

TABLE OF CONTENTS  
PART V

SECTION

2018

5.1           **GENERAL**

- 5.1.1       Materials Control Functions of the Secretary of Transportation
- 5.1.2       Materials Control Functions of the Bureau of Construction and Materials

5.2           **QUALITY CONTROL/QUALITY ASSURANCE**

- 5.2.1       Statistics
- 5.2.2       Rounding Off and Random Sampling
  - 5.2.2.1     Rounding Off of Numbers
  - 5.2.2.2     Random Sampling
- 5.2.3       Reasons for Quality Control/Quality Assurance (QC/QA) and the Certified Inspection and Testing Training Program (CIT<sup>2</sup>).
- 5.2.4       Procedures for Quality Assurance
- 5.2.5       Quality Control/Quality Assurance (QC/QA) Tests
- 5.2.6       Comparison of Quality Control and Verification Tests
- 5.2.7       Contractor's Quality Control Plan
  - 5.2.7.1     HMA: Contractor's Quality Control Plan
  - 5.2.7.2     Guide for Quality Control and Acceptance Requirements for HMA
  - 5.2.7.3     Example of a Laboratory Quality Manual For HMA
  - 5.2.7.4     Concrete: Contractor's Quality Control Plan
  - 5.2.7.5     Example of a Laboratory Quality Manual for Concrete
  - 5.2.7.6     Concrete Structures: Contractor's Quality Control Plan
  - 5.2.7.7     Example of a Contractor's Concrete Structures Quality Control Plan for Controlling Evaporation
  - 5.2.7.8     Cement Treated Base: Contractor's Quality Control Plan (CTB)
  - 5.2.7.8.1   Example of a Laboratory Quality Manual for CTB

5.3           **MIX DESIGN METHODS**

- 5.3.1       Concrete Mix Design
- 5.3.2       Bituminous Mix Design
- 5.3.3       Superpave Mix Design
- 5.3.4       Mix Design Procedures for CIR (Cold in Place Recycling) Material

5.4           **LABORATORY AND SAMPLE IDENTIFICATION**

- 5.4.1       Laboratory Identification
- 5.4.2       Sample Identification
- 5.4.3       Sample Identification Forms

5.5           **REQUIRED SAMPLE SIZES**

TABLE OF CONTENTS  
PART V

2018

SECTION

5.6        **AGGREGATES**

- 5.6.1      General
- 5.6.2      Types of Production
- 5.6.3      Inspection Responsibilities
- 5.6.4      Approval of Deposits
- 5.6.5      Inspection, Sampling and Testing

5.7        **INSPECTION AND SAMPLING OF MATERIALS**

- 5.7.1      Asphalt Materials
- 5.7.2      Brick and Concrete Masonry Units
- 5.7.3      Concrete Curing Materials
- 5.7.4      Joint Sealing and Joint Filler Materials
- 5.7.5      Miscellaneous Materials
- 5.7.6      Miscellaneous Metals
- 5.7.7      Bridge Paints and Pavement Marking Materials
- 5.7.8      Culvert, Sewer and Underdrain Pipe
- 5.7.9      Cementitious Material
- 5.7.10     Materials for Roadside Improvements
- 5.7.11     Steel and Iron
- 5.7.12     Timber, Lumber, Piling and Posts
- 5.7.13     Water for Use with Portland Cement

5.8        **NUCLEAR GAUGE**

- 5.8.1      1.13.2 SOM - RADIOLOGICAL SAFETY GUIDELINES
- 5.8.2      Independent Assurance Replicate (ASR) Check for Nuclear Density Gauges
- 5.8.3      Segregation Check Using the Nuclear Density Gauge
- 5.8.4      Joint Density Evaluation Using the Nuclear Density Gauge

5.9        **SAMPLING AND TEST METHODS FOREWORD**

- 5.9.01     KT-01    Sampling and Splitting of Aggregates
- 5.9.02     KT-02    Sieve Analysis of Aggregates
- 5.9.03     KT-03    Material Passing No. 200 (75  $\mu$ m) Sieve by the Wash Method
- 5.9.04     KT-04    Percent Retained on the No. 200 (75  $\mu$ m) Sieve by Dry Screening
- 5.9.05     KT-05    Unit Weight of Aggregate
- 5.9.06     KT-06    Specific Gravity and Absorption of Aggregates
- 5.9.07     KT-07    Clay Lumps and Friable Particles in Aggregate
- 5.9.08     KT-08    Shale or "Shalelike" Materials in Aggregate
- 5.9.10     KT-10    Plasticity Tests
- 5.9.11     KT-11    Moisture Tests
- 5.9.12     KT-12    Standard Compaction Test

TABLE OF CONTENTS  
PART V

2018

SECTION

5.9.13	KT-13	Field Density Tests of Soils, Treated Base Courses and Water Bound Base Courses
5.9.14	KT-14	Marshall Tests of Bituminous Mixes
5.9.15	KT-15	Bulk Specific Gravity and Unit Weight of Compacted Hot Mix Asphalt (HMA)
5.9.16	KT-16	Deleted
5.9.17	KT-17	Sampling Freshly Mixed Concrete
5.9.18	KT-18	Air Content of Freshly Mixed Concrete by the Pressure Method
5.9.19	KT-19	Air Content of Freshly Mixed Concrete by the Volumetric Method
5.9.20	KT-20	Mass Per Cubic Foot (Meter), Yield and Air Content (Gravimetric) of Freshly Mixed Concrete
5.9.21	KT-21	Slump of Portland Cement Concrete
5.9.22	KT-22	Making and Curing Compression and Flexural Test Specimens in the Field
5.9.23	KT-23	Flexural Strength of Concrete (Third-Point Loading Method)
5.9.24	KT-24	Determination of Free Moisture or Absorption of Aggregate for Use in Concrete
5.9.25	KT-25	Sampling and Splitting Plant Mixed Asphalt Mixtures
5.9.26	KT-26	Sampling Asphalt Materials
5.9.27	KT-27	Sampling Joint Compound Materials
5.9.28	KT-28	Sampling Bridge Paint
5.9.29	KT-29	Field Sampling of Portland Cement, Lime and Fly Ash
5.9.30	KT-30	Field Sampling of Thermoplastic Pavement Marking Material
5.9.31	KT-31	Determination of Percentage of Crushed Particles in Crushed Gravel AKA: Coarse Aggregate Angularity
5.9.32	KT-32	Method of Test for Density of Compacted Asphalt Mixtures by Nuclear Method
5.9.33	KT-33	Deleted See KTMR-39
5.9.34	KT-34	Sieve Analysis of Extracted Aggregate
5.9.35	KT-35	Sticks in Aggregate
5.9.36	KT-36	Density of Freshly Mixed Concrete in Bridge Deck Overlays by Nuclear Gauge
5.9.37	KT-37	Making, Curing and Testing Cement Treated and Unbound Bases
5.9.38	KT-38	Density of Freshly Mixed Concrete in Pavement by Nuclear Method
5.9.39	KT-39	Theoretical Maximum Specific Gravity of Asphalt Paving Mixtures
5.9.41	KT-41	Determination of Density and Moisture Content of Portland Cement Treated Bases, Aggregate Bases and Aggregate Shoulders by Nuclear Method
5.9.42	KT-42	Sieve Analysis for Acceptance of Lime or Cement Treated Soils
5.9.43	KT-43	Moisture Content of Asphalt Mixtures or Mineral Aggregates - Microwave Oven Method
5.9.44	KT-44	Method of Testing the Strength of Portland Cement Concrete Using the Maturity Method
5.9.45	KT-45	Determination of Dry Paint Film Thickness with the Magnetic Gauge
5.9.46	KT-46	Determination of Pavement Profile with the Profilograph
5.9.47	KT-47	Depth Determination of Hot-in-Place Recycled Asphalt Pavement (HIR)
5.9.49	KT-49	Method for Obtaining and Testing Drilled Cores from PCCP and Precast Girders
5.9.50	KT-50	Uncompacted Void Content of Fine Aggregate
5.9.51	KT-51	Field Density and Moisture Tests of Soils by Nuclear Gauge
5.9.54	KT-54	Deleted See KT-46
5.9.55	KT-55	Plastic Fines in Combined Aggregates by Use of the Sand Equivalent Test
5.9.56	KT-56	Resistance of Compacted Asphalt Mixture to Moisture Induced Damage

TABLE OF CONTENTS  
PART V

2018

SECTION

5.9.57	KT-57	Determination of Asphalt Content and Gradation of Hot Mix Asphalt Concrete by the Ignition Method
5.9.58	KT-58	Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyrotory Compactor
5.9.59	KT-59	Flat and Elongated Particles in Coarse Material Test
5.9.60	KT-60	Indirect Tensile Test
5.9.61	KT-61	Raveling Test on Recycled Asphalt Specimens
5.9.62	KT-62	Percent Solids of Lime Slurry
5.9.63	KT-63	Method for Determining Draindown Characteristics in Uncompacted Asphalt Mixtures
5.9.64	KT-64	Method for Determining Volume of Voids in Compacted Filler or Fines
5.9.65	KT-65	Sampling and Splitting Cement Treated Base Mixtures
5.9.66	KT-66	Sampling Epoxy Pavement Marking
5.9.67	KT-67	Sampling Glass Beads
5.9.68	KT-68	Sampling Traffic Paint
5.9.69	KT-69	Relative Density
5.9.70	KT-70	Method for Testing Polymer Overlays for Surface Preparation and Adhesion
5.9.71	KT-71	Air-Void Analyzer
5.9.72	KT-72	Measuring Flowing Concrete
5.9.73	KT-73	Density, Absorption and Voids in Hardened Concrete
5.9.76	KT-76	Method for Testing the Compressive Strength of Molded Cylindrical Concrete Specimens
5.9.77	KT-77	Method for Capping Cylindrical Concrete Specimens
5.9.78	KT-78	Method for Determining the Tensile Adhesive Strength of Asphalt Pavement Tack Coat
5.9.79	KT-79	Surface Resistivity of Concrete
5.9.80	KT-80	Uncompacted Void Content of Coarse Aggregate
5.9.81	KT-81	Sampling Cold Plastic Pavement Marking, Patterned Cold Plastic Pavement Marking Tape and High Durability Pavement Marking Tape
5.9.82	KT-82	Determination of Excessive Moisture in Concrete Surfaces
5.9.83	KT-83	Strand Bond in Prestressed Concrete Members
5.9.84	KT-84	Sampling Nuts, Bolts and Washers
5.9.85	KT-85	Procedures for Evaluating the Movement, Rotation, and Sound Generation of Portable Temporary Rumble Strips
5.9.86	KT-86	Characterization of the Air-Void System of Freshly Mixed Concrete by the Sequential Pressure Method (Super Air Meter – SAM)
5.10	<b>CALCULATIONS</b>	
5.10.1	Absolute Volume and Percent of Voids in a Unit Volume of Aggregate	
5.10.2	Theoretical Specific Gravity of a Combination of Aggregates	
5.10.3	Volume of Asphalt Materials	
5.10.4	Calculations for the Marshall Mix Design of Bituminous Mixtures	
5.10.5	Fineness Modulus of Aggregates (Gradation Factor)	

TABLE OF CONTENTS  
PART V

SECTION

2018

**APPENDICIES**

- Appendix A Sampling and Testing Frequency Chart – **Non Quality Control/Quality Assurance Specifications**
- Appendix B Sampling and Testing Frequency Chart – **Quality Control/Quality Assurance Specifications**
- Appendix C Test Procedure Criteria for the Independent Assurance Program
- Appendix D Policy and Procedure Manual for the Inspection of Kansas Department of Transportation District Laboratories

