

CALIFORNIA COUNCIL OF TESTING & INSPECTION AGENCIES

Laboratory Internal Auditing ASTM C1140-03a

Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels

Company Name	Company Address
Telephone No.	
Completed By:	Signature

- This practice covers procedures for preparing test panels of dry-mix or wet-mix shotcrete and for testing specimens sawed or cored from the panels.
- Test panels of shotcrete are fabricated using the personnel, materials, equipment, and shooting positions under investigation. Specimens are core drilled or sawed from these panels for evaluation.
- Specimens obtained in accordance with the procedure section of this practice may be used for preconstruction studies of shotcrete mixtures, to qualify nozzle men and equipment, or for quality control, or compressive or flexural strength testing, during the progress of a project.
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1.00 Test Panels	Ref	Yes	No	N/A	Comments
1.1 Are the forms for receiving the shotcrete sufficiently rigid to prevent dislodging of the shotcrete through vibration or deformation and made of either wood or steel construction?					
1.2 Are the forms a minimum width and length of 24 in. (610 mm) and a minimum depth of 3½ in. (89 mm) with either square or sloped sides?					
NOTE: IBC 1914.10.1 Minimum panel dimension shall be 18 X18 for 3/8 aggregate					
1.3 When using wood forms is the back made from plywood at least ¾ in. (19 mm) thick and side pieces made of lumber with a minimum thickness of 1½ in. (38 mm)?					
1.4 When using steel forms are they made from material having a minimum thickness of ¼ in. (5 mm)?					

2.00 Materials	Ref	Yes	No	N/A	Comments
2.1 When using the Dry-Mix Process is the test mixture the same materials and proportions being used or proposed for use in the structure?					
2.2 When using the Wet-Mix Process does the test mixture have the specified slump, air content and unit weight as specified?					
2.3 When fibers are used, does the test mixture have the specified time of flow, air content, and unit weight as the mixture being used or proposed for use in the structure?					
2.4 Prior to shooting the panels has the following been determined?					
the air content by Test Method C 231					
the unit weight by Test Method C 138/C 138M					
slump by Test Method C 143/C 143M					
and time of flow by Test Method C 995					

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3.00 Procedure	Ref	Yes	No	N/A	Comments
3.1 Have specimens been obtained from panels by drilling cores or sawing beams in accordance with Test Method C 42/C 42M, or by sawing cubes in accordance with Test Method C 513?					
3.2 Are the samples taken from the shotcrete in the space equal to the depth plus 1 in. from the outside edges?					
NOTE: For 3 1/2 in. deep, 24 X 24 in. forms, this corresponds to 4 1/2 in. from the inside of the bottom corner formed by the base of the form, resulting in a sample area of 15 X 15 in					
3.3 Are the cores or beams free from corrugations and striations caused by uneven sawing or coring?					
3.4 Have all flat surfaces been sawed to ensure parallel and smooth surfaces?					
3.5 Are the cores drilled and tested for compressive strength perpendicular to the surface of the panel?					
NOTE: Cubes and beams may be tested either perpendicular or parallel to the surface of the panel.					
NOTE: The direction of testing can influence the results and shall be specified.					
3.6 Are the freshly applied specimens properly handled to protect them from damage due to extremes of temperature and vibrating movements, shaking, or shock during the hydration process					
3.7 Are beams tested in accordance with Test Method C 78?					
NOTE: Beams of fiber-reinforced concrete shall be tested in accordance with Test Method C 1018 or Test Method C 1399.					
3.8 Are specimens obtained from panels and tested at designated ages?					
3.9 Unless moisture conditioning is specified, are the specimens obtained from panels no more than 2 h before being tested?					
3.10 When moisture conditioning is specified, has it been in accordance with the provisions of Test Method C 42/C 42M unless otherwise specified by the purchaser.					
3.11 Has the density, absorption, and voids been determined in accordance with the provisions of Test Method C 642?					
3.12 Has the data obtained in flexural tests been treated in accordance with Test Methods C 78, C 1018 or C 1399.					

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4.00 Curing	Ref	Yes	No	N/A	Comments
4.1 To prevent evaporation of water from the panels, has the specimen been covered and tightly wrapped (as soon after fabrication as is safe to prevent damage) with a sheet of material meeting requirements of Specification C 171?					
NOTE: IBC 1914.10.1 The conditions under which the panels are cured shall be the same as the work.					
4.2 If the panel has not been covered, has it been stored in a moist room meeting the requirements of Specification C 511?					
4.3 If the specimen is field cured, when was it moved to the laboratory? just prior to testing.					
4.4 If the specimen is a latex admixed shotcrete panel has it been moist-cured for 24 h and then air-dried for the balance of the curing cycle?					

5.00 Obtaining & Testing Specimens	Ref	Yes	No	N/A	Comments
5.1 Has a separate panel been shot for each mixture representing each admixture type or dosage, fiber type or fiber volume and each shooting position anticipated in the structure (that is, slab, slopes, vertical, and overhead).					
5.2 If an admixture is used, has it been added in the same manner and dosage as proposed for use or used in the structure?					
5.3 Do the test specimens used for bar encapsulation studies and qualification of personnel, equipment, and application techniques include reinforcing bars?					
5.4 Reinforcing bars should be excluded from samples prepared for compressive, flexural, and tensile tests?					
5.5 If fibers are added to the shotcrete, are they included in the respective test samples?					
5.6 Has shotcrete been applied using the equipment, water pressure, and air pressure that are to be used on the structure?					
5.7 Has the sample been prepared by the operating personnel (nozzlemen and gun operator) that's to be used on the structure?					
5.8 Has the sample panel been prepared in the same manner that's to be used on the structure?					
5.9 Have the wood forms been dampened just prior to shotcreting?					

6.00 Calculation	Ref	Yes	No	N/A	Comments
6.1 Has the length to diameter correction factor found in Test Method C 42/C 42M been applied to compressive strengths?					
6.2 For sawed cubes, has the compressive strengths been multiplied by a correction factor of 0.85 to obtain equivalent strength of drilled cores?					

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7.00 Report	Ref	Yes	No	N/A	Comments
Does the report have the following information?					
7.1 Type and proportions of					
Cement					
Admixtures					
Fine and course aggregates including size & grading					
Free water content, in the case of wet mix shotcrete					
Temperature					
7.2 Type and proportion of any fibers used					
7.3 Position of panel as shot					
7.4 Type of shotcrete, that is, wet or dry					
7.5 Name of nozzleman and gun operator					
7.6 Specimen size					
7.7 Moisture conditioning					
7.8 Direction of testing relative to panel surface					
7.9 Unit weight					
7.10 Air content					
7.11 Absorption and voids					
7.12 Slump					
7.13 Time of flow, if applicable					
7.14 Strength and other mechanical properties evaluated					
7.15 Test method used					
7.16 Correction factors applied					

8.00 Precision & Bias	Ref	Yes	No	N/A	Comments
8.1 Has the precision and bias been reported according to the referenced test method?					

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