

OS-299 (6-25)  Pennsylvania Department of Transportation	TRANSMITTAL LETTER	PUBLICATION: Publication 27 (Bulletin 27)
DATE: 11/21/2025		
SUBJECT: Publication 27 (Bulletin 27), Asphalt Concrete Mixtures, Design Procedures, and Specifications for Special Asphalt Mixtures		
INFORMATION AND SPECIAL INSTRUCTIONS: Publication 27 (Bulletin 27), 2003 Edition, Change 6, implements the following Strike-Off Letters (SOLs) which included Publication 27 (Bulletin 27) Chapter or Appendix Attachments: • SOL# 481-16-04: ○ Chapter 2B, Modifications to AASHTO R 46, Section 4. Summary of the Practice, Subsection 4.6 Review of the Job Mix Formula (JMF), Language assigning a JMF/Mix Design Number as shown in Appendix K. • SOL# 481-16-06: ○ Chapter 2B, Revisions to the Moisture Sensitivity Evaluation requirements to require a minimum dosage of anti-strip additive in all SMA mixtures, to modify AASHTO T 283, and to require moisture sensitivity reevaluation, at least once every 5 years. • SOL# 481-18-02: ○ Appendix E, Complete revision of the Asphalt Seal Coat and Asphalt Surface Treatment design processes to replace existing design chart processes with equation-based design processes. • SOL# 481-24-01: ○ Chapter 2A, Updates throughout entire Chapter 2A to reflect updates and revisions to AASHTO Standards (AASHTO M 323, R 35, and T 283), to include Department modifications for 4.75 mm NMAS asphalt mixtures, and to update/clarify mechanical testing requirements. ○ Appendix K, Updates to the JMF/Mix Design Number naming convention. • SOL# 481-24-02: ○ Appendix J, Updates to Appendix J due to Publication 408 changes and revisions to Appendix J adding the requirement for submission of Environmental Product Declarations (EPDs) and related data entry into eCAMMS. Publication 27 (Bulletin 27), 2003 Edition, Change 6, implements the following FHWA Approved Clearance Transmittal (CT) revisions: • CT H-12-040, Publication 408, Section 344 Full Depth Reclamation. Complete revision to the existing Bulletin 27, Chapter 2 mixture design guidelines and process using Marshall compaction hammer. ○ New Chapter 2C, Full Depth Reclamation Mix Design Guidelines and Procedure Using Emulsified Asphalt Stabilization and the Superpave Gyratory Compactor. • CT H-23-09, Publication 408, Section 419 and Publication 27 (Bulletin 27), Chapter 2B allowing fiberless SMA and up to 10% RAP in SMA. ○ Chapter 2B, revisions to SMA mixture design process to address fiberless SMA and to allow up to 10% RAP in SMA. Publication 27 (Bulletin 27), 2003 Edition, Change 6, implements the following editorial updates throughout all Chapters and Appendices: • Updated the referenced PennDOT organization names to current names [e.g., "Bureau of Construction and Materials (BOCM)", "Materials Division (MD)", "Laboratory Testing Section (LTS)", "New Products and Innovations (NPI) Section"]. • Updated online locations to externally published reference documents and document hyperlinks.		

- Updated from existing "CAMMS" to "eCAMMS".
- Updated from existing "bituminous" to "asphalt".
- Updated from "Hot-Mix Asphalt (HMA)" to "asphalt mixture".
- Updated from "emulsion" to "emulsified asphalt".
- Deleted existing old references to "E" class emulsified asphalts [e.g., deleted "(E-4)", "(E-5)", "(E-8C)", etc.]
- Updated from "asphalt cement" to "asphalt binder"
- Updated from "PG 58-28", "PG 64-22", and "PG 76-22" to "PG 58S-28", "PG 64S-22", and "PG 64E-22", respectively.
- Updated all existing designations to AASHTO and ASTM Standards with current designations (e.g., from "AASHTO TP 71" to "AASHTO T 344" and from "AASHTO T 40" to "AASHTO R 66").
- Updated existing references to AASHTO or ASTM Sections with the current Section numbers.
- Updated modifications to AASHTO or ASTM Standards based on published revisions to the AASHTO and ASTM Standards (e.g., updated Chapter 2B modifications to AASHTO T 283 due to published revisions in AASHTO T 283).
- Updated existing references to Publication 408 Section numbers to current Section numbers (e.g., revised from "Section 409" to "Section 413").
- Removed and replaced the pronouns "he", "him", "his", "she", & "her".
- In Appendix D, updated pages D-5 and D-6 with current LTS worksheets.

Publication 27 (Bulletin 27), 2003 Edition, Change 6, implements the following revisions as they have become common practice or are already required by eCAMMS:

- Chapter 1:
 - Added requirements for producer use of the eCAMMS ESB Asphalt Quality Control Testing and the eCAMMS ESB Plant Summary Shipment Entry.
 - Added requirement for a plant to provide or have access to mechanical testing equipment for performing asphalt mixture rut testing and crack testing as specified in Chapter 2A and Chapter 2B.
- Chapter 2A:
 - Added requirement for AASHTO T 324 to calculate a creep slope from the output data and plot from the steady state portion of the plot as shown in AASHTO T 324, Figure 3.
- Chapter 2B:
 - Added requirements for mechanical testing of asphalt mixtures for rutting and cracking for SMA as mechanical testing information is required in eCAMMS.

Publication 27 (Bulletin 27), 2003 Edition, Change 6, implements the following technical revisions due to the reason indicated:

- Chapter 2A:
 - Added new requirement to prepare a minimum of four compacted test specimens for ASTM D8225 to improve the Coefficient of Variation (COV) analysis.
 - Revised maximum rut depth testing requirement for AASHTO T 324 to test compacted specimens to a maximum 20,000 passes or to a maximum rut depth of 15 mm, whichever occurs first (i.e., revised from "20 mm" to "15 mm" due to bouncing issues with some equipment especially at rut depths greater than 15 mm).
- Appendix H:
 - Added language and requirements to address up to 10% RAP in SMA mixtures and removed these requirements from Chapter 2B that were FHWA approved with CT H-23-09.
 - In the Tier 1 and Tier 2 Mix Design sections, added clarification that RAP mix designs are not required to be based on virgin mix designs especially since less than 10% of current annual mixture designs are virgin mix designs.

CANCEL AND DESTROY THE FOLLOWING:

Publication 27 (Bulletin 27), 2003 Edition,
Change 5

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ASPHALT CONCRETE MIXTURES, DESIGN PROCEDURES, AND SPECIFICATIONS FOR SPECIAL ASPHALT MIXTURES

Publication 27 (Bulletin 27), 2003 Edition, Change 6



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INTRODUCTION

The contents of this Bulletin are intended for PennDOT, Contractor and Producer personnel for use in conjunction with the Field and Laboratory Testing Manual ([Publication 19](#)), Specifications ([Publication 408](#)), Special Provisions and Supplements, and the Construction Manual for Construction Project Inspection ([Publication 8](#)).

- CHAPTER 1** gives Department requirements for mixing plants producing hot-mixed asphalt paving mixtures.
- CHAPTER 1A** gives Department requirements for asphalt mixing plants producing cold-mixed asphalt paving mixtures.
- CHAPTER 2** contains Department approved procedures for design and control of asphalt paving mixtures using a modified Marshall design procedure and includes procedures for design of Cold Recycled Base Course.
- CHAPTER 2A** contains Department references to and modifications of the AASHTO R 35 *Standard Practice for Superpave Volumetric Design for Asphalt Mixtures* and the AASHTO M 323 *Standard Specification for Superpave Volumetric Mix Design*.
- CHAPTER 2B** contains Department references to and modification of the AASHTO M 325 *Standard Specification for Stone Matrix Asphalt (SMA)*, and AASHTO R 46 *Standard Practice for Designing Stone Matrix Asphalt (SMA)*
- CHAPTER 2C** contains Department design procedures for Full Depth Reclamation (FDR) using asphalt stabilizer.
- CHAPTER 3** contains Department specifications for asphalt stockpile patching materials including inspection, sampling and approval.
- CHAPTER 4** contains a glossary of commonly used terms related to asphalt binder materials, mineral aggregates, and asphalt concrete.
- APPENDICES A through D** give Department procedures for blending aggregates for mix design and production.
- APPENDIX E** gives the Department design method for asphalt seal coats and asphalt surface treatments.
- APPENDIX F** gives the Department procedure for obtaining approval to use printed tickets in place of laboratory testing of the completed mix for asphalt content.
- APPENDIX G** describes the Department asphalt mixture surge silo or storage system approval procedure.

- APPENDIX H** gives Department Superpave and Stone Matrix Asphalt (SMA) design guidelines for using reclaimed asphalt pavement (RAP) and manufacturer waste reclaimed asphalt shingles (RAS).
- APPENDIX I** outlines Department requirements for testing of the mixture's theoretical maximum specific gravity and Voids in Mineral Aggregate during volumetric mix design and production quality control.
- APPENDIX J** outlines Department procedures for annual asphalt concrete mix design submittal for both new mix designs and existing mix designs with 0 to < 5 and ≥ 5 Production Quality Control (QC) test results from the previous calendar year.
- APPENDIX K** provides an alpha-numeric asphalt concrete mix design naming system for quickly identifying mixture design characteristics, such as, Hot Mix Asphalt (HMA) or Warm Mix Asphalt (WMA), Nominal Maximum Aggregate Size (NMAS), Design ESAL Range, Asphalt Binder Performance Grade, Reclaimed Asphalt Pavement or Reclaimed Asphalt Shingle Tier Level, Skid Resistance Level, and Version Number.

REFERENCES

The reference materials listed below are specifically referenced within this Publication. All references to AASHTO and ASTM standard practices, specifications, and test procedures refer to the current approved and published version available at the time of project bid letting. The version dates below are provided for information only and are current as of November 2025.

REFERENCE MATERIALS:

PennDOT Publications:

19	Field and Laboratory Testing Manual
35	Qualified Products List for Construction
37	Specifications for Bituminous Materials (Bulletin No. 25)
41	Producers of Asphalt Mixtures (Bulletin No. 41)
242	Pavement Policy Manual
351	Bituminous or Asphalt Technician Certification Program
408	Specifications
447	Approved Products for Lower Volume Local Roads

AASHTO Standards:

AASHTO Standard Specifications:

M 323-22	Superpave Volumetric Mix Design
M 325-08 (2025)	Stone Matrix Asphalt (SMA)
M 332-23	Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test

AASHTO Standard Practices:

R 35-22	Superpave Volumetric Design for Asphalt Mixtures
R 46-22	Designing Stone Matrix Asphalt (SMA)
R 66-16 (2024)	Sampling Asphalt Materials
R 76-23	Reducing Samples of Aggregate to Testing Size
R 114-22	Design Considerations When Using Reclaimed Asphalt Shingles (RAS) in Asphalt Mixtures

AASHTO Standard Method of Tests:

T 19M/T 19-25	Bulk Density (“Unit Weight”) and Voids in Aggregate
T 59-25	Emulsified Asphalts
T 84-25	Specific Gravity and Absorption of Fine Aggregate
T 85-25	Specific Gravity and Absorption of Coarse Aggregate
T 96-22	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
T 133-22	Density of Hydraulic Cement
T 134-25	Moisture-Density Relations of Soil-Cement Mixtures
T 166-25	Bulk Specific Gravity (G_{mb}) of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens
T 176-22	Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

T 182-84 (2002)	<i>Discontinued</i> - Coating and Stripping of Bitumen-Aggregate Mixtures
T 195-22	Determining Degree of Particle Coating of Asphalt Mixtures
T 209-25	Theoretical Maximum Specific Gravity (G_{mm}) and Density of Asphalt Mixtures
T 228-22	Specific Gravity and Density of Semi-Solid Asphalt Materials
T 275-22	Bulk Specific Gravity (G_{mb}) of Compacted Asphalt Mixtures Using Paraffin-Coated Specimens
T 283-22	Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
T 312-22	Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor.
T 324-23	Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
T 344-22	Evaluation of Superpave Gyratory Compactor (SGC) Internal Angle of Gyration Using Simulated Loading

SPECIFICATIONS ([Pub. 408](#)), including:

Section:

106	Control of Material
344	Full Depth Reclamation
412	Superpave Mixture Design, Construction of Plant-Mixed 6.3 mm Thin Asphalt Overlay Courses
413	Superpave Mixture Design, Standard and RPS Construction of Plant-Mixed Asphalt Courses with Percent Within Limits and LTS Testing (PWL-LTS)
419	Stone Matrix Asphalt Mixture Design, RPS Construction of Plant-Mixed Wearing Courses
420	Pervious Asphalt Pavement System
489	Ultra-Thin Bonded Wearing Course
703	Aggregate

ASTM Standards:

C70-20	Standard Test Method for Surface Moisture in Fine Aggregate
D698-12 (2021)	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,500 ft-lbf/ft ³ (600 kN-m/m ³))
D3625/D3625M-20 (2024)	Standard Practice for Effect of Water on Asphalt-Coated Aggregate Using Boiling Water
D8225-19	Standard Test Method for Determination of Cracking Tolerance Index of Asphalt Mixture Using the Indirect Tensile Cracking Test at Intermediate Temperature

FIELD AND LABORATORY TESTING MANUAL ([Pub. 19](#)), including:

PA Test Method (PTM) No.

1	Probability Sampling
4	Treatment of Extreme Values

100	Amount of Material Finer Than 75 μm (No. 200) Sieve in Aggregate.
106	The Moisture-Density Relations of Soils (Using a 5.5-lb. Rammer and a 12” Drop)
608	Calibration of Mechanical Sieve Shaker
616	Sieve Analysis of Coarse and Fine Aggregate
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