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Concrete Strength Testing Study Guide

ASTM C 617 – CAPPING CYLINDRICAL CONCRETE SPECIMENS

1. Neat cement caps and high-strength gypsum-plaster shall be formed against a glass plate at least _____ in. thick, a machined metal plate at least _____ in. thick, or a polished plate of granite or diabase at least _____ in. thick.

2. Plates used for sulfur capping have a recessed area to hold sulfur that cannot be more than _____ in. deep.

3. In all cases, plates shall be at least _____ in. greater in diameter than the test specimen and the working surfaces shall not depart from a plane by more than _____ in _____ inches.

4. Alignment devices ensure that the resulting caps are perpendicular to the axis of the cylinder to within _____°.

5. A pot with _____ _____ _____ is required for melting and heating sulfur mortar.

6. Never heat the melting pot over an _____ _____. The sulfur pot must be located under a _____ to exhaust the fumes.

7. Capping materials used on cylinders with an expected strength of 500 to 7000 psi must have a minimum strength of _____ psi or the cylinder strength, whichever is greater.

8. To qualify sulfur mortar or gypsum used to test concretes with strengths greater than _____ psi, that has a strength less than the cylinder strength, the average strength of the cylinders capped with the capping material must be at least _____ % of the average strength of the companion cylinders.

9. All capping materials are tested for compressive strength using _____ in. cubes.

10. The strength of capping material are tested on receipt of a new lot and at intervals at least every _____ months.

11. Qualification tests of neat hydraulic cement paste are used to determine proper _____-_____ _____ and cap curing time needed to achieve strength.

12. For gypsum cement paste, a lower water-cement ratio will yield _____ strength results, but the resulting mixture will be _____ workable.

13. Use only _____ _____ _____ to cap freshly molded cylinders.

14. Use a carpenter square across the top and down the side of the cylinder to check that the difference between the highest point and lowest point across the _____ of the cylinder is not more than _____ in.

15. When capping with high strength gypsum, place a conical mound of paste on top of the _____. Press an oiled _____ _____ on top of the paste and apply downward pressure until the plate contacts the top of the cylinder.

16. Prepare sulfur mortar for use in capping by heating to a temperature between _____and _____°F.

17. Sulfur can be reused if the cylinders previously tested had strengths less than _____ psi. The oldest material in the pot shall not be used more than _____ times.

18. Check the temperature at approximately_____ intervals during capping.

19. The capping plate or device shall be warmed before use. This will cause the sulfur to _____ _____ and the resulting cap will be _____.

20. In preparing the cylinder for sulfur capping, make sure that the ends are dry enough to avoid _____ or foam pockets larger than _____ in.

21. Sulfur mortar must be allowed to harden a minimum of _____ hours before testing concrete strengths of _____ psi or greater.

22. During each day's capping operation, check the _____ on at least _____ specimens prior to compression testing by using a _____ _____ and a _____ in. feeler gauge.

23. During each day of compression testing, check the _____ of caps on at least _____ specimens.

24. To check cap thickness, after completing the compression test, recover at least _____ pieces of the capping material from the selected specimen and measure and record the thickness to the nearest _____ in.

25. Do not test capped cylinders before the caps have had enough time to develop _____.

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ASTM C 1231 – USE OF UNBONDED CAPS IN DETERMINATION OF COMPRESSIVE STRENGTH OF HARDENED CONCRETE SPECIMENS

26. Use of unbonded caps below _____ psi or above _____ psi is not permitted.

27. Pads shall be _____ ± ____ in. thick and the diameter shall not be more than _____ in. smaller than the inside diameter of the ring.

28. _____ pads are disposable and should only be used the number of times specified in the Table unless qualification tests are done.

29. For an anticipated cylinder strength of 3500 psi, the correct pad durometer used could be _____ or _____.

30. The maximum number of reuses allowed on a neoprene pad that will be testing concrete in the range of 1500 to 7000 psi is _____. For concrete in the range of 7000 to 12000 psi, the maximum number of reuses is _____.

31. The user shall maintain a record indicating the date the pads are _____ _____ _____, _____ _____, and the _____ _____ _____.

32. The height of the retaining ring shall be _____ in.

33. The inside diameter of the retaining ring shall not be less than _____ % or greater than _____ % of the diameter of the cylinder.

34. The bearing surfaces of the retaining rings must be plane to _____ in.

35. A straight edge and a round wire gauge with a diameter of up to _____ in are required for checking the ends of cylinders prior to using unbonded caps.

36. The remainder of the testing is done according to ASTM Test Method _____.

37. When tests are to be made to establish a permissible number of *reuses* exceeding those in Table 1, only those reuses which are within _____ psi of the _____ strength level to be qualified will be included in reuse count.

38. When testing for qualification or pad reuse, a minimum of _____ _____ of cylinders shall be made at the _____ and _____ strength levels desired or anticipated. Average strength of cylinders tested must not be less than _____ % of the average strength of the companion capped/ground cylinders.

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ASTM C 39 – COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

39. This test method is limited to concretes with a unit weight in excess of _____ lb/ft^3.

40. The compressive strength values obtained using this test method are dependent on several variables including the _____ and shape of the specimen being tested, batching, mixing procedures, age, temperature and _____ _____.

41. Testing machines must be verified as follows:

    - Within _____ months of last calibration,
    - On original _____ or immediately after relocation,
    - Immediately after making _____ or _____ ,
    - Whenever there is a reason to suspect the _____ of the indicated loads.

42. The compression machine must be accurate to _____ of the indicated load.

43. The upper bearing block is a _____ and _____, commonly referred to as the spherical head.

44. All bearing blocks must be at least _____ % larger than the nominal diameter of the cylinder being broken with them.

45. Except for the concentric circles, the bearing faces of the testing machine shall not depart from a plane by more than _____ in. in 6 in.

46. The lower bearing block shall be at least _____in. thick when new, and _____ in. after any resurfacing.

47. The ball and socket portions of the spherical head should be taken apart and cleaned thoroughly at least every _____ months. The pieces should be _____ with a petroleum-type oil.

48. The maximum diameter of the bearing face of the suspended spherically seated block shall not exceed _____ inches for a 6 inch diameter test specimen.

49. For a specimen that is _____ inches in diameter, the maximum diameter of the bearing face of the suspended spherically seated block shall not exceed 6.5 inches.

50. Prior to testing, neither end of the test specimen shall depart from perpendicularity to the axis by more than _____°.

51. Any end of a test specimen that is not plane to within _____ in. needs to be _____ , ground or _____.

52. The diameter used for calculating the cross-sectional area of the specimen, shall be determined to the nearest _____ in. by averaging two diameters measured at _____ _____ to each other at about the midheight of the specimen.

53. Specimens shall not be tested if any individual diameter of a cylinder differs from any other diameter of the same cylinder by more than _____ %.

54. The number of individual cylinders measured to be used for determining average diameter is not prohibited from being reduced to one for each _____ or _____ per day, whichever is greater, provided they are from a single lot of molds and consistently produce average diameters within a range of 0.02 in.

55. If a density measurement is required, the length of the specimen is measured to the nearest _____in. at _____ locations spaced evenly around the specimen.

56. Test specimens shall be tested in a _____ condition.

57. The allowable testing time tolerance for a 28 day old cylinder is _____ hours.

58. Wipe clean the _____ _____ of the upper and lower bearing blocks, spacers if used, and of the specimen.

59. Align the center of the cylinder with the _____ of the _____ bearing block. _____ the _____ bearing block so that the bearing face is _____ to the top of the cylinder.

60. Prior to testing, verify that the load indicator is set to _____.

61. If using unbonded caps, apply up to _____% of the anticipated specimen strength and verify that the axis of the cylinder does not depart from vertical by more than _____°.

62. Apply the load continuously and without shock at a rate of _____psi/s.

63. During application of the first half of the anticipated loading phase, a _____ rate of loading shall be permitted.

64. The compressive strength results must be multiplied by a correction factor if the length to diameter ratio is _____ or less.

65. When specimen has a length to diameter ratio of 1.50, a correction factor of _____ will be multiplied by the compressive strength results.

66. Report the _____ number, average measured _____, and maximum _____. Report the compressive strength to the nearest _____ psi and note the type of _____. Report the _____ of specimen at time of testing.

ASTM C 78 – FLEXURAL STRENGTH OF CONCRETE (USING SIMPLE BEAM WITH THIRD-POINT LOADING)

67. This test uses _____ - _____ loading to determine the flexural strength of concrete.

68. A beam with a depth of 6 in. would have a span length of _____ in.

69. A beam with a span length of 12 in. would have a depth of _____ in.

70. The load applying and support blocks should not be more than _____ in. high, measured from the center of the axis or pivot.

71. The test specimen shall have a test span within _____% of being three times the depth as tested.

72. In a typical test setup, the bottom of the beam is referred to as the _____ face.

73. Surface drying of the specimen before testing will result in a _____ of the measured flexural strength.

74. When testing molded specimens, turn the specimen on its_____ with respect to its position as molded.

75. Apply between _____and_____ % of the estimated load before checking the specimen for gaps with the feeler gages.

76. If no gaps are present using the 0.004 in. feeler gauge _____ _____ is required.

77. If there is a gap greater than _____ in. over a length of _____ inch but less than _____ in. over a length of one inch, then the specimen may be _____, _____, or _____.

78. If there is a gap that is greater than the _____ in. feeler gage over an inch, the only acceptable methods to eliminate the gap is by _____ or _____.

79. If leather shims are to be used to eliminate gaps, they must be a uniform _____ in. thickness and shall extend across the _____ width of the specimen.

80. The load shall be applied at a constant rate to increase the maximum stress on the tension face between _____ and _____ psi/min.

81. The specimen shall be loaded _____ and _____ _____.

82. To determine the dimensions of the specimen after completion of testing, take _____ measurements across the width and depth to the nearest _____ in. and average.

83. If the fracture occurs on a capped section of the beam, the _____ _____ must be included in the measurement.

84. Use an alternative calculation when the beam fracture occurs outside the middle third of the tension face but is within _____ %.

85. The test results should be _____ if the beam fracture occurs outside the middle third of the tension face by more than _____ %.