Compression Test

****Note:** If further information is needed, please refer to ASTM C-39.

Summary: This test method consists of applying a compressive axial load to molded cylinders at a reasonable rate until failure occurs. The compressive strength of the specimen is calculated by dividing the maximum load attained during the test by the cross sectional area of the specimen.

Procedure:

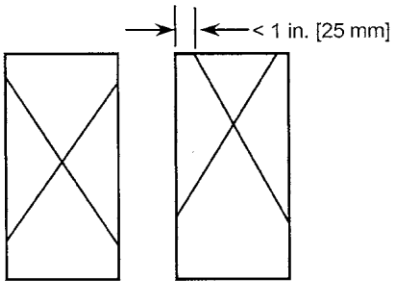
1. Take the test specimen (4" x 8") out of the cylindrical mold using the splitter tool
    a. Blade of tool faces outwards and is stuck down the side of the cylindrical mold
    b. Use a mallet to tap on the tool and split the mold
    c. **Remember:** Moist-cured test specimens shall be tested as soon as possible after removal from moist storage
    d. All test specimens shall be broken within the permissible time tolerances as follows:

Test Age	Permissible Tolerance
24 h	± 0.5 h or 2.1 %
3 days	2 h or 2.8 %
7 days	6 h or 3.6 %
28 days	20 h or 3.0 %
90 days	2 days 2.2 %

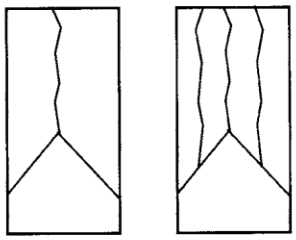
2. Weigh the test specimen once removed from the mold as soon as possible
    a. Density is then calculated because the volume is already known(Density= Mass/Volume)
3. Next turn on the machine you will be using to test
4. Tare the machine
5. Place the inserts for the 4" x 8" cylinders in the machine
    a. Place the lower bearing block with its hardened face up platen of the testing machine directly under the spherically seated upper bearing block
        i. Wipe the bearing surfaces clean of the upper and lower bearing blocks
    b. Make sure you have 2 people placing the top insert (one holding the top insert, the other tightening/loosening the connection between the machine and top insert)
    c. The top insert will be pushing down on the specimen while the bottom insert allows the test specimen to rest on it
6. Now place the specimen between the top and bottom insert with the specimen resting on the bottom insert
    a. Center the test specimen as well as possible between the top and bottom inserts
        i. Carefully align the axis of the specimen with the center of thrust of the upper block
7. Using the Full Advance setting, touch the upper bearing block to the top of the test specimen
8. Before testing make sure the top of the test specimen and upper bearing block surface lie parallel to each other as well as the load indicator is reading zero
9. Using the Metered Advance setting
    a. Twist the silver knob from closed to ¾ of a turn open
    b. The load should be applied continuously and without shock
    c. The slower the rate of loading, the better the test result will be

i. The load should not increase by more than 40 kips per minute

10. Apply the compressive load until the load indicator shows that the load is decreasing steadily and the specimen displays a well-defined fracture pattern
    a. Well-defined fracture patterns are as follows and need to be recorded:

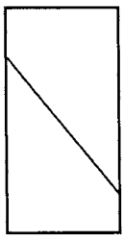


Type 1
Reasonably well-formed cones on both ends, less than 1 in. [25 mm] of cracking through caps

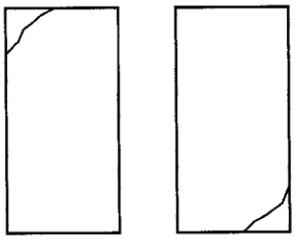


Type 2
Well-formed cone on one end, vertical cracks running through caps, no well-defined cone on other end

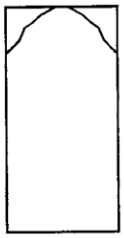
Type 3
Columnar vertical cracking through both ends, no well-formed cones



Type 4
Diagonal fracture with no cracking through ends; tap with hammer to distinguish from Type 1



Type 5
Side fractures at top or bottom (occur commonly with unbonded caps)



Type 6
Similar to Type 5 but end of cylinder is pointed

    b. If the fracture pattern is not one of the typical patterns, sketch and describe briefly the fracture pattern
    c. If the measured strength is lower than expected, examine the fractured concrete and note the presence of large air voids or evidence of segregation, whether fractures pass predominantly around or through the course aggregate particles
11. Record the maximum applied load that caused the specimen to break
    a. The machine should have recorded this value in kips
    b. The value can be accessed by pressing: Max Load on the control panel
12. The compressive strength of the specimen can be calculated by dividing the maximum applied load during the test by the cross sectional area of the specimen
13. Before testing the next specimen, make sure the machine is turned off and then back on to clear the saved maximum load and allow and a new one to be recorded