Standard Specification for

Portland Cement

AASHTO Designation: M 85-21[1]

Technically Revised: 2021 **Editorially Revised: 2021**

Technical Subcommittee: 3a, Hydraulic Cement and Lime

ASTM Designation: C150/C150M-21

AASHTO

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1. SCOPE

1.1. *This specification covers ten types of portland cement as follows (see Note 1)*:

1.1.1. *Type I*—For general use, when the special properties specified for any other type are not required;

1.1.2. *Type IA*—Air-entraining cement for the same uses as Type I, where air entrainment is desired;

1.1.3. *Type II*—For general use, more especially when moderate sulfate resistance is desired;

1.1.4. *Type IIA*—Air-entraining cement for the same uses as Type II, where air entrainment is desired;

1.1.5. *Type II(MH)*—For general use, more especially when moderate heat of hydration and moderate sulfate resistance are desired.

1.1.6. *Type II(MH)A*—Air-entraining cement for the same uses as Type II(MH), where air entrainment is desired.

1.1.7. *Type III*—For use when high early strength is desired;

1.1.8. *Type IIIA*—Air-entraining cement for the same use as Type III, where air entrainment is desired;

1.1.9. *Type IV*—For use when low heat of hydration is desired; and

1.1.10. *Type V*—For use when high sulfate resistance is desired.

Note 1—Some cements are designated with a combined type classification, such as Type I/II, indicating that the cement meets the requirements of the indicated types and is being offered as suitable for use when either type is desired.

1.2. When both SI and inch-pound units are present, the SI units are the standard. The inch-pound units are approximations listed for information only.

1.3. The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 327, Processing Additions for Use in the Manufacture of Hydraulic Cements
- R 71, Sampling and Amount of Testing of Hydraulic Cement
- R 80, Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction
- T 105, Chemical Analysis of Hydraulic Cement
- T 106M/T 106, Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in. Cube Specimens)
- T 107M/T 107, Autoclave Expansion of Hydraulic Cement
- T 131, Time of Setting of Hydraulic Cement by Vicat Needle
- T 137, Air Content of Hydraulic Cement Mortar
- T 153, Fineness of Hydraulic Cement by Air Permeability Apparatus
- T 154, Time of Setting of Hydraulic Cement Paste by Gillmore Needles
- T 186, Early Stiffening of Hydraulic Cement (Paste Method)

2.2. *ASTM Standards*:

- C33/C33M, Standard Specification for Concrete Aggregates
- C51, Standard Terminology Relating to Lime and Limestone (as used by the Industry)
- C226, Standard Specification for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Hydraulic Cement
- C452, Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate
- C563, Standard Test Method for Approximation of Optimum SO_3 in Hydraulic Cement
- C1038/C1038M, Standard Test Method for Expansion of Hydraulic Cement Mortar Bars Stored in Water
- C1702, Standard Test Method for Measurement of Heat of Hydration of Hydraulic Cementitious Materials Using Isothermal Conduction Calorimetry
- E29, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. TERMINOLOGY

3.1. *Definitions*:

3.1.1. *portland cement*—a hydraulic cement produced by pulverizing clinker, consisting essentially of hydraulic calcium silicates, and usually containing one or more of the following:

- water,
- calcium sulfate,
- up to 5 percent limestone, and
- processing additions.

3.1.2. *air-entraining portland cement*—a portland cement containing an interground air-entraining addition.

3.1.3. *hydraulic cement*—a cement that sets and hardens by chemical interaction with water and is capable of doing so under water.