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Standard Specification for Latex and Powder Polymer Modifiers for Hydraulic Cement Concrete and Mortar[1]

This standard is issued under the fixed designation C1438; 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.

ε[1] NOTE—Section 1 and footnote addresses were editorially corrected in October 1999.

1. Scope

1.1 This specification covers performance criteria for latexes and redispersible powders when used as modifiers in hydraulic cement concretes and mortars to improve adhesion and reduce permeability (see Note 1).

NOTE 1—For further information concerning theory, benefits, limitations, and applications of polymer-modified hydraulic cementitious mixtures, refer to ACI 548.3R-95.

1.2 The performance criteria are based on certain property changes that are achieved by use of the polymer modifier compared with reference concrete or mortar (Test Methods C 1439).

1.3 Prepackaged, proprietary mortar products are not included in this specification. Also, this specification does not cover cementitious mixtures modified with organic polymer latexes and powders.

1.4 The values stated in SI units are to be regarded as standard.

1.5 The following precautionary statement pertains only to the test method portion, Section 10, of this specification: *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 125 Terminology Relating to Concrete and Aggregates[2]

C 494 Specification for Chemical Admixtures for Concrete[2]

C 1439 Test Methods for Polymer-Modified Mortar and Concrete[2]

2.2 *ACI Standard:*

ACI 548.3R-95 State-of-the-Art Report on Polymer-Modified Concrete[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*—Terms used in this specification are defined in Terminology C 125 or in this section.

3.1.1 *latex*, *n*—a dispersion of organic polymer particles in water.

3.1.2 *polymer-modified concrete or mortar*, *n*—a hydraulic cement concrete or mortar containing a polymer modifier.

3.1.3 *polymer modifier*, *n*—latex or redispersible powder formulated for use with hydraulic cements.

3.1.4 *redispersible powder*, *n*—powder that redisperses in water to form a latex.

3.1.5 *reference concrete or mortar*, *n*—concrete or mortar having the amounts of cement and aggregates given in Test Methods C 1439 and having an amount of water to achieve the specified slump or flow.

3.1.6 *test concrete or mortar*, *n*—concrete or mortar containing a polymer modifier and having the same composition (except for water content) and slump or flow as the reference concrete or mortar.

4. Classification

4.1 Polymer modifiers are classified into two product types:

4.1.1 *Type I*—For use in areas not exposed to moisture.

4.1.2 *Type II*—For general use.

5. Ordering Information

5.1 The purchaser shall specify the type of polymer modifier desired and the size and type of containers in which the material is to be supplied.

6. Physical and Mechanical Properties

6.1 The polymer modifier shall produce test mortar or test concrete which conforms to the requirements listed in Table 1 for the type specified.

[1] This specification is under the jurisdiction of ASTM Committee C-9 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.44 on Polymer-Modified Concrete.

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[2] *Annual Book of ASTM Standards,* Vol 04.02.

[3] Available from American Concrete Institute (ACI), 38800 Country Club Drive, Farmington Hills, MI 48333–9094.

TABLE 1 Requirements for Test Mortar and Concrete Made With Polymer Modifier

	MORTAR		CONCRETE
	Type I	Type II	Type II
Air Content, % maximum	12.0	12.0	7.0
Time of Setting, allowable deviation from reference mixture, h:min:			
Initial:			
not more than, earlier	1:00	1:00	1:00
nor, later	3:30	3:30	3:30
Final:			
not more than, earlier	1:00	1:00	1:00
nor, later	3:30	3:30	3:30
Compressive Strength, minimum % of reference mixture			
at each age	70	70	80
Bond Strength, minimum % of reference mixture			
at each age	140	140	140
Indication of Chloride Ion penetration, maximum % of reference mixture			
at each age	na[A]	25	25

[A] na = not applicable.

7. Lot Uniformity and Equivalence

7.1 When specified by the purchaser, the uniformity of a lot, or the equivalence of different lots from the same source shall be established by evaluation following Specification C 494, with the following exception:

7.1.1 *Residue by Oven Drying*—Within a range not greater than 2 percentage points of the initial sample.

8. Storage

8.1 The supplier shall store the polymer modifier in such a manner as to permit easy access for proper inspection and identification of each shipment, in a suitable building that will protect the polymer modifier from dampness and freezing, and in accordance with manufacturer's recommendations.

9. Sampling and Inspection

9.1 The supplier shall provide facilities for proper sampling of the product as specified by the purchaser.

9.2 Sampling shall conform to the requirements of Specification C 494.

10. Test Methods

10.1 Test the polymer modifier in accordance with the requirements of Test Methods C 1439.

11. Rejection

11.1 The purchaser has the right to reject the polymer modifier if it fails to meet any of the applicable requirements of this specification.

11.2 It is permitted to reject packages that are more than 2 % below the mass or volume marked on them, and it is permitted to reject the entire shipment if the average mass of packages in any shipment, as shown by weighing 50 packages taken at random, is less than that marked on the packages.

12. Packaging and Package Marking

12.1 When the polymer modifier is delivered in packages and containers, the proprietary name of the polymer modifier, the type under this specification, and the net mass or volume shall be plainly marked thereon. Similar information shall be provided in the shipping papers accompanying bulk shipments of the polymer modifier.

13. Keywords

13.1 latex; polymer modifier; polymer-modified concrete or mortar