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DRAFT TANZANIA STANDARD

Standard Test Method for Compressive Strength of Architectural Cast Stone

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TANZANIA BUREAU OF STANDARDS

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1st Edition

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Tanzania Commission for Science and Technology (COSTECH)
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The organizations marked with an asterisk (*) in the above list, together with the following were directly represented on the Technical Committee entrusted with the preparation of this draft Tanzania Standard:

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0 National Foreword

The Tanzania Bureau of standards is the statutory national standards body for Tanzania, established under the act.No.3 of 1975, amended by act.No.2 of 2009.

This draft Tanzania Standard is being prepared by BCDC 2 Masonry Technical Committee under the supervision of the Building and Construction Divisional Standards committee (BCDC).

In the preparation of this draft Tanzania Standard assistance was derived from ASTM C1194 – 25 Standard Test Method for Compressive Strength of Architectural Cast Stone. published by American Society for Testing and Materials (ASTM)

Compressive strength is an important characteristic for assessing the quality, consistency and structural performance of architectural cast stone. Reliable determination of compressive strength provides a basis for evaluating the suitability of the material for its intended application and for verifying compliance with specified performance requirements.

The test method is intended to provide reproducible and comparable results for quality control, product evaluation, conformity assessment, research and development, and verification of specified compressive-strength requirements for architectural cast stone.

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1 Scope

This test method covers the sampling, preparation of specimens, and determination of the compressive strength of architectural cast stone.

NOTE 1—The testing laboratory performing this test method should be evaluated in accordance with Practice C1093.

2 Normative references

The following referenced documents are indispensable for application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

C42/C42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm Cube Specimens)

C617/C617M Practice for Capping Cylindrical Concrete Specimens

C1093 Practice for Accreditation of Testing Agencies for Masonry

C1364 Specification for Architectural Cast Stone

3. Terminology

For definitions of terms used in this standard, see Terminology D8.

3.1 Definitions:

3.1.1 cast stone, n - an architectural precast concrete building unit intended to simulate natural cut stone.

4. Significance and Use

4.1 This test method is to be used in determining the compressive strength of cast stone. Compressive strength is one measure of resistance of cast stone to weathering and structural stress.

5. Apparatus

5.1 Testing Machine - The testing machine shall conform to the requirements prescribed in Test Method C109/C109M unless otherwise indicated therein.

6. Sampling

6.1 Select the sample to represent the cast stone under consideration. The sample may be selected by the purchaser or his authorized representative from each 14 m^3 of cast stone. Select a sample of adequate size to permit the preparation of three compression test specimens.

7. Test Specimens

7.1 For compression tests, take three specimens from each sample. Cut specimens from the finished surface of the sample to consist of one surface intended to be exposed to view and five saw-cut surfaces, except for faced cast stone, cut specimens through the faced surface to consist of approximately equal parts of the facing material and the backup material.

7.2 Cut test specimens from the sample with saws. The test specimens shall be 50.8mm or 50-mm cubes. The allowable size tolerance of the cubes shall be 3.2 mm.

7.3 Measure the top and bottom of the bearing surfaces of the test specimens to 0.25 mm and average the two bearing areas to obtain the compression area.

8. Conditioning

8.1 Unless specified otherwise, initiate oven-drying of specimens 28 days after manufacture at a temperature of 110 6 5°C until the loss in mass is not more than 0.1 % in 24 h of drying. Remove specimens from the oven and allow to cool in room temperature for 4 to 6 h before capping.

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NOTE 2—Once the specimens are placed in the drying oven, curing slows and eventually stops as any moisture in the specimen is consumed for hydration or is evaporated. If oven drying is initiated at 28 days, then compression testing will occur after 28 days from casting and the value may vary from the value obtained if the specimen was tested on the 28th day. The age of the specimen at the time of testing should be considered when evaluating compliance with ASTM C1364 Standard Specification for Architectural Cast Stone.

9. Specimen Preparation

9.1 Cap each specimen, after drying, using equipment, materials, and procedures that conform to those specified in Practice C617/C617M. Capping material is required that will exceed the compressive strength of the tested cubes. Form the cap by spreading the capping material upon a capping plate and pressing the specimen firmly on it. Make the cap as thin as possible but not to exceed 2.4 mm. Caps must be allowed to harden a minimum of 16 hours prior to testing.

10. Procedure

10.1 At 20 hours 64 hours after capping, apply load through a spherical bearing block placed on top of the specimen in a vertical testing machine. The loading of homogenous specimens shall be parallel to the casting direction and of faced specimens shall be normal to the position in which the cast stone is laid in the wall (Fig. 1). The area of the bearing block shall be the same, or slightly larger, than that of the test specimen.

10.2 Center the specimen in the testing machine and apply the initial load at a rate which will permit hand adjustment of the contact plate on the specimen.

10.3 Apply load uniformly and without shock. Loading shall be at a rate of 1380 to 2415 kPa/s or for testing machines of screw type, the moving head shall travel at a rate of approximately 1.3 mm/min when the machine is running idle.

10.4 The compression testing machine shall have a low range dial or a digital reading scale that shall have an accuracy of 61.0 % of the maximum load applied to the cast stone specimens.

10.5 Load specimens to failure.

11. Calculations

11.1. Calculate the compressive strength of each specimen as follows:

$$C = W/A \qquad (1)$$

where:

C = compressive strength of the specimen, psi (MPa),
W = maximum load, lbf (N), on the specimen at failure, and
A = calculated area of the uncapped bearing surface in in.^{2} (mm^2).

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12. Report

12.1 Report the following information.

12.1.1 The average compressive strength of three specimens taken from a single sample with the psi results rounded off to the nearest 10 psi.

12.1.2 The following information shall be reported as applicable: identification of the sample, mixture proportions, compressive strength, name of the project, date of casting, and date oven-drying initiated.

13. Precision and Bias

13.1 Precision—The precision of this test is similar to Test Method C42/C42M for which data are not yet available. The precision of this test method will be stated when data become available.

13.2 Bias—Since there is no accepted reference material suitable for determining the bias of results of this test method, no statement on bias is being made.

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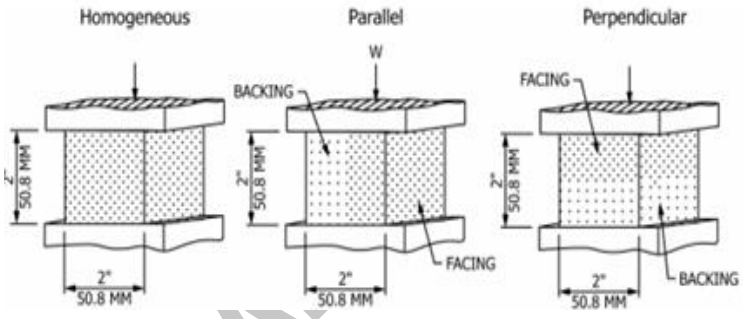


Figure 1 Loading Position