DESCRIPTION OF INSPECTION

The inspection was designed to include an examination of the apparatus and an observation of the test procedures used in determining the physical properties of pozzolans, and an examination of the apparatus and procedures used in determining Loss on Ignition as set forth in ASTM Specification C311.

The ASTM Standards on which the work was based are as follows: C109/C109M, C114, C150, C151/C151M, C157/C157M, C185, C187, C188, C227, C230/C230M, C305, C311, C430, C441, C490/C490M, C511, C618, C778, C1012, C1437, and E11.

Apparatus

Storage Facilities for Test Specimens (C511)

The physical condition and the functioning of the various mechanical features of the moist air storage facilities for pozzolan test specimens were observed, and where possible, the temperature and humidity of the storage atmosphere were checked for conformance to the requirements of C511. In addition, it was determined whether or not the unit was equipped with automatic temperature control and with a temperature recording device.

The cleanliness and physical condition of all water storage tanks presented for inspection were observed, and it was noted whether or not the water was lime saturated. Where possible, the temperature of the water was checked for conformance to the requirements of the various methods of test for which such facilities are required.

The availability of warm and dry storage facilities was checked. The temperature of the air in the storage facilities was checked for conformance to the specification if the facilities were in operation during the inspection.

Monitoring devices for temperature and relative humidity of the dry storage facilities were checked for physical condition and conformance to pertinent requirements.

Sieves (E11)

The physical condition of each sieve presented for inspection was noted, and a check was made to determine if the size of the opening was within the tolerances prescribed by E11.

With the exception of such omissions as may be set forth in the footnote section, the group of sieves presented for inspection contained one or more of each of the sieves listed in Specifications C441 and C778. The particular sieve numbers are: No. 4, No. 8, No. 16, No. 20, No. 30, No. 40, No. 50, and No. 100.

Wet Sieving Apparatus (C430)

Each No. 325 sieve, spray nozzle, and pressure gage presented for inspection was checked for conformance to the requirements of C430, and the physical condition was observed. A check was made of the nozzle in use to determine if the flow rate was within the limits set forth in C430.

Autoclave Soundness Apparatus (C151 and C490)

The operating characteristics of each autoclave presented for inspection were observed to determine if the autoclave was operating in general conformance to the requirements of C151. Particular attention was given to rate of heating, maintenance of test pressure, and rate of cooling; and each pressure gage was checked for conformance to the design and accuracy requirements of C151. Each length comparator and bar mold presented was checked for conformance to the design and dimensional requirements of C490 and the accuracy of indication of each comparator was checked.

Graduates (C1005)

One or more glass graduates typical of those used by the laboratory were checked for conformance to the marking and volumetric requirements of C1005.

Flow Table (C230)

Each ten-inch flow table and accompanying concrete pedestal, and each flow caliper and flow mold presented for inspection were checked for conformance to the design and dimensional requirements of C230. In addition, the performance of each table was tested with a sample of the CCRL flow table material.

Compression Test Apparatus (C109, C311 and E4)

Compression Machine - Unless otherwise noted, only one testing machine was inspected. During this inspection, several of the more important mechanical features of the machine were examined, the bearing blocks were checked for conformance to the design and dimensional requirements of C109, and the accuracy of load indication was verified.

The verification tests were made using force measuring instruments (load cells) calibrated at the National Institute of Standards and Technology. The selection of test points was made based on loads consistent with the range of use of the material being inspected. In all tests, the test loads were approached by increasing the load from a lower load as specified in Method E4.

Cube Molds and Tampers - The cube molds and tampers presented for inspection were checked for conformance to the design and dimensional requirements of C109.

Mix Balances (C1005)

Each mix balance presented for inspection was tested for accuracy and sensitivity at 1000 grams and 2000 grams as specified in the various methods of test. Any balance which could be read directly over its entire capacity was tested for accuracy of indication at five test points over its capacity. Any balance which used a dial or beam in addition to equal arms was tested for accuracy at five points across its range of use. Accuracy and sensitivity tolerances for the tests listed above were obtained from C1005. When a balance met all the requirements of the tests, and no obvious operational difficulty was present, it was assigned a CCRL identification number.

Testing Weights (Masses)(C1005)

All SI unit weights (masses), if used in the normal weighing operation, were checked for conformance to the maintenance tolerances of C1005. Frequency of verification was determined. Confirmation of the verification of these weights (masses) at the prescribed frequency was determined. When all the weights (masses) in a set were within the accuracy tolerances and were suitably stored, the storage container was assigned a CCRL identification number. In the event that mix weights (masses) were not required for balance operation, the reporting of balance weights will be omitted.

Mechanical Mixing Apparatus (C305 and C227)

Each mechanical mixer presented for inspection was checked for conformance to the requirements of C305 and C227, and the physical condition was observed. A check was made to determine if a lid or lids and one or more scrapers conforming to specification requirements were available.

Air Content of Mortar Apparatus (C185)

Each of the 400-mL measures, steel straightedges, tapping sticks, and spoons presented for inspection was checked for conformance to the applicable requirements of C185. Apparatus not listed, but also needed for use in this test, is covered elsewhere in this report.

Vicat Apparatus (C187)

Each Vicat apparatus and Vicat ring presented for inspection was checked for conformance to the requirements of C187.

Density (C188)

The availability of an apparatus to be used in determining density was checked. Where a Le Chatelier flask was presented for this purpose, checks were made to determine compliance with the design requirements of C188. Where other alternative equipment or methods were presented, a review of laboratory comparison results was conducted to establish similarity in results between the method used and the Le Chatelier method.

Curing Containers (C227, C311, and C441)

Curing containers and accessory apparatus for the test for Effectiveness of Mineral Admixture in Controlling Alkali-Silica Reactions were examined for conformance to the requirements of the specifications.

Effectiveness of Mineral Admixtures in Contributing to Sulfate Resistance (C311 and C1012)

Cube molds, bar molds and all other apparatus needed for use in this test are covered elsewhere in this report.

Loss on Ignition (C114)

The physical condition of the oven used for drying samples to constant weight was observed, and a check was made to determine that the operating temperature was maintained at 105° to 110°C.

The crucibles used in this test were checked for capacity and physical condition. The balance used was checked for conformance to the requirements of the specification. The muffle furnace was also checked for the correct operating temperature range of 750 ± 50°C.

Miscellaneous

The temperature and relative humidity of the air in the laboratory and the temperature of the mixing water were checked for conformance to the requirements of the various methods of test. Observations were made to determine if the necessary sample splitter and sieves were available for checking the standard sand and graded standard sand for conformance to C778. The suitability of the rubber gloves furnished testing personnel was considered. A check was made to determine if the laboratory had been supplied with copies of the latest editions of the ASTM Book of Standards pertaining to the testing of pozzolans.

Procedures

The test methods which were observed and discussed during the inspection were as follows: Normal Consistency Test; Soundness Test by Autoclave; Preparation of Strength Activity Index with Portland Cement; Increase of Drying Shrinkage of Mortar Bars; Effectiveness of Mineral Admixture in Controlling Alkali-Silica Reactions; Air-Entrainment of Mortar; No. 325 Sieve Fineness Test; Effectiveness of Mineral Admixtures in Contributing to Sulfate Resistance; Loss on Ignition; and Density. The laboratory's conformance to specified procedures was as indicated in the Summary of Findings.

The procedures used in testing test samples were also discussed, and the handling and storage of molded specimens were observed. The laboratory's conformance to standard practices was as indicated in the Summary Section.

All departures from specified procedures or standard practices noted by the CCRL representative were reviewed in detail with the operator, with particular attention being given to those matters described in the Footnote Section.