.1   Ensure the container is empty, clean, in good condition and of cylindrical shape. Reject containers that cannot be used to determine the volume of a fluid accurately due to presence of any residual material or due to a distorted shape.

    3.2   Measure the Internal Diameter D and the total internal height H of the empty container.

    3.3   Prime system by pumping grout through the hose or placement pipe to be used for construction, until a uniform flow is established. This material will be wasted. Immediately after priming, begin to pump directly into the container. Count the number of full strokes required to fill the container as much as practical without overtopping it. If the container is overtopped, or partial strokes are introduced, empty/clean container and repeat.

    3.4   After pumping the last stroke, measure the height H_1, from the top of the container to the top of grout in the container.

    3.5   Determine the actual height of grout inside the containier, H_2, as

    $$H_2 = H - H_1 \qquad (1)$$

    3.6   Compute the volume pumped as follows:

    $$V = \frac{\pi D^2}{4} x\, H_2 \qquad (2)$$

3.7   Compute the calibration factor CF in cubic feet per pump stroke as:

$$CF = \frac{V}{N}$$ (3) Where N is the number of strokes

The calibration factor, CF is the number that will convert the number of strokes to a volume in cubic feet of grout pumped.

EXAMPLE: Refer to Fig 1. Before the test, the internal diameter of the container D was measured as 23 in. The total height H of the container was measured as 34 in. A total of six (6) full strokes were pumped during the test into the barrel. After these strokes, the free height H_1 was measured as 4 in.
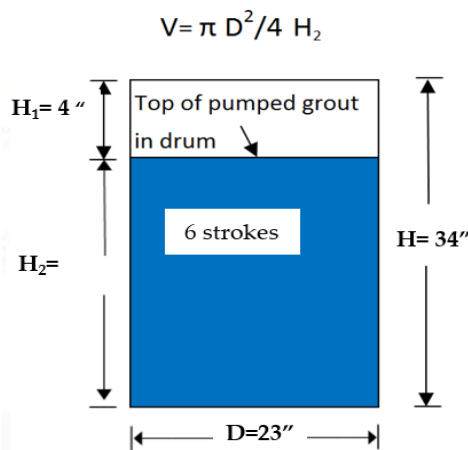

$$V = \pi D^2/4 \ H_2$$

$H_1 = 4''$ Top of pumped grout in drum

6 strokes $H = 34''$

$H_2 =$

$D = 23''$

Fig. 1

4. Calculations:

4.1   The actual height of grout H_2 is determined as $H_2 = H - H_1 = 34 \, in - 4 \, in = 30 in$

4.2   The volume of grout pumped is determined as

$$V = \frac{\pi D^2}{4} \ x \ H_2 \ = \frac{\pi * (23)^2}{4} x \ 30 = 12{,}464 \ in^3$$

$$V = 12{,}464 \ in^3 \ / \frac{1728 \ in^3}{ft^3} = 7.21 \ ft^3$$

4.3   The calibration factor is:

CF= V/N = 7.21 ft³/ 6 strokes = 1.20 ft³/stroke