

**STANDARD SPECIFICATIONS**  
*for*  
**TRANSPORTATION MATERIALS**  
*and*  
**METHODS OF SAMPLING AND TESTING**  
**Thirty-Fifth Edition**  
**2015**

Adopted by the



## INTRODUCTION

This Thirty-Fifth Edition of Transportation Materials is published in three parts. Part 1 contains specifications for materials; Part 2 includes methods of testing and specifications for testing equipment, many of which contain both U.S. Customary and Metric units of measure; and Part 3 contains provisional standards. Part 1 contains 138 materials specifications and 57 Standard Practices. Overall, technical revisions were made in 26 of the standards since the Thirty-Fourth Edition, 38 standards were reconfirmed, 5 new standards were added, no standards were discontinued, and 1 standard was deleted. A number of specifications were included in this publication at the request of the AASHTO Subcommittee on Bridges and Structures.

Many of these specifications agree with those of the American Society for Testing and Materials (ASTM). In all cases where the Association and ASTM standards are technically identical, or substantially identical with some changes, reference to the ASTM designation number is shown in the heading of the specification.

In previous editions, AASHTO has printed ASTM standards which have been adopted by AASHTO and given an AASHTO designation. This was done under a long-standing copyright arrangement between AASHTO and ASTM. Starting with the Thirty-First Edition, AASHTO-approved ASTM standards are not printed. Instead, the AASHTO specification includes the corresponding ASTM designation number and any AASHTO exception to the ASTM specification. A complete list of AASHTO specifications with corresponding ASTM standards is included following the Table of Contents.

General jurisdiction over Association standards in this field rests with the AASHTO Highway Subcommittee on Materials, which has members representing each of the 50 States, the Commonwealth of Puerto Rico, and the District of Columbia that constitute the Member Departments of the Association, and the U.S. Department of Transportation. In addition, the Subcommittee has representation from several of its Associate Members, including the New Jersey Turnpike Authority, the Pennsylvania Turnpike Authority, and The Port Authority of New York and New Jersey. Also represented on the Subcommittee are some of the Association's International Associate members, including the Canadian Provinces of Nova Scotia and Ontario.

Beginning in 1993 with the Sixteenth Edition, material specifications and test methods are published by AASHTO each year. Annual revisions are voted upon by the Association's 52 Member Departments prior to the publication of each new edition of this book, and if approved by at least two-thirds of the Member Departments, they are included in the edition as standards of the Association.

Per the Style Manual for AASHTO Publications and the Subcommittee's guidelines, standards may include supplementary requirements, annexes, appendixes, and notes. Some are mandatory and some are not.

- Supplementary requirements apply only when specified within a contract.
- Annexes are mandatory.
- Appendixes are nonmandatory.
- Numbered notes, whether within the text or listed as endnotes, are nonmandatory, explanatory material.
- Lettered notes in tables and figures are mandatory except when they occur in supplementary requirements or appendixes.

Comments regarding these specifications are welcomed and should be addressed to the Executive Director of AASHTO, 444 North Capitol Street, N.W., Suite 249, Washington, D.C. 20001. AASHTO's website and internet address is <http://transportation.org>.

# PART 1—STANDARD SPECIFICATIONS AND STANDARD PRACTICES

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### **DELETED SPECIFICATIONS**

The following specification has been deleted from the 35<sup>th</sup> Edition:

R 53-10	Qualification of Deformed and Plain Reinforcing Steel Bar, Welded Wire, and Wire Producing Mills
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**Revisions for 35<sup>th</sup> Edition of Standard Specifications for  
Transportation Materials and Methods of Sampling and Testing—Part 1**

The balloted technical changes listed below are also indicated in the specifications by a change bar in the left margin. Non-balloted editorial changes do not receive the change bar.

Designation Number	Title	Technical Section Number	Ballot Revision
M 17-11 (2015)	Mineral Filler for Bituminous Paving Mixtures	2c	Reconfirmed for 2015 publication.
M 30-15	Zinc-Coated Steel Wire Rope and Fittings for Highway Guardrail	4d	Revised Table 3 to eliminate Class 1.
M 31M/M 31-15	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement	4g	Revised to maintain equivalency with ASTM A615/A615M-12.
M 45-15	Aggregate for Masonry Mortar	1c	Revised to maintain equivalency with ASTM C144-11.
M 85-15	Portland Cement	3a	Revised to include reporting of chloride content and to permit use of ASTM C1702 for heat of hydration requirements.
M 86M/M 86-15	Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe	4a	Revised Sections 6.4 and 6.5.
M 92-10 (2015)	Wire-Cloth Sieves for Testing Purposes	1b	Reconfirmed for 2015 publication.
M 111M/M 111-15	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products	4h	Revised to maintain equivalency with ASTM A123/A123M-13.
M 152M/M 152-15	Flow Table for Use in Tests of Hydraulic Cement	3a	Revised to maintain equivalency with ASTM C230/C230M-13.
M 169-15	Steel Bars, Carbon and Alloy, Cold-Finished	4f	Revised to maintain equivalency with ASTM A108-13.
M 170-15	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe	4a	Revised Sections 6, 8, and 10.
M 170M-15	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe [Metric]	4a	Revised Section 6, 8, and 10.
M 181-10 (2015)	Chain-Link Fence	4d	Reconfirmed for 2015 publication.

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Designation Number	Title	Technical Section Number	Ballot Revision
M 195-11 (2015)	Lightweight Aggregates for Structural Concrete	1c	Reconfirmed for 2015 publication.
M 201-15	Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes	3a	Revised to maintain equivalency with ASTM C511-13.
M 205M/M 205-11 (2015)	Molds for Forming Concrete Test Cylinders Vertically	3b	Reconfirmed for 2015 publication.
M 206M/M 206-15	Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe	4a	Revised Section 6.
M 207M/M 207-15	Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	4a	Revised Sections 6, 8, and 10.
M 213-01 (2015)	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)	4e	Reconfirmed for 2015 publication.
M 231-95 (2015)	Weighing Devices Used in the Testing of Materials	1b	Reconfirmed for 2015 publication.
M 232M/M 232-10 (2015)	Zinc Coating (Hot-Dip) on Iron and Steel Hardware	4h	Reconfirmed for 2015 publication.
M 240M/M 240-15	Blended Hydraulic Cement	3a	Revised Section 6.1.3 to clarify the meaning of <i>slag</i> .
M 242M/M 242-15	Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe	4a	Revised Section 6.
M 246-15	Steel Sheet, Metallic-Coated and Polymer-Precoated, for Corrugated Steel Pipe	4b	Revised Section 6.2 to include 25% Maleic Anhydride Grafted Polymer as an option.
M 254-06 (2015)	Corrosion-Resistant Coated Dowel Bars	4g	Reconfirmed for 2015 publication.
M 259-11 (2015)	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers	4a	Reconfirmed for 2015 publication.
M 259M-11 (2015)	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers [Metric]	4a	Reconfirmed for 2015 publication.
M 262-11 (2015)	Concrete Pipe and Related Products	4a	Reconfirmed for 2015 publication.
M 268-15	Retroreflective Sheeting for Flat and Vertical Traffic Control Applications	4d	Revised Section 5.17.2 to allow an alternate to acrylic black overlay film.

Designation Number	Title	Technical Section Number	Ballot Revision
M 270M/M 270-15	Structural Steel for Bridges	4f	Revised to maintain equivalency with ASTM A709/A709M-13a.
M 273-11 (2015)	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 ft of Cover Subjected to Highway Loadings	4a	Reconfirmed for 2015 publication.
M 273M-11 (2015)	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 0.6 m of Cover Subjected to Highway Loadings [Metric]	4a	Reconfirmed for 2015 publication.
M 277-06 (2015)	Wire Rope and Sockets for Movable Bridges	4g	Reconfirmed for 2015 publication.
M 278-15	Class PS46 Poly(Vinyl Chloride) (PVC) Pipe	4b	Revised extensively.
M 285M/M 285-11 (2015)	Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service	4h	Reconfirmed for 2015 publication.
M 288-15	Geotextile Specification for Highway Applications	4e	Revised Sections 2, 4, 10, and the Appendix to include paving fabrics with fiberglass and other fibers resulting in paving fabrics with low ultimate elongation.
M 292M/M 292-15	Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both	4f	Revised to maintain equivalency with ASTM A194/A194M-12a.
M 294-15	Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter	4b	Revised to clarify the definitions of <i>buckling</i> and <i>wall/liner</i> .
M 295-11 (2015)	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete	3b	Reconfirmed for 2015 publication.
M 297-10 (2015)	Preformed Polychloroprene Elastomeric Joint Seals for Bridges	4e	Reconfirmed for 2015 publication.
M 302-15	Slag Cement for Use in Concrete and Mortars	3b	Revised Section 1.1 and Table 1.
M 304-11 (2015)	Poly(Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter	4b	Reconfirmed for 2015 publication.
M 306-10 (2015)	Drainage, Sewer, Utility, and Related Castings	4h	Reconfirmed for 2015 publication.
M 318-02 (2015)	Glass Cullet Use for Soil-Aggregate Base Course	1a	Reconfirmed for 2015 publication.

<b>Designation Number</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
M 319-02 (2015)	Reclaimed Concrete Aggregate for Unbound Soil-Aggregate Base Course	1a	Reconfirmed for 2015 publication.
M 320-10 (2015)	Performance-Graded Asphalt Binder	2b	Reconfirmed for 2015 publication.
M 322M/M 322-10 (2015)	Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement	4g	Reconfirmed for 2015 publication.
M 327-11 (2015)	Processing Additions for Use in the Manufacture of Hydraulic Cements	3a	Reconfirmed for 2015 publication.
M 329M/M 329-11 (2015)	Stainless Clad Deformed and Plain Round Steel Bars for Concrete Reinforcement	4g	Reconfirmed for 2015 publication.
M 333-15	Detectable Warning Surfaces	4d	Adopted AASHTO Provisional standard MP 12 as a full standard.
R 8-96 (2015)	Evaluation of Transportation-Related Earthborne Vibrations	5b	Reconfirmed for 2015 publication.
R 18-10 (2015)	Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories	AMRL	Reconfirmed for 2015 publication.
R 21-96 (2015)	Drilling for Subsurface Investigations—Unexpectedly Encountering Suspected Hazardous Material	5b	Reconfirmed for 2015 publication.
R 22-97 (2015)	Decommissioning Geotechnical Exploratory Boreholes	5b	Reconfirmed for 2015 publication.
R 27-01 (2015)	Assessment of Corrosion of Steel Piling for Non-Marine Applications	1a	Reconfirmed for 2015 publication.
R 29-15	Grading or Verifying the Performance Grade (PG) of an Asphalt Binder	2b	Revised to eliminate the need for flash point and rotational viscosity testing as part of determining the performance grade of an asphalt binder.
R 30-02 (2015)	Mixture Conditioning of Hot Mix Asphalt (HMA)	2d	Reconfirmed for 2015 publication.
R 32-11 (2015)	Calibrating the Load Cell and Deflection Sensors for a Falling Weight Deflectometer	5a	Reconfirmed for 2015 publication.
R 33-11 (2015)	Calibrating the Reference Load Cell Used for Reference Calibrations for a Falling Weight Deflectometer	5a	Reconfirmed for 2015 publication.

<b>Designation Number</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
R 35-15	Superpave Volumetric Design for Asphalt Mixtures	2d	Revised to clarify the blending procedure in Section 6 and to provide consistent language for definitions in Section 9.
R 41-05 (2015)	Measuring Pavement Profile Using a Dipstick	5a	Reconfirmed for 2015 publication.
R 52-10 (2015)	Compost for Erosion/Sediment Control (Compost Blankets)	1a	Reconfirmed for 2015 publication.
R 58-11 (2015)	Dry Preparation of Disturbed Soil and Soil-Aggregate Samples for Test	1a	Reconfirmed for 2015 publication.
R 59-11 (2015)	Recovery of Asphalt Binder from Solution by Abson Method	2c	Reconfirmed for 2015 publication.
R 64-15	Sampling and Fabrication of 50-mm (2-in.) Cube Specimens Using Grout (Non-Shrink) or Mortar	3b	Revised Section 7.6, including Notes 3 and 4.
R 66-15	Sampling Asphalt Mixtures	2a	T 40 was revised significantly and reclassified as this standard practice.
R 67-15	Sampling Asphalt Mixtures after Compaction (Obtaining Cores)	2c	Newly adopted standard.
R 68-15	Preparation of Asphalt Mixtures by Means of the Marshall Apparatus	2d	T 245 was revised extensively; as a result, part of T 245 was excerpted and reclassified as this standard practice.
R 69-15	Determination of Long-Term Strength for Geosynthetic Reinforcement	4e	Adopted AASHTO Provisional standard PP 66 as a full standard.

- \* The designation numbers of AASHTO materials standards are comprised of the following:
- a letter that reflects the type of standard—M for standard specifications, R for standard practices, or T for standard methods of test;
  - the unique sequential number of the standard in its type;
  - following a hyphen, the date of publication in its current form; and
  - in some cases, the year of its last reconfirmation in parentheses.

For example, M 326-08 (2012) would be a standard specification, would carry the unique identifying number 326 in the list of specifications, was initially approved or last revised in 2008, and was reconfirmed for publication without technical changes in 2012.

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**DELETED SPECIFICATION**

T 26-79 (2008)      Quality of Water to Be Used in Concrete

## Revisions for 35<sup>th</sup> Edition of Standard Specifications for Transportation Materials and Methods of Sampling and Testing—Part 2

The balloted technical and editorial changes listed below are also indicated in the specifications by a change bar in the left margin. Non-balloted editorial changes do not receive a change bar.

Designation Number*	Title	Technical Section Number	Ballot Revision
T 2-91 (2015)	Sampling of Aggregates	1c	Reconfirmed for 2015 publication.
T 21M/T 21	Organic Impurities in Fine Aggregates for Concrete	1c	Revised as a dual unit standard.
T 24M/T 24-15	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	3c	Revised extensively.
T 26-79 (2008)	Quality of Water to Be Used in Concrete	3b	Deleted.
T 30-15	Mechanical Analysis of Extracted Aggregate	2c	Revised Note 7.
T 40-02 (2012)	Sampling Bituminous Materials	2a	Revised significantly and reclassified as standard practice R 66.
T 42-10 (2015)	Preformed Expansion Joint Filler for Concrete Construction	4e	Reconfirmed for 2015 publication.
T 48-06 (2015)	Flash and Fire Points by Cleveland Open Cup	2b	Reconfirmed for 2015 publication.
T 49-15	Penetration of Bituminous Materials	2b	Revised extensively.
T 59-15	Emulsified Asphalts	2a	Revised extensively.
T 72-10 (2015)	Saybolt Viscosity	2a	Reconfirmed for 2015 publication.
T 78-15	Distillation of Cutback Asphalt Products	2a	Revised to delete Figure 4.
T 90-15	Determining the Plastic Limit and Plasticity Index of Soils	1a	Revised Section 5.
T 96-02 (2015)	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine	1c	Reconfirmed for 2015 publication.
T 98-12	Fineness of Portland Cement by the Turbidimeter	3a	Editorially revised.

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<b>Designation Number*</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
T 99-15	Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop	1b	Revised extensively.
T 100-15	Specific Gravity of Soils	1a	Revised extensively.
T 105-14	Chemical Analysis of Hydraulic Cement	3a	Editorially revised.
T 106M/T 106-15	Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in. Cube Specimens)	3a	Updated to maintain equivalency with ASTM C109/C109M-13.
T 107M/T 107-11 (2015)	Autoclave Expansion of Hydraulic Cement	3a	Reconfirmed for 2015 publication.
T 111-11 (2015)	Mineral Matter or Ash in Asphalt Materials	2b	Reconfirmed for 2015 publication.
T 113-15	Lightweight Pieces in Aggregate	1c	Updated to maintain equivalency with the U.S. customary requirements of ASTM C123/C123M-12.
T 121M/T 121-15	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete	3b	Revised Section 7.
T 127-15	Sampling and Amount of Testing of Hydraulic Cement	3a	Updated to maintain equivalency with ASTM C183-13.
T 131-15	Time of Setting of Hydraulic Cement by Vicat Needle	3a	Updated to maintain equivalency with ASTM C191-13,
T 133-11 (2015)	Density of Hydraulic Cement	3a	Reconfirmed for 2015 publication.
T 148-15	Measuring Length of Drilled Concrete Cores	3c	Revised extensively.
T 154-15	Time of Setting of Hydraulic Cement Paste by Gillmore Needles	3a	Updated to maintain equivalency with ASTM C266-13.
T 158-11 (2015)	Bleeding of Concrete	3b	Reconfirmed for 2015 publication.
T 162-15	Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency	3a	Updated to maintain equivalency with ASTM C305-13.
T 167-10 (2015)	Compressive Strength of Hot Mix Asphalt	2d	Reconfirmed for 2015 publication.
T 177-10 (2015)	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	3c	Reconfirmed for 2015 publication.
T 178-15	Portland-Cement Content of Hardened Hydraulic-Cement Concrete	3c	Revised extensively.

<b>Designation Number*</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
T 180-15	Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop	1b	Revised extensively.
T 185-15	Early Stiffening of Hydraulic Cement (Mortar Method)	3a	Updated to maintain equivalency with ASTM C359-13.
T 186-15	Early Stiffening of Hydraulic Cement (Paste Method)	3a	Updated to maintain equivalency with ASTM C451-13.
T 192-11 (2015)	Fineness of Hydraulic Cement by the 45- $\mu$ m (No. 325) Sieve	3a	Reconfirmed for 2015 publication.
T 195-11 (2015)	Determining Degree of Particle Coating of Asphalt Mixtures	2c	Reconfirmed for 2015 publication.
T 196M/T 196-11 (2015)	Air Content of Freshly Mixed Concrete by the Volumetric Method	3b	Reconfirmed for 2015 publication.
T 197M/T 197-11 (2015)	Time of Setting of Concrete Mixtures by Penetration Resistance	3b	Reconfirmed for 2015 publication.
T 198-15	Splitting Tensile Strength of Cylindrical Concrete Specimens	3c	Updated to maintain equivalency with the U.S. customary requirements of ASTM C496/C496M-11.
T 201-15	Kinematic Viscosity of Asphalts (Bitumens)	2b	Revised extensively.
T 202-15	Viscosity of Asphalts by Vacuum Capillary Viscometer	2b	Revised extensively.
T 208-15	Unconfined Compressive Strength of Cohesive Soil	1a	Revised Section 6.
T 210-15	Aggregate Durability Index	1c	Revised extensively.
T 213M/T 213-11 (2015)	Mass [Weight] of Coating on Aluminum-Coated Iron or Steel Articles	4h	Reconfirmed for 2015 publication.
T 224-10	Correction for Coarse Particles in the Soil Compaction Test	1b	Discontinued due to lack of use.
T 225-06 (2015)	Diamond Core Drilling for Site Investigation	1b	Reconfirmed for 2015 publication.
T 233-02 (2015)	Density of Soil In-Place by Block, Chunk, or Core Sampling	1a	Reconfirmed for 2015 publication.
T 245-15	Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus	2d	Revised extensively; as a result, part of this standard test was excerpted and reclassified as standard practice R 68.
T 246-10 (2015)	Resistance to Deformation and Cohesion of Hot Mix Asphalt (HMA) by Means of Hveem Apparatus	2d	Reconfirmed for 2015 publication.

<b>Designation Number*</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
T 247-10 (2015)	Preparation of Test Specimens of Hot Mix Asphalt (HMA) by Means of California Kneading Compactor	2d	Reconfirmed for 2015 publication.
T 265-15	Laboratory Determination of Moisture Content of Soils	1a	Revised Section 6.
T 272-15	Family of Curves—One-Point Method	1b	Revised extensively.
T 276-15	Measuring Early-Age Compression Strength and Projecting Later-Age Strength	3c	Updated to maintain equivalency with the U.S. customary requirements of ASTM C918/C918M-07.
T 277-15	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	3c	Updated to maintain equivalency with ASTM C1202-12.
T 282-01 (2015)	Calibrating a Wheel Force or Torque Transducer Using a Calibration Platform (User Level)	5a	Reconfirmed for 2015 publication.
T 285-89 (2015)	Bend Test for Bars for Concrete Reinforcement	4g	Reconfirmed for 2015 publication.
T 298-15	High-Strain Dynamic Testing of Piles	1b	Revised extensively.
T 302-15	Polymer Content of Polymer-Modified Emulsified Asphalt Residue and Asphalt Binders	2a	Revised Section 1.
T 304-11 (2015)	Uncompacted Void Content of Fine Aggregate	1c	Reconfirmed for 2015 publication.
T 306-11 (2015)	Progressing Auger Borings for Geotechnical Explorations	1b	Reconfirmed for 2015 publication.
T 308-10 (2015)	Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method	2c	Reconfirmed for 2015 publication.
T 309-15	Temperature of Freshly Mixed Portland Cement Concrete	3b	Reinstated and revised extensively.
T 311-00 (2015)	Grain-Size Analysis of Granular Soil Materials	1a	Reconfirmed for 2015 publication.
T 312-15	Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyrotory Compactor	2d	Revised Section 4.
T 318-15	Water Content of Freshly Mixed Concrete Using Microwave Oven Drying	3b	Revised extensively.
T 319-15	Quantitative Extraction and Recovery of Asphalt Binder from Asphalt Mixtures	2c	Revised Section 13.1.2.1.
T 329-15	Moisture Content of Asphalt Mixtures by Oven Method	2c	Revised extensively.

<b>Designation Number*</b>	<b>Title</b>	<b>Technical Section Number</b>	<b>Ballot Revision</b>
T 330-07 (2015)	The Qualitative Detection of Harmful Clays of the Smectite Group in Aggregates Using Methylene Blue	1c	Reconfirmed for 2015 publication.
T 336-15	Coefficient of Thermal Expansion of Hydraulic Cement Concrete	3c	Revised extensively.
T 339-10 (2015)	Analysis of Structural Steel Coatings for Isocyanate Content	4c	Reconfirmed for 2015 publication.
T 340-10 (2015)	Determining Rutting Susceptibility of Hot Mix Asphalt (HMA) Using the Asphalt Pavement Analyzer (APA)	2d	Reconfirmed for 2015 publication.
T 342-11 (2015)	Determining Dynamic Modulus of Hot Mix Asphalt (HMA)	2d	Reconfirmed for 2015 publication.
T 354-15	Specific Gravity and Absorption of Aggregate by Volumetric Immersion Method	1c	Adopted AASHTO Provisional standard TP 77 as a full standard.
T 355-15	In-Place Density of Asphalt Mixtures by Nuclear Methods	2c	Adopted as a new standard.
T 356-15	Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter	3c	Adopted AASHTO Provisional standard TP 59 as a full standard.
T 357-15	Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure	3c	Adopted AASHTO Provisional standard TP 64 as a full standard.
T 358-15	Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration	3c	Adopted AASHTO Provisional standard TP 95 as a full standard.

- \* The designation numbers of AASHTO materials standards are comprised of the following:
- a letter that reflects the type of standard—M for standard specifications, R for standard practices, or T for standard methods of test;
  - the unique sequential number of the standard in its type;
  - following a hyphen, the date of publication in its current form; and
  - in some cases, the year of its last reconfirmation in parentheses.

For example, T 333-07 (2012) would be a standard method of test, would carry the unique identifying number 333 in the list of specifications, was initially approved or last revised in 2007, and was reconfirmed without technical changes in 2012.

## PROVISIONAL STANDARDS

This Thirty-Fifth Edition of Transportation Materials is published in three parts. Part 1 contains specifications for materials; Part 2 includes methods of testing and specifications for testing equipment, many of which contain both English and Metric units of measure; and Part 3 contains provisional standards. Overall, technical revisions were made in 71 of the standards since the Thirty-Fourth Edition, 96 standards were reconfirmed, 19 new standards were added, 8 standards were discontinued, and 2 standards were deleted. A number of specifications were included in this publication at the request of the AASHTO Subcommittee on Bridges and Structures.

This edition marks the first time that the provisional standards are published as Part 3 of Transportation Materials, rather than as a separate publication. As before, a chronology of the year-to-year status of the provisional standards during the past eight years is included immediately following the Part 3 Table of Contents. A complete chronology is available on our website at [http://downloads.transportation.org/chronological\\_summary.pdf](http://downloads.transportation.org/chronological_summary.pdf).

General jurisdiction over Association standards in this field rests with the AASHTO Highway Subcommittee on Materials, which has members representing each of the 50 States, the Commonwealth of Puerto Rico and the District of Columbia that constitute the Member Departments of the Association, and the U.S. Department of Transportation. In addition, the Subcommittee has representation from several of its Associate Members, including the New Jersey Turnpike Authority, the Pennsylvania Turnpike Authority, and the Port Authority of New York and New Jersey. Also represented on the Subcommittee are some of the Association's International Associate members, including Nova Scotia and Ontario.

Beginning in 1993 with the Sixteenth Edition, material specifications and test methods are published by AASHTO each year. Annual revisions are voted upon by the Association's 52 Member Departments prior to the publication of each new edition of this book, and if approved by at least two-thirds of the Member Departments, they are included in the edition as standards of the Association.

All Provisional Standards are approved for publication by the AASHTO Highway Subcommittee on Materials. The format for the Provisional Standards was developed by AASHTO in 1993, with an objective of providing a mechanism for early distribution of materials specifications and test methods resulting from SHRP and other research. Provisional Standards are standards which have been adopted by the Highway Subcommittee on Materials on a temporary basis for a maximum of eight years. At any time during the eight-year period, the Subcommittee can ballot to convert a provisional standard into a full standard.

A Provisional Standard is initially approved for two years by a vote of the Subcommittee. At the end of two years and four years after the initial approval, the Technical Section of the Subcommittee responsible for the Provisional Standard can extend its life by a voice vote or letter ballot for an additional two years. At the end of six years and seven years after the initial approval, the Subcommittee can extend the Provisional Standard's life by a voice vote or letter ballot for an additional one year. If a Provisional Standard fails any extension vote, it is discontinued. At the end of eight years, the Subcommittee can ballot a Provisional Standard for adoption as a Full Standard or the Provisional Standard is discontinued.

The time period used to maintain the provisional status is used for the refinement of these standards on the basis of the comments received from the users and other reviewers. It is planned that the provisional standards will be considered by the Subcommittee for future publication as full standards. The Subcommittee, so far, has converted 89 provisional standards into full standards. These full standards are now regularly published in Part 1 or Part 2. At the same time, over a period of 22 years, 41 Provisional Standards did not receive the Subcommittee's approval. These standards, therefore, are excluded from this publication.

Per the Style Manual for AASHTO Publications and the Subcommittee's guidelines, standards may include supplementary requirements, annexes, appendixes, and notes. Some are mandatory and some are not.

- Supplementary requirements apply only when specified within a contract.
- Annexes are mandatory.
- Appendixes are nonmandatory.
- Numbered notes, whether within the text or listed as endnotes, are nonmandatory, explanatory material.
- Lettered notes in tables and figures are mandatory except when they occur in supplementary requirements or appendixes.

Comments regarding these specifications are welcomed and should be addressed to the Executive Director of AASHTO, 444 North Capitol Street, N.W., Suite 249, Washington, D.C. 20001. AASHTO's Web site and internet address is <http://transportation.org>.

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**AASHTO PROVISIONAL STANDARDS  
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Std.	Brief Title	Sec.	12/07	06/08	01/09	06/09	02/10	06/10	08/10	06/11	08/11	06/12	08/12	06/13	08/13	06/14	01/15	06/15			
MP 1	PG Binders	2b																			Full Std
MP 1a	PG Mod. Bndr. Crit. Lowtemp	2b																			Full Std
MP 2	Spec. Superpave Mix	2d																			Full Std
MP 5	Decks - Cathod. Protect.	4g																			Delete
MP 6	PE Pipe 1050 & 1200 mm	4b																			Full Std
MP 7	PE Pipe 1350 & 1500 mm	4b																			Full Std
MP 8	SMA	2d	✓	<b>M 325</b>																	Full Std
MP 9	Compost Filter Berms	1a	Reconf.	✓		✓	✓	<b>R 51</b>													Full Std
MP 10	Compost Blankets	1a	Reconf.	✓		✓	✓	<b>R 52</b>													Full Std
MP 11	Inertial Profiler	5a	✓	✓		✓	✓	<b>M 328</b>													Full Std
MP 12	Detectable Warning Surface	4d		✓		✓		✓		✓		✓	✓	✓	✓	✓	✓		<b>M 333</b>		Full Std
MP 13	Stainless Clad Rebar	4g		✓		✓		✓	✓	<b>M 329</b>											Full Std
MP 14	WIM Pavement Smoothness	5a	✓	✓		✓		✓		✓	✓			<b>M 331</b>							Full Std
MP 15	Reclaimed Asphalt Shingles	2d		✓	✓	✓		✓		✓		✓	✓	✓							Delete
MP 16	RCA Used in Portland Cement	1c		✓		✓	✓	✓		✓		✓	✓	✓		✓	Reconf.	✓			
MP 17	Pavement Ride Quality	5a	✓	✓	Reconf.	✓	✓	<b>R 54</b>													Full Std
MP 18	Uncoated Billet-Steel Rebar	4g			✓	✓	✓	✓	Reconf.	✓		✓	✓	✓	Reconf.	✓	✓	✓			
MP 19	PG Asphalt Binder Using MSCR	2b					✓	✓	✓	✓		✓	✓	✓	✓	<b>M 332</b>					Full Std
MP 20	Steel-Reinforced PE, 12-36 in.	4b					✓	✓	✓	✓		✓	✓	✓	Reconf.	✓			✓		
MP 21	PP Pipe, 330- to 1500-mm diam.	4b							✓	✓		✓	✓	<b>M 330</b>							Full Std
MP 22	Fiber-Reinforced Polymer Comp.	4f											✓	✓		✓	Reconf.	✓			
MP 23	Reclaimed Asphalt Shingles	2d													✓	✓	✓	✓			Revised
MP 24	Waterborne Traffic Paints	4c													✓	✓	✓	✓			Revised
MP 25	Perf.-Graded Bitum. Sealants	4e															✓	✓			New
MP 26	Cotton Duck Bridge Bearings	4e															✓	✓			New
PP 1	PAV Aging	2b																			Full Std
PP 2	Aging Long/Short Term	2d																			Full Std
PP 3	Rolling Wheel Comp.	2d																			Delete
PP 5	Eval. Modf. Asph. System	2d																			Delete
PP 6	PG Binders Verification	2b																			Full Std

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PP 7	Def. Calib. Load Cells FWD	5a																			Full Std
PP 8	Ref. Calib. Load Cells FWD	5a																			Full Std
PP 10	Test Pits Eval. Pavt. Perf.	1b																			Delete
PP 19	Vol. Design HMA	2d																			Delete
PP 20	Crack Sealant Pavement	5a																			Delete
PP 21	Eval. Cold Mixes	2a																			Delete
PP 22	Spec. Crack Sealants	2a																			Delete
PP 23	Cond. of Bridges Eval.	3c																			Delete
PP 25	Joint Seals in Conc. Pave.	3c																			Delete
PP 26	Certif. Binder Suppliers	2b																			Full Std
PP 28	Design Superpav. Mix	2d																			Full Std
PP 29	Deicing Chem. Eval.	5b																			Full Std
PP 30	Coatings Zinc Primer	4c																			Full Std
PP 31	Profile Rod/Level Pave.	5a																			Full Std
PP 32	Profile Dipstick Pave.	5a																			Full Std
PP 33	Boring Hole Decomm.	5b																			Full Std
PP 34	Crack Tendency Conc.	3c	✓	T 334																	Full Std
PP 35	Eval. Gyr. Compactors	2d																			Delete
PP 36	Steel Pile Corr.	1a																			Full Std
PP 37	Roughness Pavmnts	5a																			Combined
PP 37M	Roughness Pavmnts (Metric)	5a																			Full Std
PP 38	Rut Depth Measurmnts	5a	✓	R 48																	Full Std
PP 39	Faultng Conc. Pavts.	5a																			Full Std
PP 40	Ground Pen. Radar	5a																			Full Std
PP 41	SMA	2d	✓	R 46																	Full Std
PP 42	Low Temp Props-Binders	2b		✓		R 49															Full Std
PP 44	Cracks AC Pavmts	5a	✓	✓	✓	✓	✓	R 55													Full Std
PP 45	Qualif. Rebar mills	4g		✓		✓	✓	R 53													Full Std
PP 46	Geo. Reinf. Bases AC Pavt	4e	✓	✓	✓	R 50															Full Std
PP 47	Comparing 2 Gytratories	2d																			Delete
PP 48	Gytratory Internal Angle	2d		✓	✓																Delete

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PP 49	Cert. Inertial Profilers	5a	✓	✓	✓	✓	✓	R 56													Full Std	
PP 50	Operating Inertial Profilers	5a		✓	✓	✓	✓	R 57														Full Std
PP 51	Pavement Ride Quality	5a	✓	✓	Reconf.	✓	✓	R 54														Full Std
PP 52	Develop QA Plan for HMA	5c			✓																	Full Std
PP 53	Reclaimed Asphalt Shingles	2d		✓	✓	✓		✓		✓	✓	✓	✓	✓								Delete
PP 54	Match Curing of Concrete	3c		✓		✓		✓		✓	✓	✓	✓	✓		✓					✓	Extended
PP 55	Overcoating Field Test Program	4c		✓		✓		✓		✓	Reconf.	✓	✓									Delete
PP 56	Suitability of Recycled Materials	5b	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	R 65						Full Std
PP 57	Equipment Calibration	5c	✓	✓		✓	✓	✓		✓	✓	R 61										Full Std
PP 58	Static Segr. of SCC Cylinders	3c	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓		✓	Reconf.	✓				
PP 59	Coal Fly Ash for Embankments	1a			✓	✓	✓	✓		✓	✓	✓	✓	✓	Reconf.	✓					✓	
PP 60	Cyl. Performance Tests/SGC	2d			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓					✓	
PP 61	Dyn. Mod. Master Curves/AMPT	2d			✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	Reconf.	✓				
PP 62	Dyn. Mod. Master Curves/HMA	2d			✓	✓	✓	✓		✓		✓	✓	R 62								Full Std
PP 63	Pipe Joint Selection	4b			✓	✓	✓	✓	Reconf.	✓		✓	✓	✓	Reconf.	✓					✓	
PP 64	Agg Shape from DI Analysis	1b					✓	✓	✓	✓		✓	✓	✓	✓	✓					✓	Extended
PP 65	Reactivity of Concr. Agg. & Exp.	3c					✓	✓	✓	✓		✓		✓		✓	Reconf.	✓			✓	
PP 66	Long-Term Strength Geo Reinf	4e					✓	✓		✓		✓	✓	✓		✓	✓	R 69				Full Std
PP 67	Quant. Cracks in Asphalt Surf	5a					✓	✓		✓		✓	✓	✓	✓	✓					✓	
PP 68	Collect Images for Distress Det	5a					✓	✓		✓		✓	✓	✓	✓	✓					✓	
PP 69	Pave. Deformation Parameters	5a					✓	✓		✓		✓	✓	✓	✓	✓					✓	
PP 70	Transverse Pavement Profile	5a					✓	✓		✓		✓	✓	✓	✓	✓					✓	
PP 71	Suppliers of Emulsified Asphalt	2a							✓	✓		✓	✓	✓	Reconf.	✓					✓	
PP 72	Residue from Emulsified Asphalt	2a							✓	✓		✓	✓	✓	Reconf.	✓					✓	
PP 73	Sealers Port. Cem. Concrete	4c							✓	✓		✓	✓	✓		✓	Reconf.	✓			✓	
PP 74	Glass Beads Traff. Mark.	4c							✓	✓	✓	✓	✓	✓		✓	Reconf.	✓			✓	
PP 75	Vacuum Drying Comp. Asphalt	2c										✓	✓		✓	Reconf.	✓				✓	
PP 76	Troubleshooting Ashp. Specim.	2d										✓	✓		✓	Reconf.	✓				✓	
PP 77	PFC Mix Design	2d												✓	✓						✓	
PP 78	Reclaimed Asphalt Shingles	2d												✓	✓						✓	
PP 79	High-Frict. Surface Treatmt.	4c												✓	✓						✓	



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TP 39	Modified Rice SG	2c																			Full Std
TP 40	% Asphalt HMA	2a																			Delete
TP 41	% Asphalt Cold Mix Strip.	2a																			Delete
TP 42	% Asphalt Cold Mix Drain	2a																			Delete
TP 43	Workability Cold Mixes	2a																			Delete
TP 44	Cohesion Cold Mixes	2a																			Delete
TP 46	Mr. Soils & Agg.	1a																			Full Std
TP 47	Ecology-Deicing Chem.	5b																			Delete
TP 48	Brookfld Vis.	2b																			Full Std
TP 50	Pen. Sealr by Water Abs.	3b																			Delete
TP 51	Cath. Systm Tests/Decks	4g																			Delete
TP 52	St. Maturity Test Conc.	3b																			Full Std
TP 53	AC by Ignition Method	2c																			Full Std
TP 54	Cement Paste Stiffness	3a																			Delete
TP 55	Chlorides- Sp. Ion Probe	3c																			Full Std
TP 56	Void Cont. C. Agg.	1c																			Full Std
TP 57	Methy. Blue Value Clays	1c																			Full Std
TP 58	CA Degradation-Deval.	1c																			Full Std
TP 59	Air Cont. Hardened Conc.	3c	✓	✓		✓		✓		✓		✓	✓	✓		✓	✓			T 356	Full Std
TP 60	Thermal Expan of Conc.	3c	✓	✓		T 336															Full Std
TP 61	% Fract. Coarse Agg.	1c		✓		T 335															Full Std
TP 62	Dynamic Mod. of HMA	2d		✓		✓	✓	✓	✓	T 342											Full Std
TP 63	Asphalt Pvmt. Analyzer	2d		✓	✓	✓	✓	T 340													Full Std
TP 64	Rapid Chloride Migration	3c	✓	✓		✓		✓		✓		✓	✓	✓		✓	✓			T 357	Full Std
TP 65	Detection of Metallic Zinc	4c		✓		T 337															Full Std
TP 66	Hindered Amine Lt. Stabs.	4c	✓	✓		T 338															Full Std
TP 67	Isocyanate Content	4c	✓	✓		T 339															Full Std
TP 68	Density by Elect. Surf. Cont.	2c		✓		✓		✓	Reconf.	✓	✓	T 343									Full Std
TP 69	BSG by Vacuum Sealing	2c																			Full Std
TP 70	MSCR Test Using DSR	2b		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				T 350		Full Std
TP 71	SGC Internal Angle—Loading	2d		✓	✓	✓	✓	✓	✓	✓	✓	T 344									Full Std

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TP 72	Percentage of Lime in HMA	2c	✓	✓		✓		✓	Reconf.	✓		✓	✓	✓		✓	Reconf.	✓			Extended	
TP 73	Slump Flow of SCC	3b	✓	✓	✓	✓		✓		✓		✓	✓	T 347								Full Std
TP 74	Passing Ability SCC by J-Ring	3b	✓	✓	✓	✓		✓		✓		T 345										Full Std
TP 75	AV Charc. Fresh Mixed Conc.	3b	✓	✓		✓		✓		✓		✓	✓	T 348								Full Std
TP 76	Tire/Pave. Noise Using OBSI	5a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	Revised
TP 77	SpGr&Absorption of Agg by VIM	1c			✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓		✓		
TP 78	Detect P in Asphalt Binder	2b			✓	✓		✓		✓		✓	✓	✓	Reconf.	✓				✓		
TP 79	Dynamic Modulus and Flow No.	2d			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	Revised
TP 80	VSI for SCC	3b			✓	✓	✓	✓		✓		✓	✓	✓	✓	T 351						Full Std
TP 81	Det Agg Shape by DI Analysis	1c					✓	✓	✓	✓	✓			✓		✓	Reconf.	✓				
TP 82	SPGr of Agg by Water Displace.	2c					✓	✓		✓		✓	✓	✓		✓				✓		
TP 83	Fabr. of 2-in. Cubes Using Grout	3b					✓	✓		✓		✓	✓	✓	✓	R 64						Full Std
TP 84	Adh. Anchors/Sustained Load	4c					✓	✓	✓	✓		✓	✓	✓	Reconf.	✓				✓		
TP 85	Visc. of Crack Seal./Brook. RV	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 86	Aging Seal/Fillers w/Vac Ov.	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 87	Flex. Creep Stiffness by BBR	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 88	Tensile Prop. of Seal. by DTT	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 89	Adh of Crack Seal. by DAT	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 90	Measuring Inertial Fracture	4e					✓	✓		✓		✓		✓		✓	Reconf.	✓		✓		Extended
TP 91	Binder Bond Strength Test	2a							✓	✓		✓	✓	✓		✓				✓		Revised
TP 92	Cracking Temp. Using ABCD	2b							✓	✓		✓	✓	✓	✓	✓	Reconf.	✓				
TP 93	SSC Frmwk. Press. Transducers	3b							✓	✓	✓	✓	✓	✓	✓	T 352						Full Std
TP 94	SSC Fill Capac. Caisson Test	3b							✓	✓		✓	✓	T 349								Full Std
TP 95	Surf. Resist. Chloride Ion	3c							✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	T 358		Revised
TP 96	Prot Sealers Port Cem. Concrete	4c							✓	✓		✓	✓	✓		✓	Reconf.	✓				
TP 97	Glass Beads in Pavemt Markgs	4c							✓	✓	✓	T 346										Full Std
TP 98	Rd Surf Veh Noise SIP	5a							✓	✓	✓	✓	✓	✓		✓	Reconf.	✓				
TP 99	Rd Surf Traff Noise CTIM	5a							✓	✓	✓	✓	✓	✓		✓	Reconf.	✓				
TP 100	Deep Foundation Elements	1b									✓	✓		✓		✓	Reconf.	✓				
TP 101	Estimating Fatigue Resistance	2b									✓	✓		✓		✓	Reconf.	✓				
TP 102	Eval. of Asphalt Release Agents	2b									✓	✓		✓		✓	Reconf.	✓				

