Designation: C 1370 – 00

Standard Test Method for Determining the Chemical Resistance of Aggregates for Use in Chemical-Resistant Sulfur Polymer Cement Concrete and Other Chemical-Resistant Polymer Concretes[1]

This standard is issued under the fixed designation C 1370; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the effects of selected environments on aggregates for use in manufacturing sulfur polymer cement concrete (SC) and other chemical-resistant polymer concretes.

1.2 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units given in parentheses in the standard may be approximate.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 904 Terminology Relating to Chemical-Resistant, Non-Metallic Materials[2]

2.2 *National Institute of Standards and Technology:*

Handbook 44 Specifications Tolerances and other Technical Requirements for Commercial Weighing and Measuring Devices[3]

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology C 904.

4. Significance and Use

4.1 The results obtained by this test method should serve as a guide in, but not as the sole basis for, selection of aggregates for use in sulfur polymer cement concrete and other chemical-resistant polymer concretes for a particular application. No attempt has been made to incorporate in the test method all the various factors that may affect the performance of a material when subjected to actual service.

4.2 This test method assists in determining whether aggregates are susceptible to attack by solutions in the environment of intended use.

4.3 This is not a test for permeability and results are not to be interpreted as a measurement of, or indication of, permeability of the material tested.

5. Apparatus

5.1 *Weighing Equipment*, shall be capable of weighing materials or specimens to ±0.3 % accuracy. The weighing equipment shall meet the National Institute of Standards and Technology requirements for sensitivity and tolerances.

NOTE 1—In general, small quantities should not be weighed on large capacity scales. In many applications, the smallest quantity weighed on a scale should be greater than about 10 % of the maximum capacity of the scale; however, this will vary with the performance characteristics of the scale and the required accuracy of the determination. Acceptable scales used for weighing concrete materials preferably should weigh accurately to about 0.1 % of total capacity and the foregoing precaution is applicable. However, certain analytical and precision balances are exceptions to this rule and should weigh accurately to 0.001 %. Particular care must be exercised in measuring small quantities of material by determining the difference between two much larger weights.

5.2 Drying oven of sufficient size to accommodate the aggregate sample and capable of holding the sample at a temperature of 230± 10°F (110 ± 6°C).

5.3 *Small Tools*, including, but not limited to, items such as 600 mL beakers, hot plate capable of holding sample and solution at constant 140 ± 4°F (60 ± 2°C), desiccator, filter flask, funnel, and No. 1 qualitative filter papers.

6. Materials Preparation

6.1 The temperature in the vicinity of the mixing and testing operations shall be 73 ± 4°F (23 ± 2°C).

6.2 The temperature of the aggregate test specimens will vary and sometimes exceed 212°F (100°C).

7. Procedure

7.1 Dry aggregate to constant weight, cooling in a desiccator before weighing. Weigh three 200 g specimens of aggregate. Record the initial weight (W_1) of aggregate. Place each

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[2] *Annual Book of ASTM Standards*, Vol 04.05.

[3] Available from the National Institute of Standards and Technology (NIST), U.S. Department of Commerce, Washington, DC 20234.

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aggregate specimen in a separate beaker and weigh the 200 g specimen, beaker, and filter paper.

7.2 For each aggregate specimen and beaker, add 400 mL of the solution from the environment in which the polymer concrete will be placed. As an alternative, prepare and add 400 mL of 20 wt. % solution of an appropriate media (HCl, H_2SO_4, etc.) to each aggregate specimen and beaker. Cover the beaker with a watch glass to prevent evaporation. Heat the aggregate specimen and beaker to 140 ± 4°F (60 ± 2°C) and hold for 24 h.

7.3 Filter specimen and rinse residue on filter paper thoroughly with distilled water to remove all of the solution.

7.4 Dry residue and filter paper to constant weight in the beaker with the aggregate specimen. Record the final weight of aggregate (W_2).

8. Calculation

8.1 *Percent Loss*— The percent loss of aggregate is equal to the initial constant dry weight of the test specimen (W_1) minus the final constant dry weight of the test specimen (W_2) divided by the initial constant weight (W_1) of the test specimen times 100. It is calculated as follows:

$$Percent\ Loss = \frac{W_1 - W_2}{W_1} \times 100$$

9. Report

9.1 Report the following information:

9.1.1 Identification of aggregate tested, including name and address of source and supplier.

9.1.2 Identification of solution used.

9.1.3 Average percent loss of weight.

9.1.4 Number of specimens tested.

9.1.5 Standard deviation.

9.1.6 Any unusual observations.

10. Precision and Bias

10.1 Precision and bias for this test method have not been established.

10.2 Test specimens that are manifestly faulty should be rejected and not considered in determining the loss of weight of aggregate.

11. Keywords

11.1 acid-resistant concrete; aggregates; chemical-resistant; mineral acids; percent loss; polymer concrete; sulfur; sulfur polymer cement (SPC); sulfur polymer cement concrete (SC)

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