



DETERMINING FLOW OF GROUT MIXTURES (FLOW CONE METHODS)

SCOPE

This method of test covers the procedure to be used both in the laboratory and in the field for determining the flow of grout mixtures by measuring the time of efflux of a specified volume of grout from a standardized flow cone.

The procedure is a modification of ASTM C939 and D6449.

APPARATUS

1. Flow cone as specified in ASTM C939 with a 1/2 inch (12.7 mm) orifice for flowable mortar (See Figure 1).
2. Flow cone as specified in ASTM D6449 with a 3/4 inch (19 mm) orifice for concrete grout for fabric formed concrete revetment.
3. Stopwatch accurate and readable to 0.2 seconds
4. Level
5. Calibration jug or container to hold a quantity of water equal to 2 qt. (1725 mL)

CALIBRATION OF CONE

1. The flow cone shall be firmly mounted in such a manner that the top will be level and the cone free from vibration (use level, rigid, horizontal surface).
2. Level the cone by adjusting the mounting forks.
3. Close the discharge tube of the cone by placing a finger over the lower end. (Be sure not to disturb the leveled cone.)
4. Introduce 1725 ± 1 mL of water into the cone.
5. Adjust the pointer so that the point just comes into contact with the water.
6. Start the stopwatch and remove the finger simultaneously. Stop the stopwatch when the flow stops. The elapsed time should be 8.0 +/- 0.5 seconds for the 1/2 inch orifice and 4.0 +/- 0.5 seconds for the 3/4 inch orifice.

SAMPLE

The test sample shall consist of 1725 ± 1 mL of grout.

PROCEDURE

1. Select the flow cone with the proper flow opening. A flow cone with a 1/2 inch (12.7 mm) orifice is for flowable mortar (ASTM C939). A flow cone with a 3/4 inch (19 mm) orifice is for concrete grout for fabric formed concrete revetment (ASTM D6449).
2. Moisten the inside surface of the flow cone.
3. Place a finger over the discharge opening.
4. Introduce grout into the cone until the grout surface rises into contact with the pointer.
5. Start the stopwatch and remove the finger simultaneously.
6. Stop the stopwatch at the first break in the continuous flow of grout from the discharge opening (when the cone is essentially empty).
7. Read time of efflux of the grout (which is the time indicated by the stopwatch).

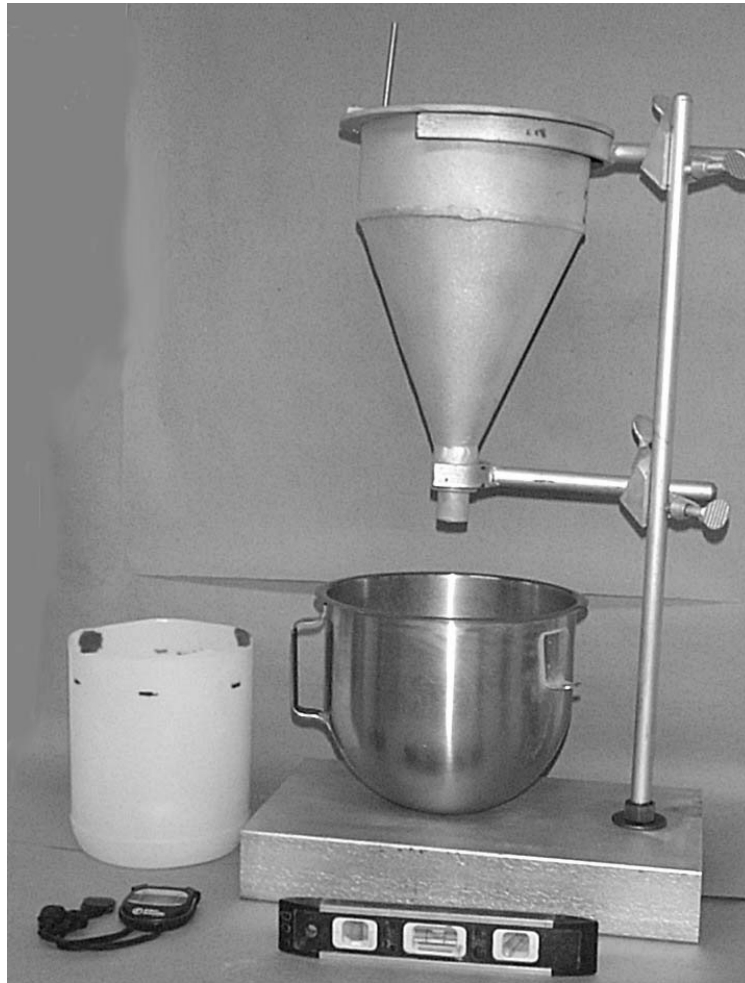
NOTE 1: If there is a break in the continuity of discharge prior to essential emptying of the cone, it is an indication that the grout is too thick to be properly tested for flow.

NOTE 2: For the 1/2 inch orifice, if the sand used in the grout mixture is larger than No. 4 (4.75 mm) in size, then the sample should be sieved through a No. 4 (4.75 mm) sieve cloth prior to being introduced to the flow cone.

REPORT – (See Figure 2 for an Example.)

1. Average time of efflux to the nearest second.
2. Composition of the sample
3. Information and observation of the physical characteristics of the sample

FIGURE 1



Grout Flow Cone

FIGURE 2

IOWA DOT DISTRICT 1 LAB
FLOWABLE MORTAR

LAB NUMBER: 1AS4:008
PROJECT NUMBER: CONTRACT NUMBER:
COUNTY: POLK DESIGN:
CONTRACTOR:
MATERIAL: FINE SAND
SOURCE: HALLETT-JOHNSON
UNIT OF MATERIAL: CEMENT-LAFARGE, FLYASH-COUNCIL BLUFFS
QUANTITY: 50 LB BAG
PRODUCER: GNA CONCRETE
SAMPLED BY: SENDER'S NUMBER
DATE SAMPLED: 5/12/04 DATE RECEIVED: 5/12/04 DATE REPORTED: 5/14/04

SIEVE SIZE	PERCENT PASSING
3/8"	100
#4	99
#8	92
#16	78
#30	44
#50	8.2
#100	0.9
#200	0.5

DISPOSITION: COMPLIES WITH THE FOLLOWING PROPORTIONS: 400 LBS. FLYASH,
100 LBS. CEMENT, 2600 LBS. SAND. FLOWABILITY OF 16 SEC OBTAINED
WITH 68 GAL/YD³ H₂O.

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GNA CONCRETE

SIGNED: JOHN HART
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