Materials

Guidance Manual

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET

March 2014

Produced by Organizational Management Branch
Office of Human Resource Management

TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

OFFICE OF THE SECRETARY
OFFICIAL ORDER 108749

SUBJECT: MATERIALS GUIDANCE MANUAL

This manual has been prepared to provide information and guidance to personnel of the Transportation Cabinet. Its purpose is to give uniformity in the interpretation and administration of laws, rules, and regulations applicable to the operation of the *Division of Materials* and its relationship with other units of the Cabinet.

The rules and regulations contained within are approved and declared effective unless officially changed.

All previous instructions, written and oral, relative to or in conflict with this manual are hereby superseded.

Signed and approved this 4th day of March, 2014.

Michael Hancock
Secretary

Approved as to Legal Form

Office of Legal Services

Kentucky UNBRIDLED SPIRIT

An Equal Opportunity Employer M/F/D

MATERIALS

Chapter

INDEXES

Subject

Table of Contents

00 INDEXES

01 Table of Contents 03/14

100 INTRODUCTION

101 Design of This Manual 03/14
102 Purpose of This Manual 03/14

200 ADMINISTRATION

201 Organization, Function, & Jurisdiction 03/14
202 Guidance Manuals 03/14
203 Small Quantities Acceptance 03/14
204 Laboratory Accreditation 03/14
205 District Equipment Calibration 03/14
206 Geotechnical Branch 03/14

300 ASPHALT BRANCH

301 Overview 03/14
302 Liquid Asphalt Section 03/14
303 Asphalt Mixtures Testing Section 03/14
304 Asphalt Field Operations Team 03/14

400 STRUCTURAL MATERIALS BRANCH

401 Overview 03/14
402 Aggregate Section 03/14
403 Chemical Section 03/14
404 Concrete & Physical Properties Section
404-1 Concrete 03/14
404-2 Cement Laboratory 03/14
404-3 Physical Laboratory 03/14

500 CONTRACT ADMINISTRATION

501 Independent Assurance & Material Certification 03/14
502 Internal Audits 03/14

9000 EXHIBITS

MATERIALS

Chapter

INTRODUCTION

Subject

Design of This Manual

PURPOSE

The *Materials Guidance Manual* is a guide for use in the performance of sampling and testing by the Division of Materials, district materials offices, and section offices of the Transportation Cabinet. This manual establishes policies, procedures, standards, and instructions for the sampling and testing of materials used in the construction of transportation projects.

ORGANIZATION & NUMBERING

Chapters—The subject matter in the manual is divided into chapters or sections. The chapter title appears in the upper right-hand corner of the first page of a subject and in the upper left-hand corner of any subsequent page.

Sections—Some chapters are divided into sections. Each section title, instead of chapter title, appears in the upper right-hand corner of the first page of a subject and in the upper left-hand corner of any subsequent page.

Subjects—Chapters and sections are arranged by subjects.

Subject Number—Each subject is assigned a number, which appears in the upper right-hand corner of each page of the subject. For example, Chapter 400 includes subjects 401, 402, and 403, followed by subject 404 which is divided into section subjects 404-1 through 404-3.

Subject Title—The title of a subject appears in the upper right-hand corner of the first page of a subject and in the upper left-hand corner of any subsequent page.

"MAT" Prefix—Preceding each subject number, this prefix stands for the manual title *Materials*.

Date—The latest issuance date of a subject appears at the bottom left of each page of the subject. This date agrees with the latest issuance date shown for the subject in the Table of Contents (**MAT-01**).

ORGANIZATION & NUMBERING (CONT.)

Page Numbering—Each subject has its own page numbering, which appears at the bottom of each page.

LOCATING INFORMATION

Indexes—One index appears at the front of the manual, and one index appears at the back:

- **Table of Contents (MAT-01)**—This index at the front lists the titles of the manual's chapters and their subjects, as well as other information, in numerical order. It includes the latest issuance dates of all the subjects. As the manual matures, these dates change.
- **List of Exhibits (MAT-9000)**—This index at the back lists the manual's exhibits and includes the latest issuance date of each exhibit. As the exhibits mature, the issuance dates change.

CROSS-REFERENCES IN MANUAL

Subject Numbers within Text—A boldfaced subject number that appears within the text references the location of more information about the subject.

QUESTIONS

Whom to Contact—For answers to questions about the contents of the manual, please contact:

Division of Materials
1227 Wilkinson Boulevard
Frankfort, KY 40601
(502) 564-3160

For copies of the manual, please contact:

Organizational Management Branch
Transportation Cabinet Office Building
200 Mero Street
Frankfort, KY 40622
(502) 564-4610

MATERIALS

Chapter

INTRODUCTION

Subject

Purpose of This Manual

PURPOSE

This manual serves as a guide for conducting day-to-day business as it relates to the use of materials by the Transportation Cabinet.

WHAT THE MANUAL DOES NOT COVER

This manual provides reasonable and uniform policies and procedures that allow sufficient flexibility for solving special problems. It is impractical to attempt to provide in this manual policies and procedures for all situations that may arise. This manual does not answer all questions; it leaves many areas where individual judgment may be required.

QUESTIONS

Questions or special problems shall be directed to the Division of Materials.

SUGGESTIONS

The Division of Materials encourages suggestions for new and revised policies and procedures. Suggestions shall be submitted via the proper channels to appropriate Cabinet divisions or offices.

MATERIALS

Chapter

ADMINISTRATION

Subject

Organization, Function, & Jurisdiction

ORGANIZATION

The Division of Materials has the ultimate responsibility in all matters involving the use of materials in KYTC construction or maintenance projects. The division is divided into two engineering branches headed by transportation engineering branch managers with direct responsibility to the director. The engineering branches are as follows:

- The Structural Materials Branch is divided into three sections:
  - Aggregate Section
  - Chemical Section
  - Concrete and Physical Properties Section
- The Asphalt Branch is divided into two sections:
  - Asphalt Mixture Testing Section
  - Liquid Asphalt Section

Each highway district has a materials laboratory supervised by a district materials engineer, called the district Materials Section supervisor (DMSS), who is responsible for the oversight of all materials activity within the district. The DMSS enforces the materials policy established by the division and reports directly to the district's Engineering Support Branch Manager.

FUNCTION

The Division of Materials is responsible for the materials engineering required for the design, construction, and maintenance of the roads and bridges in the state highway system. To ensure specification compliance, engineering testing shall be performed on all materials used in road and bridge construction.

Division staff members:

- Develop standards and specifications for materials
- Establish test procedures that determine compliance with specifications

FUNCTION (CONT.)

- Coordinate testing conducted at the project sites
- Provide or oversee qualification programs in the areas of aggregate testing, grading inspection and testing, asphalt-mixture testing, bridge-coating inspection, pavement marking, and concrete testing

JURISDICTION

The responsibility of the division extends to materials used or submitted for use in state-aided or federal-aided highway construction or in state-aided highway maintenance.

MATERIALS

Chapter

ADMINISTRATION

Subject

Guidance Manuals

DIVISION GUIDANCE MANUALS

The Division of Materials prepares the following manuals outlining standard procedures for sampling, testing, and control of materials:

- *Materials Field Sampling and Testing Manual*
- *Kentucky Methods Manual*
- *Precast/Prestressed Concrete Manual*
- *List of Approved Materials* (published and maintained only on the Division of Materials website)
- *Aggregate Source Book* (published and maintained only on the Division of Materials website)
- *Materials Guidance Manual*

MATERIALS

Chapter

ADMINISTRATION

Subject

Small Quantities Acceptance

POLICY

The Materials Module of the TRNS*PORT SiteManager computer program provides the means for tracking materials utilized in construction projects. Samples required, samples obtained, samples deficient, and test results are some of the data maintained in SiteManager. SiteManager Materials outlines provisions for waiving the normal sampling and testing requirements for small quantities or miscellaneous materials while providing for their acceptance on the basis of visual inspections or certifications. Such waivers are intended to provide a practical approach to acceptance that reduces testing costs and provides for better utilization of inspectors.

MATERIALS

Chapter

ADMINISTRATION

Subject

Laboratory Accreditation

DIVISION OF MATERIALS LABORATORY ACCREDITATION

The Division of Materials maintains "Accredited" status under the AASHTO (American Association of State Highway and Transportation Officials) Accreditation Program (AAP). The division obtains accredited status by passing on-site inspection of equipment and demonstration of test procedures, participation in all appropriate proficiency sample testing, and maintenance of a quality system conforming to AASHTO R18. The division is responsible for overseeing the statewide laboratory qualification program and for accrediting district materials laboratories.

DISTRICT LABORATORY ACCREDITATION

To maintain an accredited status, each district materials laboratory shall successfully pass a regular inspection by Division of Materials personnel. During the inspection, the division inspectors evaluate laboratory equipment and calibration documentation. Throughout the year, the district Materials Section Supervisor (DMSS) is responsible for equipment verifications and calibrations at the specified frequencies.

The DMSS is also responsible for the inspection and accreditation of all other laboratories within the district performing acceptance testing for the Department of Highways, including contractor and consultant laboratories.

MATERIALS

Chapter

ADMINISTRATION

Subject

District Equipment Calibration

GENERAL

Materials personnel from the Central Office and district offices play a role in the calibration of district equipment.

MASTER THERMOMETERS

Each district materials laboratory is equipped with the following two "master" thermometers used to calibrate all other thermometers in the district laboratory and all thermometers in the contractor and consultant laboratories:

- One thermometer used for low-temperature calibrations with a range of 66 to 80°F
- One thermometer used for high-temperature calibrations with a range of 90 to 390°F

Master thermometers shall be used only for the calibration of other thermometers and not for testing purposes.

The division's Liquid Asphalt Section calibrates the two master thermometers annually. The district Materials Section Supervisor (DMSS) annually calibrates all thermometers not considered as masters.

COMPRESSION MACHINES, SPEEDY MOISTURE TESTERS, WET-FILM THICKNESS GAGES, & STATE OWNED BALANCES-WEIGHTS

Division representatives regularly visit each district laboratory to verify the accuracy of these testing devices. The DMSS shall make the field apparatus available at the district laboratory for a calibration check during these visits. The Division distributes reports documenting the equipment checks to the DMSS.

CONCRETE AIR METERS

The DMSS shall ensure that concrete air meters are calibrated and shall perform necessary maintenance, such as cleaning and replacement of gaskets, at least once annually. The instructions for calibration, checking the initial pressure line, and verifying the aggregate correction factors are provided and retained with each apparatus.

SAND EQUIVALENT APPARATUS

A representative from the Aggregate Section conducts a regular inspection of the equipment assigned to the district laboratories to check the timer, solution level, and other parameters.

NEW EQUIPMENT

New equipment shall be calibrated and verified by the responsible laboratory prior to placing it in service.

MATERIALS

Chapter

ADMINISTRATION

Subject

Geotechnical Branch

SUMMARY

The Geotechnical Branch of the Division of Structural Design was formerly a branch of the Division of Materials. The Geotechnical Branch was removed from Materials as part of an administrative reorganization. SiteManager Materials has testing requirements for some Geotechnical items including Borrow, Embankments, Chemically Stabilized Subgrades, Subgrades and Topsoil. Oversight for testing these materials is the responsibility of district materials personnel, but the sampling and testing requirements are the responsibility of the Geotechnical Branch.

REFERENCE

The Geotechnical Branch details their policies and procedures in the *Geotechnical Manual*.

MATERIALS

Chapter

ASPHALT BRANCH

Subject

Overview

OVERVIEW

The Asphalt Branch is responsible for the testing and approval of asphalt-related materials used on Department of Highways' projects. This branch provides technical assistance and training concerning asphalt-related topics to others within the department, industry, Federal Highway Administration (FHWA), and academia.

The Asphalt Branch consists of two sections:

- Liquid Asphalt Section
- Asphalt Mixtures Testing Section

The branch also contains an asphalt field operations team that reports directly to the branch manager. **MAT-304** details the team's responsibilities

MATERIALS

Chapter

ASPHALT BRANCH

Subject

Liquid Asphalt Section

GENERAL RESPONSIBILITIES

The Liquid Asphalt Section is responsible for the testing, approval, and acceptance of all liquid asphalt materials, crack and joint sealers, and numerous miscellaneous materials used on department projects.

The primary duties and responsibilities of the Liquid Asphalt Section include, but are not limited to, the following:

- Ensuring that liquid asphalt material producers conform to applicable requirements of Kentucky Method **KM 64-444**, "KYTC Approved Supplier Certification (ASC) Program for Performance-Graded (PG) Asphalt Binders," or **KM 64-445**, "KYTC Approved Supplier Certification Program for Emulsified Asphalts (EASC)"

  The section tests PG binder and asphalt emission materials for qualification under the Approved Supplier Certification and the Emulsified Asphalt Supplier Certification programs, reviews the quality control plans for suppliers, performs inspections of the testing facilities and terminals, and tests quality control samples yearly.

- Ensuring that the producers of joint and miscellaneous materials conform to applicable specifications, practice appropriate quality control procedures, and verify certification of material during product manufacture

- Performing acceptance, certification, or informational testing on liquid asphalt, crack and joint sealers, and miscellaneous materials, and reporting results and recommended actions to appropriate parties

  The section receives and tests samples obtained at the project site in accordance with the department's *Materials Field Sampling and Testing Manual* (*Sampling Manual*) and evaluates liquid asphalt, crack

GENERAL RESPONSIBILITIES (CONT.)

and joint sealers, and miscellaneous materials in accordance with the appropriate portions of Division 800 of the department's *Standard Specifications for Road and Bridge Construction* (*Standard Specifications*). If a sample does not meet specification requirements, the material represented by that sample may or may not be subject to a price adjustment or removal from the project. Section personnel make recommendations to appropriate parties regarding the acceptability of, and pay factor for, such material.

The section routinely performs tests on materials that are the responsibility of other sections within the Division of Materials. Materials tested, evaluated, and accepted by the section are listed under "Materials Tested" below.

- Inspecting and approving source terminals, refineries, laboratories, and personnel and verifying quality control procedures for materials certification

  Before an asphalt terminal is allowed to ship material to department projects, the section inspects the facility for several items including, but not limited to, the following:

  - Storage and shipping tank capacity
  - Sampling valves
  - Annual certification of scales
  - Contamination of materials
  - Required records for shipping and testing
  - Laboratory facilities
  - Expertise of testing personnel

  Terminals desiring to certify their own products for immediate use shall be inspected and approved annually by the Liquid Asphalt Section. At the beginning of each construction season, terminals shall give the section a complete set of compliance test data and one sample of material for each product and grade produced. Section personnel shall evaluate the laboratory equipment, testing procedures, and testing records.

- Providing technical assistance and training to others within the department, industry, FHWA, and academia and to other specialized or professional personnel

GENERAL RESPONSIBILITIES (CONT.)

The technical assistance provided by the section may involve testing and approval of materials, use of these materials, investigations of failures, or specifications. Training usually involves testing crack seal, joint seal, or liquid asphalt–related materials and is provided to new employees or industry personnel.

- Meeting with others within the department, industry, FHWA, academia, and other specialized or professional personnel to discuss policies, manuals, methods, specifications, and equipment

  Section personnel solicit input, interpret requirements, explain revisions, or introduce new strategies.

- Maintaining AASHTO accreditation for all applicable tests

  The accreditation process involves several steps, including the following:

  - Establishing, implementing, and maintaining a quality system that complies with the requirements of AASHTO R 18, *Recommended Practice for Establishing and Implementing a Quality System for Construction Materials Testing Laboratories*
  - Receiving required on-site assessments and quality system evaluations as conducted by the AASHTO Materials Reference Library (AMRL)
  - Participating in all required AMRL proficiency sample programs
  - Providing qualified personnel who meet applicable criteria

- Evaluating and recommending action regarding new products

- Researching various products, materials, specifications, or methods

  On occasion, the Liquid Asphalt Section researches a certain product's performance or deficiency and recommends improvements or corrections to the product or changes in the methods of evaluation. The section also performs research to develop new specifications or test methods, or to justify changes in current specifications or test methods.

- Writing, reviewing, and recommending changes to policies, manuals, methods, and specifications

GENERAL RESPONSIBILITIES (CONT.)

The section provides necessary revisions to the liquid asphalt–related items in the *Sampling Manual, Kentucky Methods Manual,* and *Standard Specifications*.

- Reviewing proposed revisions to AASHTO and ASTM standards

  Section personnel provide recommendations regarding changes and acceptance of the standards.

- Maintaining the department's *List of Approved Materials* for all asphalt-related products

  Because of the various materials for which the section is responsible, the *List of Approved Materials* requires frequent and detailed updating.

MATERIALS TESTED

Asphalt-related materials tested, evaluated, and accepted by the Liquid Asphalt Section include, but are not limited to, the following:

Performance-graded (PG) asphalt binders (M320, T301, T313, T314, T315, T316, T44, T48, T240, R28, KM 64-440)	PG 58-28 PG 64-22 PG 64-28 PG 64-34 PG 70-22 PG 70-28 PG 76-22
Liquid asphalt materials (T44, T50, T55, T59, T72, T78, T79, T182, D5, D113, D402, D2042)	KP-4 KP-6
Emulsified asphalt materials (T50, T51, T53, T59)	AE-200 HFMS-2 HFRS-2 RS-1 RS-2 CRS-2 CRS-2P SS-1 SS-1h

MATERIALS TESTED (CONT.)

Note: The specification requirements and test methods for the products listed above are outlined in Section 806 of the department's *Standard Specifications,* a *Special Provision,* or a *Special Note* included in the project proposal. The primary uses for these products are found in Division 400 of the department's *Standard Specifications*.

The crack seal, joint seal, and miscellaneous materials tested, evaluated, and accepted by the Liquid Asphalt Section include, but are not limited to, the following items:

- Preformed, compression, Neoprene joint sealers (D412, D471, D573, D1149, D2240, D2628, KM 64-409, D64-410)
- Lubricant adhesives for preformed joint sealers
- Hot-poured, elastic joint sealers (D3405)
- Asphalt-mastic pipe sealers (T111, T229, D217, KM 64-415, KM 64-416)
- Flexible plastic gaskets (T47, T51, T53, T111, T229, D6, D71, D92, D113, D217, D297)
- Flexible butyl-rubber gaskets (T47, T51, T111, T229, C765, C766, C792, D36, D92)
- Fiberglass waterproofing membrane (one-step) (D146, E96)
- Modular expansion dams (D412, D471, D573, D1149, D2240, D2628, KM 64-409, D64-410)
- Pipe coatings (T44, T47, T48, T49, T53, T229, M190)
- Oil-asphalt joint fillers (T44, T47, T48, T49, T51, T53)
- Silicone rubber sealants (one component) (C719, D412, D792A, D793, D1149, D2240, KM 64-430)
- Silicone rubber sealants (two component) (D412, D792)
- Geotextile fabrics
- Traffic-loop encapsulants (D412)
- Asphalt removers
- Truck-bed release agents

MATERIALS TESTED (CONT.)

Note: The specification requirements and test methods for some of the products listed above are outlined in Sections 806, 807, 808, 835, and 843 of the department's *Standard Specifications,* a *Special Provision,* or a *Special Note* included in the project proposal.

MATERIALS

Chapter

ASPHALT BRANCH

Subject

Asphalt Mixtures Testing Section

RESPONSIBILITIES

The Asphalt Mixtures Testing Section is responsible for reviewing, testing, evaluating, and ensuring the quality of asphalt mixtures. The section also provides training and technical assistance as appropriate.

TESTING & EVALUATING CONTRACTOR ASPHALT MIXTURES

The Asphalt Mixtures Testing Section tests and evaluates asphalt mixtures as submitted by the contractor for review to ensure the quality of the asphalt mixtures proposed for use by the particular contractor.

If a mix design and department verification are required as described in Kentucky Method 64-421 (KM 64-421), *Establishing the Job-Mix Formula of Asphalt Mixtures by the Contractor*, the contractor shall submit the following items to the section for evaluation:

- Job-mix formula (JMF) in the appropriate electronic format
- Aggregate and asphalt binder samples
- Laboratory mix design or plant-produced mixture data
- Volumetric specimens and maximum specific gravity samples (a "one-point check")

The section performs tests on the above component materials and mixtures according to the appropriate methods—normally AASHTO M 323*, Superpave Volumetric Mix Design,* and AASHTO R 35*, Superpave Volumetric Design for Hot-Mix Asphalt (HMA*). In addition, the section usually completes a moisture-susceptibility test according to ASTM D 4867, *Effect of Moisture on Asphalt Concrete Paving Mixtures*.

A volumetric analysis completed with a Superpave Gyratory Compactor in conformance with AASHTO M 323 and AASHTO R 35 involves the actual manufacture of cylindrical specimens of asphalt mixture that

TESTING & EVALUATING CONTRACTOR ASPHALT MIXTURES (CONT.)

subsequently undergo unit-weight tests. To calculate the percentage of air voids and voids in the mineral aggregate (VMA), the analysis includes additional tests such as the theoretical maximum specific gravity analysis as described in AASHTO T 209, *Theoretical Maximum Specific Gravity and Density of Hot-Mix Asphalt Paving Mixtures.*

The moisture-susceptibility test involves subjecting a set of specimens to vacuum saturation and a freeze-thaw cycle and then comparing the retained strength of those specimens to an identical set that has not been vacuum-saturated or frozen. This tensile strength ratio (TSR) shall satisfy a minimum value to ensure that the potential for the mixture to "strip" in the presence of water during the life of the pavement is minimized. Liquid anti-stripping additives shall be used as necessary to increase the TSR of an asphalt mixture to an acceptable level.

The aforementioned tests constitute a laboratory mix design analysis of an asphalt mixture received by the Asphalt Mixtures Testing Section. Given the proper performance of each of these tests and collection of the appropriate data, the mixture is then ready for a mathematical analysis and comparison with the contractor's laboratory design as described in KM-443, *Method for Verifying a Contractor's Laboratory Mix Design*.

TESTING & EVALUATING EXPERIMENTAL ASPHALT MIXTURES

The section tests various experimental asphalt mixtures for informational or research purposes. On occasion, the section researches a certain mixture's performance or deficiency and recommends improvements or corrections to the mixture or changes in the methods of evaluation. The section also performs research to develop new specifications, test methods, or to justify changes in current specifications or test methods.

EVALUATING RUTTING SUSCEPTIBILITY & FATIGUE RESISTANCE

The section tests selected asphalt mixtures in the asphalt mixtures performance tester (AMPT) to evaluate potential rutting susceptibility and fatigue resistance.

DETERMINING ASPHALT BINDER CONTENT, GRADATION, & RECOVERING ASPHALT BINDER

The section tests asphalt mixture samples to determine the asphalt binder content and gradation or to recover the asphalt binder according to the following:

- For asphalt binder content, the section uses one of the following:
  - KM 64-405, *Extraction of Binder from Asphalt Paving Mixtures*
  - KM 64-437*, Determination of Asphalt Binder Content of Asphalt Mixtures Using the Nuclear Asphalt Content Gauge*, or
  - AASHTO T 308, *Determining the Asphalt Binder Content of Hot-Mix Asphalt (HMA) by the Ignition Method*
- For gradation, the section uses one of the following:
  - KM 64-433, *Wet-Sieve Analysis of Aggregates Used in Asphalt Mixtures*
  - KM 64-620, *Wet Sieve Analysis of Fine and Coarse Aggregate*
- For recovering asphalt binder, the section uses:
  - ASTM D 5404, Recovery of Asphalt from Solution Using the Rotary Evaporator

TESTING PAVEMENT CORES

The section tests cores extracted from existing pavements and, in most cases, tests the cores to determine density for informational purposes according to AASHTO T 166, *Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens*. Other tests on cores may include the following:

- Maximum specific gravity determinations on the mixture(s) comprising the cores according to AASHTO T 209
- Asphalt binder content determinations according to KM 64-405
- Extracted-gradation determinations according to KM 64-433 or KM 64-620
- Recovery of the asphalt binder in the core according to ASTM D 5404

MAINTAINING AASHTO ACCREDITATION

The section maintains AASHTO accreditation for all applicable tests for asphalt mixtures. The accreditation process involves the following steps:

- Establishing, implementing, and maintaining a quality system that complies with the requirements of AASHTO R 18
- Receiving required on-site assessments and quality system evaluations as conducted by AMRL
- Participating in all required AMRL proficiency sample programs
- Providing qualified personnel who meet the applicable criteria

EVALUATING & REVISING ASPHALT-RELATED POLICIES, STANDARDS, METHODS, ETC.

Section personnel meet with others within the department, industry, FHWA, academia, and other specialized/professional personnel to discuss and evaluate policies, manuals, methods, specifications, equipment, and research activities. Section personnel solicit input, interpret requirements, explain revisions, or introduce new strategies regarding these items.

Section personnel write, review, and recommend changes to policies and procedures, manuals, methods, and specifications concerning the testing of asphalt mixtures and revise asphalt-mixture-related items in the *List of Approved Materials*, *Kentucky Methods*, and *Standard Specifications* as necessary.

The section reviews proposed revisions to asphalt-mixture-related AASHTO and ASTM standards. Section personnel provide recommendations regarding changes and acceptance of the standards.

CREATING & DISTRIBUTING MIXPACK SPREADSHEET

The section generates "Asphalt-Mixture-Design Results" forms, or "MixPack", spreadsheets (see KM-421) for distribution to the appropriate department and industry personnel following these steps:

- The section completes a mathematical analysis of the mixture properties in the mix design process. (AASHTO R 35, ASTM D 4867,

CREATING & DISTRIBUTING MIXPACK SPREADSHEET (CONT.)

and all other related methods contain instructions for the necessary calculations.) The section then compares the mixture to the contractor's design to ensure compliance with the applicable portions of KM 64-443. If KM 64-443 is satisfied, verification of the contractor's design is successful and complete, and the mixture is considered acceptable for use.

- The section generates "MixPack" spreadsheet detailing the mixture's acceptability or unacceptability. This computer spreadsheet contains the following information:

  - "Design Data" sheet indicating:

    - Project information,
    - Aggregate sources and sizes,
    - Asphalt binder source and grade,
    - Mixture gradation,
    - Calculation of all required volumetric properties,
    - Random sampling tonnages for each sublot,
    - Required mixture criteria,
    - Summary of the mixture property data, and
    - Applicable comments

  - "Polish-Resistance Data" sheet indicating the polish-resistant properties of the aggregates and their gradations
  - "Recycle Data" sheet containing the properties and quantities of the recycled materials in the mixture
  - "Project Items" sheet indicating the appropriate project, line item(s), and corresponding quantity and units for the item(s)
  - "One-Point Check" sheet containing results of volumetric specimens and maximum specific gravity samples produced by the contractor and tested by the department
  - "Graphs" sheet containing mixture property curves at different asphalt binder contents for the critical properties
  - "0.45 Power Chart" sheet indicating mixture gradation as compared to the control points for that nominal-maximum aggregate size
  - "TSR" sheet containing detailed results from the moisture-susceptibility analysis

CREATING & DISTRIBUTING MIXPACK SPREADSHEET (CONT.)

The section distributes this "MixPack" report via electronic mail to the Superpave Mix Design Technologist (SMDT) who submitted the contractor's laboratory design, the appropriate district materials engineer, and the appropriate field representative from the Asphalt Field Operations team of the Asphalt Branch. Section personnel maintain a detailed record of the results from all tests performed during the analysis of the mixture.

In addition to developing and distributing the "MixPack" program for department and contractor personnel to use in calculating and recording the results of laboratory mix design testing, the section maintains and revises this spreadsheet to ensure that the latest version of "MixPack" functions properly, correctly reflects the current specifications, and is available on the Division of Materials' website at:

www.transportation.ky.gov/materials/Pages/default.aspx

The section further ensures that the "MixPack" spreadsheet is compatible with SiteManager Materials. Section personnel upload completed "MixPack" reports into SiteManager Materials for database storage and future queries.

LABORATORY INSPECTIONS, TECHNICAL ASSISTANCE, & TRAINING

To satisfy federal requirements regarding qualified laboratories, the section inspects the district materials facilities for compliance with the division's in-house accreditation procedures. This inspection includes calibrating and verifying all applicable testing equipment, evaluating the district's quality system documentation, and evaluating the district's documentation regarding the inspection of the contractor laboratories to ensure compliance with accreditation procedures.

The section provides technical assistance and training to others within the department, industry, FHWA, and academia, and to other specialized or professional personnel. This assistance may concern the testing and approval of asphalt mixtures, investigations of failures, or specifications. Training normally concerns the testing of asphalt mixtures and is provided to new employees and to department or industry personnel on occasion.

LABORATORY INSPECTIONS, TECHNICAL ASSISTANCE, & TRAINING (CONT.)

The section participates in the Superpave Plant Technologist (SPT) and SMDT personnel qualification courses conducted in partnership with the department, Plantmix Asphalt Industry of Kentucky (PAIKY), and Kentucky Transportation Center (KTC). Section personnel develop course materials, provide classroom instruction, and serve as laboratory-skills monitors for these courses.

ANNUAL COOPERATIVE TESTING PROGRAM

The section administers the annual cooperative testing program involving the district, contractor, and private laboratories that perform asphalt-mixture design, acceptance, or verification testing for department projects.

This program offers the opportunity for laboratories to compare their equipment and practices with those of other laboratories, which helps the section evaluate and verify mixtures. This program also assists in identifying malfunctioning equipment or systems.

MATERIALS

Chapter

ASPHALT BRANCH

Subject

Asphalt Field Operations Team

RESPONSIBILITIES

The Asphalt Field Operations Team provides technical assistance, guidance, and training to others within the Department of Highways, industry, FHWA, academia, and to other specialized or professional personnel.

This assistance may concern the operation and design of asphalt-mixing plants, process-control/acceptance/verification testing of asphalt mixtures, adjustment of mixture ingredients, investigations of mixture or pavement failures, or specifications. Personnel are responsible for explaining and transferring new technology, procedures, and policies to department and industry personnel. The team also participates in the SPT and SMDT personnel qualification courses conducted in partnership with the department, PAIKY, and KTC. Team personnel develop course materials, provide classroom instruction, and serve as laboratory skills monitors for these courses.

The team advises and assists in investigating concerns with, or failures of, asphalt mixtures at the mixing plant, paving site, or constructed pavement. Personnel shall provide recommendations for corrective actions or adjustments.

INSPECTING & APPROVING ASPHALT-MIXING PLANTS

The team inspects and approves asphalt-mixing plants prior to initial use on department projects

The contractor submits the *Contractor's Master Certification of Asphalt Concrete Mixing Plant and Related Equipment* form (**Exhibit 9006**) for initial approval. Annually thereafter, the contractor submits the *Annual Certification for Previously Approved Asphalt Mixing Plant and Related Equipment* form (**Exhibit 9002**) to the district Materials Section Supervisor (DMSS). The contractor also gives the DMSS a copy of all necessary batching and truck scale certifications.

INSPECTING & APPROVING ASPHALT-MIXING PLANTS (CONT.)

Team personnel, in conjunction with the DMSS, grant an initial plant approval, inspect the plant annually for specification compliance, and ensure all deficiencies are corrected. Any major deficiencies shall be cause for disapproval of the asphalt-mixing plant on department projects until necessary corrections are completed.

For initial approval of an asphalt-mixing plant, the team issues the TC 64-416 form, *Annual Asphalt Mixing Plant Inspection* (**Exhibit 9001**), after the plant has been inspected and approved. The team gives the certification and approval forms to the affected DMSS(s) and contractor. The contractor posts the approval form at the asphalt-mixing plant. The team notifies the Division of Purchases of the initial approval for the asphalt-mixing plant.

For the annual approval of the plant, the DMSS issues the TC 64-416A form, *Asphalt Mixing Plant Acceptance* (**Exhibit 9003**), based on the contractor's *Annual Certification for Previously Approved Asphalt Mixing Plants and Related Equipment* form (**Exhibit 9002**).

Team personnel also maintain a detailed record of all asphalt-mixing plants approved for department use on the *List of Approved Materials.*

The team observes and monitors operations and process-control/acceptance/verification testing and inspection at the asphalt-mixing plant, asphalt paving site, and source of ingredient materials

Team personnel ensure that mixture production, daily plant inspection, sampling, and process-control/acceptance/verification testing conform to applicable specifications. The SiteManager Materials program provides sampling frequencies for each material. Testing procedures are located in the applicable Kentucky Method or AASHTO standard. Personnel report any deficiencies to the DMSS and ensure that corrections are completed promptly.

For plant inspection and process-control/acceptance/verification testing, the team ensures that applicable operations are performed as described in the following standards:

- AASHTO R 35 *Standard Practice for Superpave Volumetric Design for Hot Mix Asphalt (HMA)* AASHTO T 2, *Sampling of Aggregates*
- AASHTO T 27, *Sieve Analysis of Fine and Coarse Aggregates*

INSPECTING & APPROVING ASPHALT-MIXING PLANTS (CONT.)

- AASHTO T 308, *Standard Method of Test for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method*
- KM 64-401, *Calibrating and Checking Cold-Feed Flow on Asphalt Mixing Plants*
- KM 64-404, *Sampling Liquid Asphalt Materials*
- KM 64-405*, Extraction of Binder from Asphalt Paving Mixtures*
- KM 64-407*, Sieve Analysis of Aggregate From Asphalt Mixing Plants*
- KM 64-421*, Establishing the Job-Mix Formula of Asphalt Mixtures by the Contractor*
- KM 64-425, *Sampling Asphalt Mixtures*
- KM 64-426, *Requirements for Process-Control Testing and Inspection of Asphalt Mixtures by the Contractor*
- KM 64-433, *Wet-Sieve Analysis of Aggregates Used in Asphalt Mixtures*
- KM 64-434, *Determination of Moisture Content in Asphalt Mixtures (Rapid Field Test)*
- KM 64-435*, Acceptance of Asphalt Mixtures by Mixture Property Analysis*
- KM 64-436, *Asphalt Binder Content Determination of Asphalt Mixtures by Plant Recordation*
- KM 64-437, *Determination of Asphalt Binder Content of Asphalt Mixtures Using the Nuclear Asphalt Content Gauge*
- KM 64-438, *Asphalt Binder Content Determination of Asphalt Mixtures Based on the Maximum Specific Gravity*
- KM 64-442, *Coring and Determining Percent of Solid Density of In-Place, Compacted, Asphalt Mixture Courses*
- KM 64-620, *Wet Sieve Analysis of Fine and Coarse Aggregate*

EVALUATING MIXTURES & RECOMMENDING ADJUSTMENTS

Team personnel travel to the asphalt-mixing plants producing for major department projects to evaluate the mixtures' properties. The team ensures that the production and properties of the asphalt mixture conform to applicable specifications. When necessary and appropriate, team personnel recommend or require corrective adjustments to the mixture's components.

EVALUATING & REVISING ASPHALT-RELATED POLICIES, STANDARDS, METHODS, ETC.

The team meets with others within the department, industry, FHWA, academia, and with other specialized or professional personnel to discuss and evaluate policies, manuals, methods, specifications, equipment, and research activities. Team personnel solicit input, interpret requirements, explain revisions, or introduce new strategies regarding these items.

The team writes, reviews, and recommends changes to policies and procedures, manuals, methods, and specifications concerning the operation of asphalt-mixing plants, production of asphalt mixtures, and process-control/acceptance/verification testing.

The team makes necessary revisions to the asphalt-mixture-related items in the *Materials Field Sampling and Testing Manual*, *List of Approved Materials*, *Kentucky Methods*, and *Standard Specifications for Road and Bridge Construction*. In conjunction with the Division of Maintenance and Division of Purchases, the team reviews and recommends revisions to various price contracts for hot- and cold-mix asphalt materials.

The team also reviews proposed revisions to asphalt-mixture-related AASHTO and ASTM standards and provides recommendations regarding changes and acceptance of the standards.

ASPHALT MIXTURES ACCEPTANCE WORKBOOK

The team maintains the *Asphalt Mixtures Acceptance Workbook* (AMAW) for department and contractor personnel use in calculating and recording the results of process-control/acceptance/verification testing according to the latest specifications.

The team revises this computer spreadsheet as necessary and ensures that the latest version of the AMAW functions properly, correctly reflects current specifications, and is available on the Division of Materials' website at:

http://transportation.ky.gov/Materials/Pages/SiteManager.aspx

The team further ensures that the AMAW spreadsheet is compatible with SiteManager Materials. When requested, personnel "upload" completed AMAW spreadsheets into SiteManager Materials for database storage and future queries.

MATERIALS

Chapter

STRUCTURAL MATERIALS BRANCH

Subject

Overview

OVERVIEW The Structural Materials Branch testing, sampling, and inspection of structure-related materials used on Department of Highways' projects.

The Structural Materials Branch consists of three sections:

- Aggregate Section
- Chemical Section
- Concrete and Physical Properties Section

MATERIALS

Chapter

STRUCTURAL MATERIALS BRANCH

Subject

Aggregate Section

GENERAL RESPONSIBILITIES

The Aggregate Section is responsible for general supervision and assistance in sampling, testing, and inspecting aggregate materials used by the Department of Highways. The section consists of two units:

- Laboratory Testing unit, which performs all tests required for aggregate approval except chemical tests (Chemical Section), plasticity index (Soil Survey and Test Section), and mortar-strength ratio (Concrete and Cement Section)
- Field Control unit, which obtains samples, performs inspections for approval of sources, conducts periodic inspections of aggregates and operating procedures at sources, provides assistance and guidance to district Materials Section Supervisors (DMSSs) in approval of aggregates, and monitors the performance of polish-resistant pavements

  Note: The DMSSs are directly responsible for approval of aggregates used in their districts.

The section provides assistance to the Kentucky Crushed Stone Association to teach and proctor exams for the Kentucky Aggregate Technician Program, which certifies Kentucky's Qualified Aggregate Technicians.

AGGREGATE APPROVAL PROCEDURES

The procedures for aggregate approval include the following:

- Initial inspection of sources to determine their capability to produce aggregates meeting applicable requirements
- Periodic reinspection of approved sources
- Acceptance tests on finished-product aggregates at designated frequencies

AGGREGATE APPROVAL PROCEDURES (CONT.)

- Review of the quality control program submitted to the division by the source
- Verification that the source has provided a Qualified Aggregate Technician (QAT) and adequate testing equipment to carry out the quality control program

APPROVED SOURCES

Approved sources shall perform their own finished product quality control testing. District Materials personnel and the field control unit shall conduct inspections to determine compliance with quality control requirements. Sources not in compliance shall be notified to correct the situation. Failure to maintain an adequate quality control program shall result in removal from the *List of Approved Materials* (*LAM*).

Sources that have not been subjected to initial inspection and approval (unapproved sources) may furnish aggregates; however, each quantity proposed for use may be required to be stockpiled, sampled, tested, and approved for special uses only. These uses include concrete pipe, prestressed concrete, skid-resistant mixes, and other uses deemed to be in the best interest of the Department of Highways.

AGGREGATE SOURCES APPROVAL

Approved sources are subject to inspection and testing as necessary to maintain their approved status. Approved sources shall:

- Be adequately equipped
- Have the required QAT
- Have designated a definite site for production of aggregates
- Have provided the Division of Materials with a quality control program for review and acceptance

Inspection and testing may include:

- Inspecting facilities for crushing, grading, or otherwise processing the aggregates
- Testing various properties of the parent material and classifying them according to their location, quantity, and observed properties
- Performing tests on finished-product aggregates

AGGREGATE SOURCES APPROVAL (CONT.)

Following initial approval, source approvals are updated when:

- Additional parent materials become available
- Previously inspected materials appear to change in properties
- The finished product becomes questionable

Incorporation of untested materials, failing materials, or waste specifically rejected for incorporation into the finished product shall be a basis for rejection of the product and removal of the source from the *LAM.* This list is updated at least once annually on the basis of finished-product test results.

Acceptance testing is the governing basis for approval of shipments of aggregates used by the Department of Highways.

LEDGEROCK SOURCES APPROVAL

Sources of aggregates available in the form of ledgerock (limestone, granite, and sandstone) are evaluated for approval only after the proposed quarry face has been freshly shot and sufficiently prepared to allow a reasonable evaluation of the quantity and uniformity of the deposit. The DMSS or aggregate producer shall notify the Division of Materials when the site is ready for sampling. At such time, a representative from the Field Control Unit shall inspect the proposed quarry face and, if the face is safe and acceptable, separate it into ledges as dictated by changes in lithology (color, texture, grain size, etc.), and assign these ledges to the appropriate benches.

At the time of sampling, the Field Control Unit representative shall measure~~s~~ the thickness of each ledge, shale seam, etc., and record the measurements along with a description of each ledge and production bench. From this information the *Quarry Report* (**Exhibit 9007**), covering each source shall be prepared and made available to the DMSS and aggregate producer.

The report lists, in order from top to bottom, the stripping, shale seams, ledges, benches, etc. as they appear in the quarry face. The report shall include test results, ledge thickness, ledge descriptions, and other pertinent information.

LEDGEROCK SOURCES APPROVAL (CONT.)

A hand sample of approximately 3 – 9 pounds shall be obtained from each ledge for petrographic examination and evaluation for expansive properties. The sample shall come from a fresh, unweathered section of the face in such a manner that the entire ledge is represented. Samples shall not be obtained on or adjacent to a blast hole. Depending upon the ledge thickness or description, it may be necessary to obtain more than one hand sample to represent a ledge.

In some instances—for example, nonaccessible ledges, out-of-state quarries, and job-site quarries—it may be beneficial to the department to test expansive properties on finished-product samples for approval. In such cases, hand samples shall not be obtained, and ledge descriptions and exact footages may not be available for the quarry log.

When any ledge is considered suspect for expansion based on the petrographic examination and exceeds the percentage of bench footage allowed, **the bench is restricted from all concrete uses pending further testing**. A concrete beam expansion test shall be performed on material supplied from the questionable bench. Approval for concrete is based upon test results.

If the beam fails to meet specifications, the bench is restricted from any concrete use on state projects. The producer may propose changing bench elevations or may submit a production proposal for dilution or selective quarrying of the suspect bench. A proposal for dilution is subject to approval of the Aggregate Section on the basis of reactive properties and footages of other ledges contained in the production bench.

After the proposed quarry face and benches have been evaluated, finished-product samples representing each individual bench shall be obtained. When possible, various sizes of aggregates for testing are used to get a good representation of the benches and method of production. The test results represent these designated benches and are reported on the quarry log.

The department may require that testing be performed by private laboratories, at the aggregate producer's expense, before additional testing is performed by the department.

LEDGEROCK SOURCES APPROVAL (CONT.)

The quarry report provides guidance by depicting the location and properties of the various ledges or benches. Its purpose is to serve as a reference for the DMSS, the aggregate producer, and the Aggregate Section when inspecting for necessary stripping or waste materials and recovery of the ledgerock as required to ensure a satisfactory finished product. The department's inspectors also use the report in monitoring areas from which aggregates are produced.

The DMSS periodically inspects sources in the district to determine if the aggregate is processed from acceptable ledges and informs the Aggregate Section of any apparent change in properties of ledges. In addition, a field control unit representative periodically inspects all approved sources, at which time ledges are measured and examined. Any that appear to vary significantly in properties from the previous sampling shall be resampled and tested. An updated quarry report shall be issued when changes are noted during an inspection.

TESTING SOURCE SAMPLES

The Division of Materials tests samples for source approval in accordance with testing methods indicated for types of ledgerock in the following chart:

TABLE 1

Property	TYPES OF LEDGEROCK		
	Limestone	Granite	Sandstone
Specific Gravity & Absorption	X	X	X
Soundness	X	X	X
Lightweight Particles	X	N/A	X
Wear	X	X	X
Pore Index	X	X	X
Freeze Thaw[1]	X	N/A	N/A
Chemical Analysis	X	X	X
Concrete Beam Expansion Test	X	N/A	N/A
Deleterious Materials Visual Inspection[2]	X	N/A	N/A
Expansive Properties Petrographic Exam & Testing	X	N/A	N/A

[1] **Applicable for limestone to be used in JPC**

[2] A visual inspection and/or test to detect the presence of foreign materials that may cause the parent material to be nonfeasible as a source

TESTING SOURCE SAMPLES (CONT.)

The following discusses approval of source types for which ledgerock sampling described herein does not apply. This includes stream or glacial deposits of sand and gravel, conglomerate deposits, slag, and lightweight aggregate sources. Sources of these types are initially approved on the basis of inspection and tests as listed below. Thereafter, the basis of continued approval of these sources is periodic inspection of facilities and testing of materials, with primary emphasis on tests from the finished product. The frequency of updating approval of these sources shall be no less than once annually. Samples shall be tested at the Division of Materials for the properties in accordance with the test methods listed in the following table.

TABLE 2

Property	TYPE OF SOURCE			
	Sand	Gravel	Slag or Lightweight Aggregate	Conglomerate Coarse Aggregate
Sieve Analysis	X	Not Performed	X	Not Performed
Percent Crushed	Not Performed	X	Not Performed	X
Specific Gravity & Absorption	X	X	X	X
Pore Index	Not Performed	X	Not Performed	X
Freeze – Thaw	Not Performed	X	X	X
Soundness	X	X	X	X
Lightweight Particles	Not Performed	X	Not Performed	X
Unit Weight	Not Performed	Not Performed	X	Not Performed
Wear	Not Performed	X	X	X
Coal & Lignite	X	X	Not Performed	Not Performed
Sand Equivalent	X	Not Performed	Not Performed	Not Performed
Chemical Analysis	X	X	X	X
Deleterious Materials*	X	X	X	X

*A visual examination and/or test of the parent material or finished aggregate for the presence of excessive quantities of foreign materials that would cause the aggregate to be unacceptable

APPROVAL OF POLISH-RESISTANT AGGREGATE SOURCES

The Aggregate Section maintains a list of approved polish-resistant aggregate sources that are shown on the *Polish-Resistant Aggregate Source List* and the *LAM.* Based on performance history or chemical composition, sources are categorized as Class A or Class B. Unlisted sources may apply for polish-resistant evaluation when specific project criteria regarding average daily traffic, travel speed, and safety considerations are met. These requests are processed by change order through the project engineer.

Aggregates supplied for polish-resistant applications shall meet the applicable requirements for coarse and fine aggregates in the *Standard Specifications* and the *Polish-Resistant Aggregate Source List and Guidelines* located in the *LAM*.

Sources on this list have demonstrated satisfactory polish-resistant qualities or satisfactory performance as skid-resistant aggregates for polish-resistant surface mixes. In addition to meeting the list requirements, sampling and testing on a project basis are required. Continued acceptance of individual sources is based on satisfactory field performance.

The Aggregate Section monitors polish-resistant pavements to evaluate and report on aggregate performance and updates the *LAM* as changes occur.

APPROVAL OF FREEZE-THAW RESISTANT AGGREGATE SOURCES

The Aggregate Section maintains the *Concrete Aggregate Restriction List* located in the *LAM*. Sources are listed in ascending numerical order of their producer number. The list is also sub-divided by aggregate type. Unlisted sources may request testing for concrete approval when the subject aggregate is ready to be sampled. Initial approval time could take up to a year between the time the sample is collected and the time test reports are completed.

Aggregate supplied for general concrete uses and for freeze-thaw resistant concrete uses shall meet applicable requirements in the *Standard Specifications* for coarse and fine aggregates.

AGGREGATE ACCEPTANCE, TESTING, & APPROVAL

Aggregates delivered to construction projects are approved on the basis of acceptance samples and tests at frequencies designated on the sampling checklist.

For maintenance deliveries, the DMSS determines the frequencies for obtaining acceptance samples and tests.

Acceptance samples shall be obtained as near to the point of the aggregate being incorporated into the work as is feasible This is to preclude, insofar as practicable, the possible inclusion of unsatisfactory aggregates brought about by contamination, mishandling, segregation, etc. Acceptance samples for properties such as gradation, minus 200 content, and sand equivalent (subject to significant change after the aggregate is initially produced) shall not be obtained until after the aggregate is delivered to the point of use, unless they are used directly from the source without stockpiling. Compacted aggregate base sampling shall take place from the roadway behind the spreader but before compaction.

Acceptance samples to determine properties not subject to appreciable change shall, when deemed necessary, be obtained from finished-product aggregates at the source.

Acceptance testing for gradation; minus 200 wash; specific gravity; absorption; sand equivalent; shale; flat/elongated, uncompacted voids; and percent crushed is generally performed or monitored by the DMSSs (or project engineer personnel for the DMSSs). Acceptance testing for other specified aggregate properties is generally performed by the section's laboratory testing unit and is supplemented by visual inspection and testing by the DMSSs at sources and on the project.

FAILING AGGREGATE ACCEPTANCE TESTS

If materials fail an acceptance test, the acceptability of the materials is based on the average test result of all valid samples representing the stockpile or production lot, except when statistical acceptance procedures apply. When tests are performed during use of the material, failures may provide a basis for discontinuing use of the aggregates to appropriately correct the problem or for evaluating the material incorporated in the work for possible removal, corrective work, or acceptance at a reduced price.

FAILING AGGREGATE ACCEPTANCE TESTS (CONT.)

When stockpiled aggregates require approval on the basis of acceptance testing, three or more tests shall be performed, as necessary, to determine the characteristics of the stockpile if failures are encountered. A stockpile showing evidence of excessive variability in properties due to segregation or other cause (to the extent that some samples meet requirements and some do not) is reason to reject a portion or all of the stockpile. Where feasible, a stockpile shall require thorough mixing or blending of the materials and retesting for approval.

STOCKPILING AGGREGATES

When material is to be stockpiled at job sites, rather than at the source of supply, the producer shall notify the contractor, the DMSS, and the section supervisor of the location of the aggregate stockpile. The DMSS and the section supervisor shall inspect the location and inform the producer or contractor of department policy for stockpiling and handling aggregates.

The area in which stockpiles shall be placed shall be thoroughly cleaned of all foreign material and shall be firm and reasonably level. Stockpiles shall be built in layers not to exceed three feet in height. Each layer shall be completed before beginning the next layer.

Aggregates shall not be removed from stockpiles within one foot of the ground until final cleanup of the work, and then only if the aggregates are free from contamination from foreign matter and other aggregates.

Source of supply stockpiles, from which aggregates are used directly without further stockpiling, shall be built in accordance with designated standard methods. A sign shall be placed on stockpiles used by the Department of Highways, stating the size of the material and that the material is made to Kentucky specifications.

MATERIALS

Chapter

STRUCTURAL MATERIALS BRANCH

Subject

Chemical Section

FIELD RESPONSIBILITIES

The Chemical Section provides field technical assistance on issues related to pavement markings, sign sheeting, and structural steel coatings. The section also provides instruction for the Qualified Pavement Markings Technician training course.

The Chemical Section:

- Qualifies striping vehicles used to apply longitudinal lane markings to roadway surfaces

  Note: Qualification and subsequent follow-up inspections of these vehicles are performed in accordance with Kentucky Method 267 (KM 64-267).

- Qualifies mobile retroreflectivity vehicles in accordance with requirements set forth in the district-wide striping contracts

- Prepares and instructs annual course offerings for Qualified Pavement Markings Technician training

- Provides technical assistance to district personnel on issues related to installation and inspection of pavement-marking and sign-sheeting materials

  Note: This technical assistance also includes resolution of disputes regarding acceptance of installed pavement markings in accordance with Kentucky Method 264 (KM 64-202).

- Provides technical assistance to district personnel on issues related to installation, inspection, and failures of structural steel coatings

MATERIALS TESTED OR ACCEPTED

The Chemical Section is responsible for chemical testing and approval of materials used by the Department of Highways. The materials tested or accepted are:

- Aggregate, fine and coarse (chemical analysis)
- Bridge coatings
- Cement (chemical analysis)
- Chlorides, sodium and calcium
- Delineators
- Epoxy resins
- Fertilizers
- Flexible delineator posts
- Fly ash (chemical analysis)
- Glass beads
- Herbicides
- High-strength nuts and bolts (chemical analysis)
- Latex
- Lime—quicklime and hydrated lime
- Pavement markers, raised
- Pavement marking tapes
- Sign sheeting, reflective
- Thermoplastic pavement markings
- Traffic paint
- Variable message signs
- Water

AGGREGATE, FINE & COARSE (CHEMICAL ANALYSIS)

The Aggregate Section is responsible for the control and acceptance of all aggregates. Samples submitted to the Chemical Section receive a complete or partial chemical analysis for various chemical elements. The Chemical Section also performs insoluble residue testing on polish-resistant coarse aggregates and aggregates extracted from bituminous concrete. All results are forwarded to the Aggregate Section for necessary action.

BRIDGE COATINGS

Bridge coatings shall have approved-list status before being considered for use on a project. A certification shall accompany each batch shipped to the project. Sampling and testing shall be performed according to the *Materials Field Sampling and Testing Manual*.

CEMENT (CHEMICAL ANALYSIS)

The Concrete and Physical Properties Section is responsible for control of cement. Samples submitted to the Chemical Section are analyzed for chemical properties according to the American Society for Testing and Materials (ASTM). Results are forwarded to the Concrete and Physical Properties Section for necessary action.

CHLORIDES, SODIUM & CALCIUM

Sodium chloride–PCT purchases used as a pavement de-icer are accepted by certificate of compliance from the producer and random analysis of chemical properties outlined in the Invitation for Bid.

Calcium chloride solid (Type S) or liquid (Type L) used with sodium chloride for snow and ice removal is accepted by certificate of compliance from the producer. Sampling is in accordance with the *Materials Field Sampling and Testing Manual*.

DELINEATORS

Barrier wall and guardrail delineators shall have approved-list status before being considered for use on a project. Certification shall accompany each lot shipped to the project.

EPOXY RESINS

These materials (used for dowel installation, bonding of plastic concrete to hardened concrete, binder in mortar, and sealing of concrete) shall have approved-list status before being considered for use on a project. Certification shall accompany each lot shipped to the project.

FERTILIZERS

Fertilizers complying with the Kentucky Fertilizer Law shall be accepted on certification. If a fertilizer does not comply with the Kentucky Fertilizer Law, it is sampled according to the *Materials Field Sampling and Testing Manual* and submitted to the Chemical Section for testing and approval.

FLEXIBLE DELINEATOR POSTS

Flexible delineator posts shall have approved-list status before being considered for use on a project. Certification shall accompany each lot shipped to the project.

FLY ASH (CHEMICAL ANALYSIS)

The Concrete and Physical Properties Section is responsible for control of fly ash. Samples submitted to the Chemical Section shall receive applicable chemical analyses as detailed in ASTM. Sampling procedures are outlined in the *Materials Field Sampling and Testing Manual.* Results are forwarded to the Concrete and Physical Properties Section for necessary action.

GLASS BEADS

Glass beads for reflective pavement markings are accepted based on the evaluation of retroreflectivity of the installed pavement marking in accordance with KM 64-201, KM 64-202, or KM 64-203 as appropriate.

HERBICIDES

Although the Department of Highways reserves the right to sample and test herbicides purchased under price contract, they are sampled and submitted for testing only when requested by the district Project Delivery and Preservation Branch Manager. Material acceptance is based on manufacturer certification.

HIGH-STRENGTH NUTS & BOLTS

The Concrete and Physical Properties Section is responsible for the control of high-strength nuts and bolts. Samples submitted to the Chemical Section receive applicable chemical analyses. Sampling procedures are outlined in the *Materials Field Sampling and Testing Manual*. Results are forwarded to the Concrete and Physical Properties Section for necessary action.

LATEX

Acceptance of latex is based upon the manufacturer having approved-list status. Certification shall accompany each lot shipped to the project.

LIME—QUICKLIME & HYDRATED LIME

Lime used for soil stabilization shall be supplied from a mill with approved-list status. Sampling and documentation submission are according to the *Materials Field Sampling and Testing Manual*.

PAVEMENT MARKERS, RAISED

Markers shall have approved-list status prior to use on a project. Instructions regarding inspection, sampling, and documentation are provided in the *Materials Field Sampling and Testing Manual*.

PAVEMENT MARKING TAPES

Instructions regarding inspection, sampling, and documentation for permanent and temporary tapes are provided in the *Materials Field Sampling and Testing Manual*.

Permanent striping tape shall meet the requirements of applicable specifications. No sample is required. Acceptance is based on a review of test data, a certification statement, and initial reflectance evaluation.

Temporary striping tape shall have approved-list status prior to use on a project. No sample is required.

SIGN SHEETING, REFLECTIVE

Signs are typically fabricated in commercial sign shops for construction projects. The reflective sheeting used shall have approved-list status prior to acceptance. Procedures for inspection and acceptance are outlined in the *Materials Field Sampling and Testing Manual*.

THERMOPLASTIC PAVEMENT MARKINGS

The material shall be tested and approved prior to use on a project. Project acceptance procedures are outlined in the *Materials Field Sampling and Testing Manual*.

TRAFFIC PAINT

Both permanent paint and temporary paint are sampled according to the *Materials Field Sampling and Testing Manual.* Chemical and physical testing of the paint is performed prior to acceptance for payment on a project.

VARIABLE MESSAGE SIGNS

These signs shall have approved-list status prior to use on a project. Sampling procedures are outlined in the *Materials Field Sampling and Testing Manual*.

WATER

Water shall be sampled and tested for chemical properties when proposed for use in Portland Cement Concrete. Sampling procedures are outlined in the *Materials Field Sampling and Testing Manual*.

MATERIALS

Section

CONCRETE & PHYSICAL PROPERTIES SECTION

Subject

Concrete

FIELD RESPONSIBILITIES

The Concrete Field Unit's primary responsibilities regarding the use of concrete include, but are not limited to, the following:

- Maintaining a concrete field unit that provides assistance to district and contractor personnel in the design and quality control of concrete
- Performing initial and in-depth inspections while assisting the DMSS with normal inspections involving ready-mix concrete producers, precast concrete producers, prestressed concrete producers, and manufacturers of concrete pipe
- Reviewing and monitoring inspection and acceptance programs of qualified precast concrete producers, prestressed concrete producers, and manufacturers of concrete pipe that produce products for state projects
- Approving and maintaining the *List of Approved Materials* (*LAM*) product listings for:
  - Qualified Concrete Pipe Producers
  - Qualified Precast Concrete Producers
  - Qualified Prestressed Concrete Producers
  - Qualified Concrete Producers
- Preparing and updating the division's *Precast/Prestressed Concrete Manual*
- Preparing and updating *Kentucky Methods* related to Portland cement concrete sampling, testing, equipment calibration, and test results evaluation
- Conducting training sessions for concrete-related qualifications

FIELD RESPONSIBILITIES (CONT.)

- Conducting laboratory trial concrete mixes for the evaluation of project materials when deemed necessary
- Reviewing and making recommendations for proposed specification changes for Portland cement, concrete, and related concrete materials

CONCRETE FIELD CONTROL UNIT

To most effectively provide assistance and training, and to determine those areas where their assistance is most needed, it is essential that personnel assigned to the concrete field unit maintain close communication with district personnel. Most duties of this unit involve concrete production and inspection activities for which project and district personnel are directly responsible; thus, the concrete field unit shall provide assistance or work-related training as needed by the responsible personnel. Specific duties of concrete field unit personnel are to:

- Provide assistance and training to district and contractor personnel establishing mix designs and other inspection and concrete control activities at plants
- Provide assistance and training in the calibration of continuous mixing concrete units (concrete mobiles)
- Monitor plant operations, as necessary and possible, to ensure that plants conform to plant equipment requirements and provide the specified concrete mixture
- Approve or disapprove mix designs for various classes of concrete, including JPCP 24/48/72 and any experimental mixes
- Attend and approve or disapprove all trial batches
- Provide advice or training to inspectors in accomplishing compliance with standard sampling, testing, and inspection procedures related to control and acceptance of the concrete mixture
- Observe test equipment being used to determine whether it is adequate, in both quantity and mechanical condition, and assist in addressing deficiencies
- Bring any noted and uncorrected deficiencies for items above to the attention of appropriate project or district personnel

CONCRETE FIELD CONTROL UNIT (CONT.)

- Offer project personnel any advice that could result in an improved in-place project
- Coordinate with the District Materials Section Supervisor (DMSS) in determining that concrete plant inspection requirements are met, including (1) equipment approval inspections to ensure that the batching plants meet applicable specification requirements and (2) periodic checks of plant scales and water meters

APPROVAL OF CONCRETE BATCH PLANTS

All concrete batch plants shall be inspected for conformance to applicable requirements of the department's *Standard Specifications for Road and Bridge Construction* (*Standard Specifications*). Applicable requirements for any individual project are those specifications that are current on the date the proposal for bids is advertised.

Initial inspection and approval of concrete batch plants are the responsibility of the Concrete Field Unit.

Note: Normal inspections are the responsibility of the district materials section supervisor (DMSS). The DMSS or designated representative shall be present at the plant when scales and water measuring devices are being checked for accuracy. The plant facilities shall be reviewed during the scale check to determine if changes have occurred since the initial inspection and approval.

The Concrete Field Unit shall perform periodic in-depth inspections.

APPROVAL OF PRECAST CONCRETE ITEMS

Approval of prestress concrete producers shall be in accordance with the *Precast/Prestressed Concrete Manual* and Section 605 of the *Standard Specifications*.

Approval of precast (non-prestress) concrete producers (excluding concrete pipe producers) shall be in accordance with the *Precast/Prestress Concrete Manual* and Section 605 of the *Standard Specifications*.

Approval of manufacturers of concrete pipe shall be in accordance with KM 64-115 and Section 810 of the *Standard Specifications*.

MATERIALS

Chapter

CONCRETE & PHYSICAL PROPERTIES SECTION

Subject

Cement Laboratory

PRIMARY RESPONSIBILITIES

The Cement Laboratory's primary responsibilities include testing cementitious materials, mineral admixtures, and concrete cylinders.

TESTING

Cement Laboratory testing includes, but is not limited to, the following materials and procedures.

- Portland Cement
  - The laboratory shall perform testing and acceptance of Portland cement (see *Standard Specifications for Road and Bridge Construction* [*Standard Specifications*] Section 801 and the *List of Approved Materials* [*LAM*]).
  - The department's procedure for acceptance of Portland cement is by certification from cement mills shown on an approved list. The certification shall be signed by an authorized company representative and shall be printed or stamped on the bill of lading or on a separate sheet accompanying the bill of lading. In addition to the certification, destination samples shall be obtained at frequencies applied on a project basis through SiteManager. Any cement furnished by an approved mill may be used prior to testing.
  - Cement shall be sampled and submitted to the Central Office Division of Materials on a project basis in accordance with frequencies maintained in SiteManager. Appropriate testing is performed and reported by the Cement Laboratory and the Chemical Section. A verification test shall be performed on the same cement sample whenever an initial test from the sample fails to conform to requirements.

- Concrete Curing Compounds

  The laboratory shall receive initial samples and review past history and quality control programs for inclusion on the LAM (see *Standard Specifications* Section 823 & *LAM*).

TESTING (CONT.)

- Concrete Cylinders

  The laboratory shall perform compressive strength testing of cylinders in accordance with ASTM specifications and the current *Standard Specifications* for the appropriate application.

- Admixtures for Concrete

  The laboratory shall receive initial samples and review product literature for inclusion on the *LAM* by brand and product name. Continued inclusion of an admixture on the list is contingent upon satisfactory performance in actual project use and an annual certification (see *Standard Specifications* Section 802 and *LAM*).

- Masonry Products (Concrete Block & Concrete Brick, etc.)

  The laboratory shall perform testing and acceptance of masonry products in accordance with applicable test procedures (see *Standard Specifications* Section 824).

- Masonry Coatings

  The laboratory shall perform initial sample testing and review certified test reports for inclusion on the *LAM*. Continued listing is contingent upon annual certifications and acceptable performance (see *Standard Specifications* Section 828 and *LAM*).

- Fly Ash

  Fly ash shall be tested for acceptance. Appropriate testing is performed and reported by the Cement Laboratory and the Chemical Section. (see *Standard Specifications* Section 844 and *LAM*).

  - Departmental procedure for acceptance of fly ash requires destination (field) sampling of all fly ash but permits its use prior to completion of testing, provided the particular mill and class of fly ash are on the approved list.
  - Fly ash to be used in concrete as a separate ingredient on department projects shall be preapproved and included on the *LAM* maintained by the MCL. Testing is performed on an initial sample, and a review of satisfactory past history and quality control program is required for inclusion on the *LAM*.
  - Field sampling and testing shall be performed. Fly ash shall be sampled and submitted to the MCL on a project basis in accordance with the frequencies maintained in SiteManager. A verification test shall be performed on the same fly ash sample when an initial test

TESTING (CONT.)

from the sample fails to conform to requirements. Testing shall be in accordance with ASTM specifications.

- Non-Shrink Grout

  The laboratory shall perform initial sample testing and review product information for inclusion on the *LAM* (see *Standard Specifications* Section 601 and *LAM*).

- Concrete Repair Patch
  - Concrete repair patch includes rapid hardening, very rapid hardening, and vertical/overhead. Materials are received and testing is performed along with review of manufacturer submitted product data, materials safety data sheet, and test data from an independent test agency. Based on applicable testing and review of manufacturer data, the product may be included on the LAM.
  - A product shall be removed from the approved list if any of the following apply:
    - The manufacturer changes formulation.
    - The material performs unsatisfactorily in the field.
    - Laboratory tests indicate nonconformance with specifications.
    - The department revises the specifications, rendering a product in nonconformance (see *LAM*).

- Mineral Admixture

  Mineral admixture includes but is not limited to fly ash (covered elsewhere in this section), microsilica, and ground granulated blast furnace slag (GGBFS). Materials are received and testing performed along with review of manufacturer-submitted history of satisfactory performance and quality control plan. Based on acceptable testing and review of manufacturer documentation, the product may be included on the *LAM* (see *Standard Specifications* Section 844 and *LAM*).

FIELD RESPONSIBILITIES

The Cement Laboratory's field responsibilities include, but are not limited to, the following materials and procedures.

- Pavement and Structure Cores
  - The laboratory shall obtain and test cores for investigations related to determination of strength, to verify clearances on reinforcements, to verify aggregate properties, and to resolve other material concerns.
  - The laboratory shall maintain all equipment needed to perform portable and truck-mounted core drilling.

FIELD RESPONSIBILITIES (CONT.)

- Testing Pavements for Skid Resistance
  - The laboratory shall perform testing on pavement sections identified through a coordinated effort of the Asphalt Branch and Aggregate Section in support of the aggregate polish resistant aggregate program.
  - The laboratory shall perform testing on sites identified as exhibiting high incidents of accidents where skid resistance is suspect. These sites are identified and a request is generated by the Chief District Engineer to the Division of Traffic Operations which is then forwarded to the Central Office Division of Materials
  - The laboratory shall maintain equipment needed to perform skid testing of pavements in support of the aggregate polish resistant aggregate program.

LIST OF APPROVED MATERIALS

The Cement Laboratory maintains the *List of Approved Materials* product listings for the following:

- Chemical Admixtures
- Mineral Admixtures
- Cement
- Fly Ash
- Non-Shrink Grout
- Masonry Coatings
- Concrete Curing Compounds
- Corrosion Inhibitors
- Concrete Repair Patch

MATERIALS

Chapter

STRUCTURAL MATERIALS BRANCH

Subject

Physical Laboratory

PRIMARY RESPONSIBILITIES

This section's primary responsibility includes testing of materials assigned to the Physical Testing Laboratory.

PHYSICAL MATERIALS LISTING

This testing includes but is not limited to the following materials:

- Steel reinforcement for concrete
  - Reinforcing bars: deformed, plain, coated, uncoated
  - Prestressing strand
  - Welded steel wire fabric
  - Welded deformed steel wire fabric
  - Load transfer assemblies (contraction and expansion)
  - Cold drawn steel wire
  - Hook tie bolts
  - Hook tie bolts with expansion anchors
  - Mechanical and welded splices
  - Tie strips
  - Reinforcing strips
- Box culvert (aluminum)
- Culvert pipe: plastic, steel, concrete
- Geotechnical materials
  - Geotextiles
  - Fin (edge) drains
  - Fabric-wrapped backfill drains
  - Geo-grids
  - Gabions and mattresses

PHYSICAL MATERIALS LISTING (CONT.)

- Miscellaneous materials
  - Guard rail and accessories
  - Armored edge
  - Fencing materials
  - Welders qualification
    - Shielded metal arc
    - Mig
    - Tack
  - Sign and delineator posts
  - Handrail
  - Bond breakers (dowels)
  - Gray iron castings
  - Steel grates and frames
  - Electric wiring and conduit
  - Seed
  - Treated timber products
  - Untreated timber products
  - Modular glare screens
  - High-strength nuts and bolts
  - Coated chairs and tie wire
  - Cork
  - Bituminous fiber
  - Sponge rubber
  - Water gates
  - Incidental building materials
  - Crash cushions
  - Ductile iron pipe and fittings
  - Manhole adjusting rings(HDPE)
  - Offset blocks (composite)
  - Bolsters and chairs (plastic)

TESTING

Testing procedures are outlined below.

- ASTM A 325 Bolts, Nuts, and Washers (*Kentucky Standard Specifications: Sections 607 & 813*)

  These items are accepted on the basis of the following procedure:
  - Receive and inspect bolts for defects

TESTING (CONT.)

- Receive manufacturer's certification containing physical and chemical results and a statement that bolts conform to ASTM A 325, etc.
- Receive check sample of bolts from each shipping lot at the frequencies stated in the *Materials Field Sampling and Testing Manual and or Special Instructions on LIMS Sampling Checklist.*

  Note*:* A shipping lot, for purposes of selecting test samples, is that quantity of bolts of the same nominal size and same nominal length necessary to fill the requirements of a single purchase order. Obtain as many different manufacturer symbols in sample as size of sample will allow.

➢ Bolsters and Chairs (plastic) (LAM)

Verify material is on the LAM.

➢ Bond Breakers (dowels) –(*Kentucky Standard Specifications: Section 811, LAM*)

Bond breakers are accepted on the basis of testing by the Physical Laboratory or an approved laboratory. After acceptance, the materials shall be added to the approved list maintained by the Division of Materials.

➢ Cable Guardrail Systems

Verify system is on the LAM. Receive and test samples per instructions outlined in the project proposal.

➢ Deformed Reinforcing Bars

Test initial samples and review quality control program for inclusion on the LAM. Additional testing shall be performed on samples submitted on a project basis. (See KY Standard Specification Section 811, LAM, and KM64-101)

➢ Epoxy-Coated Reinforcing Bars

Test initial samples and review quality control program for inclusion on the LAM. Additional testing shall be performed on samples submitted on a project basis. (See KY Standard Specification Section 811 and LAM)

TESTING (CONT.)

- Electric Wiring, Conduit & Ducted Cable (*Kentucky Standard Specifications: Sections 834 & 835, LAM (conduit)*)

  Receive samples and forward to Traffic for review and approval. Document approvals in LIMS. Verify R S steel & PVC conduit manufacturers are included on the LAM.

- Fabric-Wrapped Backfill Drains (*Kentucky Standard Specifications: Section 845, LAM*)

  Verify material is on the LAM. This material shall be accepted on the basis of tests performed on the drain and its fabric cover by the Physical Laboratory. Any company wishing to sell its product for use on Transportation Cabinet (Cabinet) projects shall submit samples. If the drain is approved, it shall placed on the LAM.

- Fencing Materials (*Kentucky Standard Specifications: Sections 816 & 817*)

  Receive samples and perform acceptance testing. Samples shall be obtained at destination in accordance with the *Materials Field Sampling and Testing Manual.*

- Fin (Edge) Drains (Project Proposal)

  This material shall be accepted on the basis of job-site sampling and a manufacturer's certification.

- Geotextiles (*Kentucky Standard Specifications: Section 843, LAM*)

  Geotextiles shall be included on the LAM based upon submittal and testing through NTPEP, manufacturer's testing or certification, and Physical Section testing. Verify material is included on the LAM. Samples shall be obtained from the job site in accordance with the *Materials Field Sampling and Testing Manual*.

- Gray Iron Castings (*Kentucky Standard Specifications: Section 813, LAM*)

  Castings shall be accepted on the basis of tests performed on samples from the manufacturer for inclusion on the LAM. Project acceptance shall be by evaluation of an approved manufacturer's certification containing test results specific to the lots shipped. Lot numbers shall be cast into the product so that approval may be confirmed when the shipment arrives at the job site.

TESTING (CONT.)

- Guard Rail and Accessories (*Kentucky Standard Specifications: Section 814*, *Standard Operating Procedure for Acceptance of Guardrail Systems, LAM*)

  Guardrail and its component materials shall be approved on the basis of destination sampling and laboratory testing, or certification where permitted, for each item in accordance with the *Materials Field Sampling and Testing Manual.* The project engineer shall be responsible for checking each shipment for conformity to dimensional and zinc-coating requirements. Verify guardrail manufacturers are included on the LAM.

- Gabion Baskets and Mattress Units (*Kentucky Standard Specifications: Section 813*)

  Receive samples and perform project acceptance testing. The project engineer shall visually inspect material at the jobsite, and material shall be sampled in accordance with the *Materials Field Sampling and Testing Manual.* For approved gabion & mattress fasteners, see LAM

- Handrail (*Kentucky Standard Specifications: Sections 720 & 813*)

  All three types of handrail shall be accepted on the basis of a manufacturer's certification and visual inspection by the project engineer.

- Hook Tie Bolts (*Kentucky Standard Specifications*: Section 811 & *Standard Drawing: RPS-010-10)*

- Hook Tie Bolts with Expansion Anchors (*Kentucky Standard Specifications: Sections 512 & 811* and *Standard Drawing*s: RPS-010-10).

  Pull-out tests for acceptance shall be performed after installation of anchors as required by the *Materials Field Sampling and Testing Manual.*

- Load Transfer Assemblies (contraction and expansion**)**

  Load transfer assembly manufacturers wishing to supply assemblies to Cabinet projects shall submit a drawing of their proposed assembly along with a 4- to 6-foot section of a fabricated assembly for design approval. If the drawing and the assembly incorporate the typical features depicted by the *Standard Drawings*, the design shall be approved, and the manufacturer shall be added to the LAM.

TESTING (CONT.)

- Manhole Adjusting Rings(HDPE) (Kentucky Standard Specifications: Section 710, LAM)

  Verify material is on the LAM.

- Mechanical Splices (*Kentucky Standard Specifications: Section 602*)

  Receive and perform acceptance testing. Samples of completed splices shall be obtained from the job site in accordance with the *Materials Field Sampling and Testing Manual.*

- Modular Glare Screens (Special Note for Modular Glare Screens)

  Modular screens shall be accepted on the basis of visual inspection and job-site sampling.

- Offset Blocks (Composite) (Kentucky Standard Specifications: Section 814, Standard Drawing, LAM)

  Verify materials are on the LAM. The section engineer shall obtain manufacturer's certification confirming material conforms to NCHRP 350 Level 3.

- Pile Points (Kentucky Standard Specifications: Section 604, LAM)

  Verify included on the LAM. The section engineer shall obtain manufacturer's certification.

- Pipe (culvert, CMP, HDPE, PVC, entrance, slotted drain, storm sewer, underdrain)

- Corrugated Polyethylene Pipe M 252 (*Kentucky Standard Specifications: Section 810*)

  The manufacturer shall supply a yearly certification stating that the polyethylene materials used in manufacture of the pipe meet the requirements of AASHTO M 252.

- Corrugated Polyethylene Pipe M 294 (*Kentucky Standard Specifications: Section 810, LAM*)

  M 294 pipe shall be included on the LAM based on submittal and testing through NTPEP, manufacturer's testing or certification, and Physical Section testing. Verify material is included on the LAM.

TESTING (CONT.)

- Polyvinyl Chloride Pipe M304 (*Kentucky Standard Specifications: Section 810, LAM*)

  PVC pipe shall be accepted on the basis of a manufacturer's certification stating that the material meets the specifications as quoted in the project proposal and the specifications.

- Corrugated Metal Pipe and Slotted Drain (*Kentucky Standard Specifications: Section 810, LAM*)

  Acceptance of corrugated metal pipe is based upon a certificate of compliance from an approved fabricator with field sampling and inspection of the bituminous coating and pipe. Pipe fabricators requesting approved-list status must first submit to the Physical Laboratory a manufacturer's certified analysis and annual guarantee for each type and brand of sheet used in the fabrication of pipe, along with a quality control plan. If these documents conform to American Association of State Highway and Transportation Officials (AASHTO) specifications, a representative from the Physical Laboratory shall conduct an inspection of the plant.

  Note: Specific fabrication plant approval procedures are detailed in Kentucky Method 115.

- Prestressing Strands (*Kentucky Standard Specifications: Section 811*)

  Samples shall be obtained at the prestressed concrete plant. Perform test and acceptance based on heats of prestressing strand.

- Reinforcing Strips (Special Provision)

  Receive and perform acceptance testing. The section engineer shall obtain manufacturer's certification at jobsite.

- Row Monument & Witness Post (Standard Drawing)

  The section engineer shall perform a visual inspection at the jobsite.

- Seed (*Kentucky Standard Specifications: Section 827*)

  General Information: Seed used on transportation projects shall conform to the Kentucky Seed Law and specifications. The section engineer shall obtain one of the vendors' seed tags from each lot or variety of seed received & places in project file.

TESTING (CONT.)

- Sign Posts: Type 1 & 2 (*Kentucky Standard Specifications: Section 832*)

  Sign and delineator posts shall be accepted on the basis of tests performed by the Physical Laboratory and a manufacturer's certification. The section engineer shall submit samples obtained at the destination in accordance with the *Materials Field Sampling and Testing Manual.* 3

- Sign Base Material/Substrate (Kentucky Standard Specifications: Section 833)

  The section engineer shall obtain materials certification and places in project file.

- Silt Fence (Kentucky Standard Specifications: Section 827 & Standard Drawings)

- Silt Trap Type C Bag (Standard Drawing RDX-230)

  Verify manufacturer inclusion on the LAM. The section engineer shall obtain manufacturer's certification.

- Sod (Kentucky Standard Specifications: Section 827)

- Stay-in-Place Forms (Kentucky Standard Specifications: Section 601)

  The section engineer shall perform zinc field check & form thickness.

- Steel Grates and Frames (*Kentucky Standard Specifications: Section 812, LAM*)

  Verify materials are on the LAM. The section engineer shall obtain manufacturer's certification. Welders shall be qualified to weld on Cabinet projects.

- Structural Steel – (Concur with plans)

  The section engineer shall obtain manufacturer's certification.

- Stud Shear Connectors – (Kentucky Standard Specifications: Section 813)

  The section engineer shall obtain manufacturer's certification.

- Tie Strips (Special Provision—Concrete Retaining Walls)

  Receive and perform acceptance testing. The section engineer shall obtain manufacturer's certification.

TESTING (CONT.)

- Timber Poles – (Kentucky Standard Specifications: Section 820)

- Turf Reinforcing Matt Type 1,2,3, & 4 (Special Note 11f, LAM)- included on the LAM based upon submittal and testing through NTPEP.)

  Verify material is on the LAM. Receive and perform acceptance testing. The section engineer shall obtain manufacturer's certification.

- Treated Timber Products (*Kentucky Standard Specifications: Section 818, LAM: Treated Wood Products Approved Third Party Inspectors*)

  Treated timber products shall be accepted on the basis of grade inspections and assays performed either at the job site or at the treatment plant by the district materials engineer (DME) or approved third party. Timber treated either within the Commonwealth of Kentucky (Commonwealth) or within a reasonable driving distance of the Commonwealth shall be inspected, tested, and approved by the Division of Materials prior to acceptance for payment. A reasonable driving distance is defined as any location that allows the inspector reasonable time for inspection and round-trip travel time from his or her work station in one working day. Timber companies furnishing timber that is treated outside a reasonable driving distance of the Commonwealth shall contact the Physical Laboratory at least five days prior to commencing an order.

  A treated timber inspection consists of the following steps or procedures:

  - Check dimensions, knots, shakes, splits, cracks, etc., for conformance to specifications
  - Take cores and checking their assays for conformance to AWPA Standards
  - Mark approved pieces with the emblem of the testing agency
  - Give a copy of the inspection report to the treatment plant
  - Project personnel shall check all pieces for the presence of either a Kentucky Stamp or that of an inspection agency. Not all guardrail blocks are stamped. If stamp-approved, the timber shall be visually inspected for conformance to specifications.
  - Utility Incidental – The section engineer shall perform visual inspection and obtain letter of acceptance from local municipality.

TESTING (CONT.)

- Untreated Timber Products (*Kentucky Standard Specifications: Section 818,* See *Standard Drawings.*)

  Untreated timber shall be inspected and approved at the job site. The section engineer shall check pieces for conformity to specifications, dimensions, freedom from defects, grade, species, etc.

- Water Gates (*Standard Drawings*)

  Section engineer shall obtain certification by the manufacturer.

- Welded Steel Wire Fabric (*Kentucky Standard Specifications: Section 811*)

  Receive and perform acceptance testing on samples submitted by the section engineer in accordance with the *Materials Field Sampling and Testing Manual*.

- Welded Deformed Steel Wire Fabric (*Kentucky Standard Specifications: Section 811*)

  Receive and perform acceptance testing on samples submitted by the section engineer in accordance with the *Materials Field Sampling and Testing Manual*.

- Welders Qualification (GMAW, SMAW) (*Kentucky Standard Specifications: Sections 106, 607 & 813* and *Kentucky Methods 103, 108 &110*)

  The Physical Laboratory shall be responsible for the evaluation of the welded plates submitted for the approval of arc welders. The applicable *Kentucky Methods* are a modification of AWS D1.5 guidelines. It is important that the welder take the entire test with the plates in position. Vocational schools and their instructors who are approved by the Physical Laboratory may observe the preparation and testing of the test plates by the welder. These schools shall be placed on an approved list maintained by the Physical Laboratory.

  Note: Welders shall be approved for two calendar years if they are at no time inactive for longer than six months. The welder may complete any Cabinet project on which he or she has begun work during that time. Each approved welder is issued a card showing his or her approved positions and the expiration date of each.

FIELD DUTIES Field duties consist of the following:

- Perform periodic inspections at plants that epoxy-coat reinforcing steel to confirm conformance to their quality control assurance programs required in the *Kentucky Standard Specifications*

- Investigate high-volume marginal material failures at the project site for those items handled by the Physical Laboratory

- Perform periodic inspections at reinforcing steel mills and fabricating shops to verify compliance with quality control programs

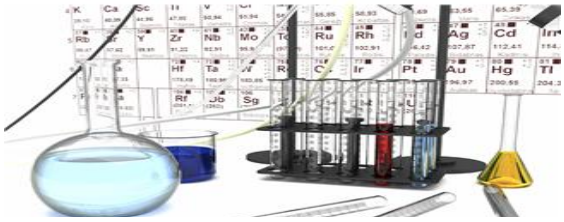
- Calibrate, adjust, and repair non-metallic thickness testers every six months at the division and district laboratories

- Perform, as needed, the job-site inspection of epoxy-coated dowel bars used in load transfer assemblies to assure specification compliance.

- Perform pull-out tests on expansive anchors used in joining old concrete to new concrete.

- Perform periodic inspections at cast iron foundries for initial approval and continued specification compliance.

- Perform periodic inspections of pipe plants for conformance to their quality control plan.



MATERIALS

Chapter

CONTRACT ADMINISTRATION

Subject

Independent Assurance & Material Certification

INDEPENDENT ASSURANCE PROGRAM OVERVIEW

The Independent Assurance Program (IA) establishes guidelines for certain National Highway System contracts and supervises independent assurance sample procurement and testing as required by the Federal Highway Administration (FHWA) per 23 CFR 637 of the *Federal Aid Policy Guide*. The district Materials Section Supervisor (DMSS) is responsible for obtaining samples and performing such tests as required under the IA Program and may be assisted by Division of Materials personnel as necessary. The division prepares a guide detailing the number and type of samples and tests required for each federal or state-aid contract that meets certain funding, location, and material quantity requirements based on a review of the contract proposal and plans.

In addition to an acceptance sampling and testing program, the FHWA requires an independent sampling and testing program that prescribes policies, procedures, and guidelines relating to sampling and testing of materials and construction in federal or state-aid highway contracts that meet certain requirements. Each state highway agency shall have a sampling and testing program that provides adequate assurance that the materials and workmanship incorporated in each federal-aid highway contract are in reasonably close conformity with the requirements of the approved plans and specifications, including approved changes. The program shall have provisions for acceptance and independent assurance samples and tests that are developed by the state and approved by the FHWA.

The following information outlines the provisions covered by the FHWA and the division's procedures for complying with the independent assurance sampling and testing portion thereof. The *Materials Field Sampling and Testing Manual* provides requirements for both acceptance and independent sampling and testing programs.

DEFINITIONS

Project—A specific section of a highway route together with all appurtenances and construction to be performed thereon under one or more contracts

Process Control Samples and Tests—All samples taken and tested for the purpose of controlling production of materials proposed for incorporation into the project

Acceptance Samples and Tests—All samples and tests used for determining the quality and acceptability of materials and workmanship incorporated into the project

Independent Assurance Samples and Tests—Samples, tests, or other procedures performed by state personnel who do not normally have direct responsibility for process control and acceptance sampling and testing

OBJECTIVE OF INDEPENDENT ASSURANCE SAMPLES & TESTS

The results obtained by independent acceptance sampling and testing are intended as aids in detection and prevention of significant discrepancies in the standard project acceptance sampling and testing program caused by any of the following:

- Procedural errors in sampling or testing
- Sampling and testing equipment malfunction or erroneous calibration
- Other sources of erroneous results that could lead to misrepresenting the true nature of the material or construction operation controlled by sampling and testing

INDEPENDENT ASSURANCE SAMPLING & TESTING PROGRAM

The following are guidelines for independent assurance sampling and testing:

- Use of Independent Testing Personnel and Equipment

  The independent assurance samples and tests shall be obtained and performed by state personnel who have no direct responsibility for process control and acceptance sampling and testing and who use the same type of equipment (but not the same equipment) used for acceptance sampling and testing.

INDEPENDENT ASSURANCE SAMPLING & TESTING PROGRAM (CONT.)

For each type of assurance sample and test required for a project, the initial test shall be obtained as provided above. Thereafter, not more than 20 percent of the remaining required assurance tests may be obtained by observation of testing as hereinafter described. If independent sampling and testing equipment is unavailable, the above procedures may be modified as necessary.

Note: The provision requiring use of independent testing equipment applies only to equipment that is generally used for field-type tests and that may cause significant errors due to possible malfunction or lack of calibration. It does not apply to miscellaneous equipment which is not critical to the accuracy of results. Also, when the *Standard Specifications for Road and Bridge Construction* or *Kentucky Methods* provides for use of optional sampling and testing equipment or procedures to determine the same property for acceptance of a material or construction operation, interchangeable use of such equipment or procedures shall be considered acceptable. For instance, the use of a volumeter for determining density of soil or dense-graded aggregate shall be acceptable for determining independent assurance densities when acceptance densities are being determined by use of a nuclear gauge.

Not more than 20 percent of the required independent assurance samples and tests shall be obtained by independent observation of acceptance sampling and testing using project-assigned equipment. However, this procedure shall be minimized, as it does not provide a check on equipment–a significant part of the objective for obtaining assurance tests–or provide a complete basis for comparison of results of acceptance and assurance tests as required under Kentucky Method (KM) 64-112-05.

- Comparison of Acceptance and Independent Assurance Results

The *Federal Aid Policy Guide* requires the independent assurance sampling and testing program to provide a comparison of results between project acceptance and independent assurance tests. Along with appropriate and timely corrections of excessive discrepancies, these comparisons are essential to achieving the objective of the assurance sampling and testing program and are a means of ensuring reliability of acceptance results and elimination of erroneous results.

INDEPENDENT ASSURANCE SAMPLING & TESTING PROGRAM (CONT.)

To provide a sound basis for comparing results and to eliminate apparent discrepancies due to inherent materials variability, samples and tests for both independent assurance and acceptance tests shall be obtained at the same time and from material at the same point in the production process.

The personnel responsible for obtaining the assurance results shall:

- Determine, in their judgment and in accordance with the applicable *Kentucky Methods*, whether compared results are favorable

- Properly document and distribute the outcome of this determination in a timely manner

- Notify the section engineer or other personnel responsible for acceptance testing as soon as unfavorable comparisons are identified so that, in the event the acceptance testing is erroneous, this person can make necessary corrections

  Note: Whenever possible, immediate corrections of procedures or equipment found to be erroneous shall be implemented cooperatively by both acceptance and assurance testing personnel, especially when materials appear borderline with respect to specified properties and when the material's acceptability is questionable.

- Personnel Responsible for Obtaining Independent Assurance Samples and Tests

  Ordinarily, the DMSS is responsible for obtaining independent assurance samples and tests within his or her district. Representatives from the Division of Materials may be designated to obtain certain assurance tests or may assist the DMSS with obtaining these tests.

- Taking and Testing of Independent Assurance Samples

  The *Materials Field Sampling and Testing Manual* designates the type and frequency of sampling and testing for the various materials and construction operations that are subject to assurance testing.

INDEPENDENT ASSURANCE SAMPLING & TESTING PROGRAM (CONT.)

In general, the required assurance tests shall be limited to naturally occurring materials and mixtures containing processed aggregates.

Assurance samples shall be taken from completed mixtures and tested for those requirements applicable to the combination of materials.

The frequency of obtaining independent assurance tests may vary for individual contracts or phases of projects in accordance with job conditions, such as the uniformity of materials at the source, the methods and equipment used, and weather conditions. Unless otherwise stipulated, independent assurance testing is not required where acceptance tests are not a project requirement. The required number of independent assurance tests shall be conducted at a rate significantly less than the regular project acceptance sampling and testing so as not to be overly burdensome. This frequency is normally 10 percent of the project acceptance testing rate.

- Reporting Independent Assurance and Project Acceptance Comparison of Results

Comparison results shall be reported on the *Independent Assurance Sample Report*. The report program is available on the Division of Materials' website (under "IAS Sampling and Testing") at:

http://transportation.ky.gov/materials/Pages/default.aspx

District personnel shall investigate unacceptable tolerance values and report the investigation results and any corrective action taken on the *Independent Assurance Sample Report* in the "Notes" area.

Independent Assurance and Project Acceptance samples used for comparison reporting shall be on entirely separate sample identification numbers. They shall not be reported on the same sample ID differentiated only by a "1" and a "2". For example, 0640QED130007 #1 (project acceptance) and #2 (independent assurance) is not an acceptable differentiation of the samples. The tester reporting the independent assurance results should not know what project acceptance sample ID results the independent assurance sample is going to be compared against. Also, the IAS Report will not function properly with identical sample ID numbers.

MATERIALS CERTIFICATION PROGRAM

The Materials Certification Program is responsible for establishing and conducting a review of contract plans and files necessary for preparing a certification of materials for each construction project as hereinafter described.

After completion of each construction contract, the Director of the Division of Construction, per department policy, shall receive certification that materials (construction operations controlled by testing) were in reasonably close conformity with specification requirements and that testing or other approval was performed in accordance with established procedures. Exceptions are noted on the certification or attached thereto.

Additionally, the FHWA requires that a comparable certification be submitted to the division administrator for all federal-aid IA Program contracts projects, except for those constructed under the Secondary Road Plan.

The Director of the Division of Materials shall satisfy final certification submission requirements by:

- Submitting the TC 64-5 form, *Certification of Materials – Construction (non-IA)* (**Exhibit 9005**), to the Director of the Division of Construction for non-IA Program contracts

- Submitting the TC 64-1 form, *Certification of Materials – Construction FHWA (IA)* (**Exhibit 9004**), to the Director of the Division of Construction and the FHWA for IA Program contracts

SECTION SUPERVISOR RESPONSIBILITIES

The district section supervisor is responsible for ensuring that all materials used on assigned projects are in reasonable conformity with specification requirements prior to their incorporation into the work and that testing or other means of determining material conformity is performed in accordance with established procedures. Upon completion of each contract and review of project documentation by the DMSS, the section supervisor shall notify the DMSS that the contract is ready for materials certification review.

SECTION SUPERVISOR RESPONSIBILITIES (CONT.)

When the acceptable status of materials incorporated into the work is questionable due to test failures, insufficient or uncompleted tests, or other approvals, the section engineer shall perform either of the following:

- Defer notification until further testing or corrective actions such as deductions or corrective work are completed
- Complete and send an exception memorandum explaining the history of and rationale for any sampling and testing deficiencies

Adherence to the above guidelines prevents submission of final certifications prior to completion of all testing and any required corrective work or deduction that may be assessed due to non-specification materials.

DISTRICT MATERIALS SECTION SUPERVISOR RESPONSIBILITIES

The DMSS shall review the project documentation to ensure that the section engineer has thoroughly complied with applicable sampling and testing requirements. This review is intended to identify errors or omissions that shall be corrected prior to notifying the Division of Materials that the contract is ready for materials certification. Normally, the district Project Delivery and Preservation Branch Manager is assigned the responsibility to sign the notification for the district and to forward it, the Final Contractor's Work Estimate, and any exceptions to the Division of Materials.

The final certification of materials is prepared by the Materials Certification Program and is based on review of the following:

- The latest Engineer's Estimate (when necessary for older contracts with sampling and testing information in the previous KMIMS database)
- SiteManager Materials Sampling Checklist
- Failing and/or Unauthorized Contract Samples Report
- Applicable internal audit reports (see **MAT-502**)

DISTRICT MATERIALS SECTION SUPERVISOR RESPONSIBILITIES (CONT.)

The intent of this review is to document the basis of acceptance of all materials incorporated into the work, including:

- Corrective work or materials allowed to remain in the completed project but accepted at unit-price reduction due to failing test results

- Materials that received less than the department's usual requirements for sampling and testing or approval prior to submission of the final certification of materials

MATERIALS

Chapter

CONTRACT ADMINISTRATION

Subject

Internal Audits

OVERVIEW

The Division of Materials conducts internal audit reviews subsequent to the materials certification process but prior to distribution of the materials certification letter. The audit process is intended to verify that sampling and testing activities are performed in accordance with applicable requirements of the *Standard Specifications for Road and Bridge Construction* and *Materials Field Sampling and Testing Manual,* as well as all relevant methods and procedures, including AASHTO and ASTM standards.

The SiteManager Materials Sampling Checklist does not review incorrect sample sizes, missing test data, or failing test results when accounting for the number of samples obtained during the construction phase. The Excel audit programs extract sample data from SiteManager Materials and compare this data to specific criteria. These audits provide a more accurate assessment of compliance with established sampling and testing procedures and ensure the accuracy of sample record data.

PURPOSE

The ultimate purpose of the audit program is to be instructive and corrective. The audit reports provide insight about district sampling and testing procedures, recordkeeping practices, and data-entry accuracy. As a result of significant findings, the districts receive instruction and take corrective action on subsequent projects to conform to all aspects of sampling and testing requirements. Likewise, the Division of Materials gains insight into district practices and is alerted to issues that need to be addressed or improvements to the materials program that may be needed.

RESPONSIBILITIES

The audit program is provided to the districts for their use. The district shall adequately address all of the significant audit findings prior to submitting a contract for materials certification. After completing the materials certification process, the Central Office materials certification technician shall also run the applicable audits on the contract and verify that all of the significant audit findings have been sufficiently addressed.

RESPONSIBILITIES (CONT.)

Only major material component items used on a contract are audited. For example, if the contract being certified is an asphalt resurfacing contract, the Asphalt MixPack audit program is used. **The "Installed Items without Sampling and Test Requirements" audit program is utilized for all contracts.** Significant audit findings and subsequent corrective actions taken by the district are reported on the materials certification letter in the "Exceptions" paragraph. Significant audit findings are not addressed in the exception memorandum provided by the district because audit findings do not involve the required quantity of samples. Significant audit findings are related to the quality of sampling and testing procedures and test data accuracy.

AUDIT PROGRAM PROCEDURE

The audit program consists of ten choices for material audits. The individual programs can be run concurrently on the same Contract ID. They include the following:

- Concrete Audit
- Aggregate Dry Sieve Audit
- Aggregate KY-200 & T27 Audit
- Aggregate T11 & T27 Audit
- Aggregate T11 Audit
- Aggregate KY-200 Audit
- Asphalt MixPack Audit
- Certifications Audit
- Geotechnical Density Audit
- Installed Items without Sampling and Test Requirements Audit

Audits can be performed on unauthorized samples, authorized samples, or a combination of both. The "unauthorized samples" audit choice allows district personnel to identify sample issues before completion of the contract, when corrections can be made and potential contract deficiencies and other concerns can be avoided.

CONCRETE AUDIT

This audit examines plastic testing data that shall be associated with the cylinder samples. The audit program will flag cylinder samples that do not also have accompanying plastic test data be flagged. Kentucky Method 64-305 (**KM-64-305**) references ASTM C 31, which specifies that slump, air content, and temperature tests be performed prior to the molding of cylinders. The accompanying plastic data shall be reported as part of the cylinder sampling process. The concrete audit verifies that the plastic testing has been performed as required. All compressive samples identified on the audit report with an error message of "No Plastic Tests" shall be addressed in the "Disposition Remarks." Likewise, a flagged concrete slump value that does not actually fail due to an exception to the applicable specification requires a "Disposition Remark." This "Disposition Remark" shall reference the specific note allowing for deviations from the acceptable results range.

AGGREGATE AUDITS

All of the aggregate audits (Dry Sieve, KY-200 & T27, T11 & T27, T11, and KY-200) examine gradation results and the correct "beginning sample" size as required by the applicable test method. Failing test results require a "Disposition" or "General Remark" outlining the steps taken, such as information about an applied deduction or the reason for waiving the recommended deduction. Also, if discovered, district personnel shall investigate and address an incorrect "beginning sample" in the "Disposition Remarks." Findings of procedural errors and corrective actions taken by the district as a result of the investigation shall be included in the "Disposition Remarks."

ASPHALT MIXPACK AUDIT

This audit concerns asphalt mixture designs and examines spreadsheets for several items, including mixture gradation, mixture properties, and proper testing protocol. Data entry errors or issues with uploading spreadsheets into SiteManager Materials identified by this audit may require the assistance of Division of Materials personnel. Occasionally, the district or the Central Office may have to enter "Disposition Remarks" to address failing values.

CERTIFICATIONS AUDIT

This audit is performed at the discretion of the Central Office. The Certifications Audit randomly selects 20 percent of the items on a contract that require certifications. The district shall then supply the certifications selected by the audit program for review by the appropriate sections of the Division of Materials.

GEOTECHNICAL DENSITY AUDIT

This audit primarily examines moisture content and compaction averages of results from nuclear density moisture gage tests.

INSTALLED ITEMS WITHOUT SAMPLING & TEST REQUIREMENTS AUDIT

This audit searches for materials with installed quantities reported in SiteManager but not appearing on the Sampling Checklist. Sampling requirements for materials found on this audit may have inadvertently been "turned off" or never been "turned on" in SiteManager Materials. Legitimate reasons for "turning off" testing requirements may occur, such as small quantity allowances or materials with visual acceptance or certification requirements that are no longer required in SiteManager Materials. This program may generate some false findings; however, it will also identify those items for which a legitimate sampling and testing requirement was incorrectly "turned off" or never "turned on." Installed materials that are mistakenly "off" shall be "turned on" so they appear on the Sampling Checklist and, if deficient, adequately addressed in the exception memorandum. This program shall be performed for all contracts.

ADDRESSING SIGNIFICANT AUDIT FINDINGS

Generally, all audit findings require a "Disposition Remark" in SiteManager Materials. If a finding is the result of a typographical error, the sample shall be revised and the data corrected. Samples shall also be flagged even if the results are acceptable but the template status ("In Spec," "Out of Spec," or "No Spec") has not been selected. This type of error shall also be corrected by revising the sample. The audit shall then be performed again to verify that the correction has been accurately recorded. As much as possible, the SiteManager Materials Sampling Checklist shall accurately reflect what actually occurred on the project.

If a single audit report identifies more than five samples flagged for the same issue, whether these items are an allowed exception to the acceptable range of results or a legitimate finding, the district does not have to revise those samples. In that case, the district may instead supply a memorandum addressing the samples identified for the same issue. If less than five samples with the same issue are flagged, those samples shall be revised. **This principle of "greater than five/less than five samples with the same issue" applies to all reports except for the "Installed Items without Sampling and Test Requirements" audit.** No "Disposition Remarks" are applicable to this audit report.

MATERIALS

Table of Exhibits

EXHIBIT NUMBER	EXHIBIT TITLE & FORM NUMBER	MANUAL REFERENCE
MAT-9001	Annual Asphalt Mixing Plant Inspection, TC 64-416	304
MAT-9002	Annual Certification for Previously Approved Asphalt Mixing Plants & Related Equipment	304
MAT-9003	Asphalt Mixing Plant Acceptance, TC 64-416A	304
MAT-9004	Certification of Materials – Construction FHWA (IA), TC 64-1	501
MAT-9005	Certification of Materials – Construction (non-IA), TC 64-5	501
MAT-9006	Contractor's Master Certification of Asphalt Mixing Plants & Related Equipment	304
MAT-9007	Quarry Report	402

Kentucky Transportation Cabinet
Division of Materials

TC 64-416
Rev. 6/00

Annual Asphalt Mixing Plant Inspection

(For Use by Division of Materials, Asphalt Field Operations Section Personnel)

Contractor/Mix Supplier: _____

Location: _____ Phone: _____

Type of Plant: _____ Manufacturer: _____

Capacity: _____

THE ABOVE-DESCRIBED ASPHALT MIXING PLANT WAS INSPECTED ON: (MMDDYY)

BY:

The plant is accepted as meeting the pertinent requirements of the current Department's *STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION* (and other pertinent specifications) and approved for use on Department of Highways' projects.

By: _____
Division of Materials, Asphalt Field Operations Section Representative

Date: _____

Copies to:

Contractor
DME
Division of Materials

02/09

KENTUCKY DEPARTMENT OF HIGHWAYS
ANNUAL CERTIFICATION FOR PREVIOUSLY APPROVED
ASPHALT MIXING PLANTS AND RELATED EQUIPMENT

Date_____

Contractor _____ Phone # _____

Plant Location _____ Phone # _____

Make of Plant _____ Plate/CIMA rating _____
(lbs/batch) or (tons/hour)

Screen sizes _____ _____ _____ _____
(Scalper) (Top Deck) (Middle Deck) (Bottom Deck)

Do you have a HMA surge/storage system with your asphalt plant? _____

If yes, please provide the following information:

Type of system heating _____ Surge _____ Storage _____

Make _____ Capacity _____tons

Is your asphalt plant equipped with a RAP feeder? _____

If yes, define how the RAP is introduced into the mixture: _____

_____

Is your asphalt plant equipped to produce Warm Mix Asphalt (WMA)? _____

If yes, what type of supply system? Water injection _____ Manufactured additives _____

What brand of supply system for producing WMA will be utilized? _____

NOTE: Any plant modifications or changes made will require a new MASTER CERTIFICATION to be completed, stating in detail all revisions, modifications, etc.

1

02/09

The following is a list of items that must be provided at the field laboratory and a list of conditions that must be satisfied at the asphalt plant. Indicate their presence and proper working conditions by checking on the line provided.

NOTE: The applicable Kentucky Method (KM) and AASHTO standard defines the equipment required to perform a given test procedure.

Inspection List for Asphalt Mixing Plants

The following is a list of items which must be provided at the field laboratory and a list of conditions which must be met at the mixing plant. Indicate their presence and proper working conditions by checking on the line provided.
Note: The Kentucky Testing Method (KM) and AASHTO standard defines the equipment required to perform a given test procedure.

Stockpiles

_____ No intermixing or segregation

Method of stockpile construction: Truck _____ Conveyor _____ Loader _____ Other_____

Stockpiles separated by: Walkway _____ Driveway _____ Bulkhead _____ Other_____

Plant

_____ Batch _____ Drum

_____ One Internet access site per company for sending and receiving electronic mail

Email address: _____

_____ Batching scales certified (Batch Plants); date _____
_____ Truck scales certified; date _____
_____ Load cells for PG binder calibration tank certified (asphalt metering pump); date _____
_____ Manufacturer's plate listing maximum rated capacity of plant
Location of maximum capacity rating plate or documentation:
_____
_____ Cold feeders, adjustments total and proportional
_____ No flow paddles attached and working properly
_____ Cold bins in good shape, properly divided
_____ Each hot bin equipped with cutoff device for indication of low supply of material
_____ Hot bin sampling device
_____ Screens in place and free of holes and tears
_____ Adequate and safe stairways to mixer platform
_____ All gears, pulleys, chains, and other moving parts guarded
_____ Automatic burner or recording thermometer and non-recording thermometer near discharge in aggregate bin

02/09

_____ Two or more asphalt binder tanks, or one tank for each grade asphalt binder normally stored
_____ Means provided for accurately measuring the volume of asphalt binder material in storage tank
_____ Return discharge line in asphalt binder tank near bottom (preferably located at opposite end of tank from outlet to plant)
_____ Sampling outlet in each asphalt binder tank or feed line to plant
_____ Non-recording thermometer for asphalt binder feed line or storage tank
_____ Drainage receptacle for flushing sampling outlet
_____ Ten test weights of 50 lbs. (Batch Plants)
_____ Scales for checking cold feeds
_____ Clean truck bed signs. (See Standard Specifications 401.02.01, N)
_____ Power Sprayer for truck bed solution
_____ Sturdily constructed platform of suitable height for inspection and sampling the mixture from any size truck 7 to 7.5 ft. tall at floor level

Field Laboratory

_____ One computer installed with and utilizing a minimum system requirement: Microsoft Office 2003 Professional (Full Installation)
_____ One printer utilized for printing test data
_____ Sufficient parking space for state personnel, near the on-site laboratory
_____ Floor space 250 sq. ft.
_____ Width, not less than 7 ft.
_____ Height of ceiling, no less than 7 ft. high
_____ One desk or table and two chairs
_____ One workbench 2.5 ft. by 6 ft. min.
_____ One permanent mounting base for solvent extractor located away from exit
_____ One light over each table and workbench and at least one ceiling light
_____ Electric wall outlets on each wall
_____ A fume hood and exhaust which are adequate for removal of solvent fumes (for solvent extractors).
_____ All contractor's equipment and supplies not pertaining to testing removed from the laboratory
_____ A suitable table or area (1.2 sq. ft.) for purposes of mixing and quartering of mixture samples

Laboratory Equipment

_____ Laboratory accreditation documentation on file and updated as required
_____ One Superpave gyratory compactor and specimen extruding system (KM 64-435)
_____ Four Superpave gyratory compactor molds (KM64-435)
_____ One set of calibration equipment for the gyratory compactor (including access to internal angle measuring device)
_____ One container meeting the requirements of KM64-411 (Pycnometer for Maximum Specific Gravity)
_____ A mechanical agitator for the Maximum Specific Gravity container
_____ A vacuum pump or water aspirator meeting the requirements of KM64-411 (capable of evacuating air from the vacuum container (pycnometer), to a residual pressure of 30.0 mm Hg or less.
_____ A manometer or vacuum gauge permanently mounted in-line for measuring partial vacuum of 25.0 to 30.0 mm Hg or less
_____ One oven capable of holding two 16 in.x 17 in. sample pans and 8 molds (capable of maintaining a constant temperature up to 360 ^{0} F)

3

02/09

_____ Five aggregate sample buckets
_____ Four sample pans (16 in. x 17 in.)
_____ One set of laboratory scales capable of weighing 5,000 grams to an accuracy of 1.0 grams
_____ All sieves necessary to perform gradation test
_____ One long handled square end shovel
_____ One 5 gallon storage can and sufficient solvent for extraction test (if applicable)
_____ Two dial stem thermometers
_____ One electric hot plate or oven with an adjustable temperature control; capable of 1000 watts or greater, and accommodating a 16 in. x 17 in. sample pan
_____ One fire extinguisher (mounted near door)
_____ One first-aid kit
_____ One outside sealable container for collection of waste solvent (if applicable)
_____ Miscellaneous equipment (scoop, spatula, spoon, screen brush, gloves, rags, matches)

General Certification Statement (all plants)

I certify that all the above items have been checked and worn or damaged parts have been replaced, and all items are on the plant site and are in good working condition. I understand that I will not be permitted to produce material for the Kentucky Department of Highways **if any one item is not available** as required or is not in satisfactory working condition.

Plant Supervisor _____ _____
(Signature) (Title)

For _____ _____
(Company Name) (Date)

Mailing Address _____ _____
(PO Box, Street) (City)

_____ _____
(State) (Zip Code)

In the event that problems arise that are not suitable to be handled by the Qualified Superpave Plant Technologist or Superintendent, list below the name(s) of the person(s) who can be contacted.

_____ _____
(Name) (Name)

_____ _____
(Title) (Title)

_____ _____
(Phone) (Phone)

4

Kentucky Transportation Cabinet
Division of Materials

TC 64-416A
Rev. 6/00

Asphalt Mixing Plant Acceptance

(For use by District Materials Personnel)

The Contractor's Certification for (Plant Type) _____ asphalt mixing plant operated by the (Plant-Mix Company) _____ and located at (Address) _____ has been received on (MMDDYY) _____, and the plant has been certified as meeting the pertinent requirements of the current Department's *STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION* (and other pertinent specifications) and is approved for use on this project.

NOTE: The Contractor's Certification is on file at the office of the District Materials Engineer and the Division of Materials, Asphalt Field Operations Section. An annual inspection will be made by a representative of the Asphalt Field Operations Section in conjunction with the District Materials Engineer. This inspection will verify the Contractor's Certification and determine that the specifications are met.

Accepted by: _____ Date: _____
District Materials Engineer

Distribution:
- Contractor
- Division of Materials, Asphalt Field Operations Section
- District Materials Engineer for each District serviced by plant

Transportation Cabinet
Department of Highways
Division of Materials
Frankfort, Kentucky 40601

CERTIFICATION OF MATERIALS

DATE:

Division Administrator
Federal Highway Administration
Kentucky Division
Frankfort, Kentucky 40601

CID:

COUNTY:

FED / STATE #:

Dear Sir or Madam:

This letter is to certify that the test results indicate the materials incorporated in the construction work on the above contract conformed to the applicable plans and specifications, except as noted below. Results of independent assurance (IA) samples and tests, as required by the Department's IA Program, compare favorably with the results of acceptance samples and tests, except as noted below.

Sincerely,

Allen H. Myers, P.E.
DIRECTOR
DIVISION OF MATERIALS

EXCEPTIONS:

TC 64-1
Rev. May 2011

Transportation Cabinet
Department of Highways
Division of Materials
Frankfort, Kentucky 40601

CERTIFICATION OF MATERIALS

DATE:

TO: **DIRECTOR OF CONSTRUCTION**

CID:

COUNTY:

FED / STATE #:

This letter is to certify that the test results indicate the materials incorporated in the construction work on the above contract conformed to the applicable plans and specifications except as noted below. All of the materials, except those listed below, were satisfactorily represented by samples tested and accepted by the Division of Materials or associated laboratory. The items listed which deviated from the Cabinet's usual requirements for sampling and testing were accepted according to the conditions below.

Laboratory reports concerning tests of materials used on this contract are on file by Contract ID number in the Division of Materials or in the appropriate District office(s).

Sincerely,

Allen H. Myers, P.E.
DIRECTOR
DIVISION OF MATERIALS

EXCEPTIONS:

TC 64-5
Rev. August 2011

04/09

CONTRACTOR'S MASTER CERTIFICATION OF ASPHALT MIXING PLANTS AND RELATED EQUIPMENT

NOTE: To be valid, this form must be completed during an actual inspection of the plant by the foreman/superintendent or another person directly responsible for the plant operation.

Contractor _____ Date _____

Plant Location _____

_____ Phone No. _____
(Name and Title of person making certification and inspection)

Make of plant _____ capacity/rating _____ or _____
(lbs/ batch) (tons/hour)

Ensure all plants have the manufacturer's plate attached to the plant listing the maximum rated capacity of the plant. (For drum mix plants list the rating at 5% moisture content of the aggregates).

1. Stockpile for plant operation

(a) Method of construction: 1) Truck _____ 2) Conveyor _____

3) Front end loader _____ 4) Bulldozer _____ 5) other _____

Construct stockpiles by such methods that will prevent segregation and maintain uniformity.
Provide front end-loader buckets that are not wider than the cold-feed bins being charged.

(b) Separate stockpiles sufficiently to prevent intermixing. Check method of separation:

1) Bulkhead _____ 2) Walkway between stockpiles _____ 3) other _____

2. Cold feeds for drier

Number of bins _____ Total capacity _____ tons

Type of feeders _____ Design feeders for total and proportional control of aggregates for all types of mixes, and design controls so that they may be locked in any position.

Charge the bins so that the aggregates will not be intermixed by spilling over from one to the other.
Charge the bins by methods that will prevent the intermixing of different stockpile materials.
Provide scales for weighing cold-feed samples.

Is the plant configured for recycled asphalt capability? Yes _____ No _____

If yes, attach a brief description of where and how recycled material is introduced into the system.

3. Asphalt Binder Tanks

Number of tanks _____

Capacity of each asphalt binder tank (gal.) 1_____ 2 _____ 3 _____ 4 _____

Jacket all lines. Type of heating system _____

1

Continuously circulate the asphalt binder during the entire operation period. Install the return-line discharge below the level of asphalt binder in the tank (preferably located in the opposite end of the storage tank from the circulating pump).

Are the asphalt binder storage tanks or the line from the pug mill equipped with sampling valves?

Yes _____ No _____

Install a sampling valve on all new storage tanks.

Are the asphalt binder tanks equipped with agitators or a bypass for overnight circulation of modified asphalts (if needed)?

Agitators _____ Bypass _____

Are the asphalt binder tanks or feed lines equipped with non-recording thermometers?

Feed lines _____ Tank _____

Method used to measure amount of binder in storage.

_____

Location of the asphalt binder sampling valve:

_____

Are asphalt binder storage tanks insulated? Yes_____ No_____

Are asphalt feed and return lines insulated? Yes_____ No_____

Design the asphalt binder storage tanks so that the asphalt binder material being used in asphalt mixtures is free of contamination. Empty the asphalt binder tank before changing the types or grades of asphalt binder. Test any asphalt binder stored for more than 60 days from the approval date (last six digits of the lot number).

4. Drier

Make _____ Size _____ ft. x _____ft.
(Length) (Diameter)

Pitch _____ in. /ft. Burner make _____

Automatic? Yes _____ No _____ Type of fuel _____

Type of coal (if used) _____

Type or shape of flights _____ RPM of drum _____

Type of firewall in cone _____

Ensure the drier and related parts are in a good overall condition.

5. Dust collector

Type: Bag _____ Washer _____ Cone _____

Other _____ Make _____

2

Does the plant have a primary dust collector? Yes _____ No _____

Does the plant have a secondary dust collector? Yes _____ No _____

If a primary collector is used, at what point is this dust returned to the mix?

_____

Method of returned dust control: Weight _____ Volume _____

Does plant have a dust and/or mineral filler silo? Yes _____ No _____

Dust run-around? Yes _____ No _____ Control all dust to the extent that no dust is returned to the asphalt mix other than that permitted by the **Standard Specifications**. Each dust-return system with a return to the base of the hot elevator must have an inspection door near the hot elevator. Does the dust-collector system meet the applicable pollution regulations? Yes _____ No _____

Attach a diagram and brief explanation to this certification explaining how the dust system operates.

6. **Gradation unit (not applicable for drum mixer plants)**

Make _____ Total area of the finest screen (all decks) _____ (sq. ft.)

Is the screening unit horizontal or inclined? _____

Number of coil springs _____ Number of leaf springs _____
(All springs are to be free and in good working condition)

Number of hot bins, including the dust-return bin _____

Capacity of hot bins (tons): 1) _____ 2) _____ 3) _____ 4) _____

Silo_____ Dust _____

Does the plant have a hot bin for storing and introducing dust to the weigh hopper? Yes _____ No _____

Type of low-bin device? Audible alarm _____ Indicator light _____ Cutoff _____

Is the plant fully automatic? Yes _____ No _____

Equip each bin with a separate overflow pipe. Install a tailing pipe for the scalper screen. **Submit with this certification a screening unit diagram that indicates: the number of decks; screening arrangement; length, width, and size opening of each screen; state if screens are stainless steel**

(Maintain screening cloths in good state of repair during plant operation)

All types of plants are required to be fully automatic. Is the plant equipped with a printing system capable of printing the weight of each individual batch component, total weight of each batch, and total weight of all batches in each truckload? Yes _____ No _____ **Attach an example of the printed ticket.**

Type/brand of system used to control the automatic batching and proportioning _____

7. **Inspection facilities - Furnish the facilities, equipment, personnel, and all other resources needed to comply with KM 64-426 and KM 64-435.**

3

Field Laboratory

Prior to initial approval of the asphalt mixing plant, the field laboratory must be inspected and qualified according to the Department's Quality Assurance Program for Materials Testing and Acceptance. Provide a field laboratory that meets the requirements of the **Standard Specifications**. Because of the numerous items, every requirement will not be repeated on this form. However**, by your signature at the end of this form, you are certifying that the field laboratory, furnishings, and equipment meet the requirements of the applicable Standard Specifications, Kentucky Methods and AASHTO Standards.**

The following comments are added for clarity and to provide additional information on certain items in the **Standard Specifications**. It is not intended to minimize other requirements that are not discussed.

a) Provide a laboratory for the exclusive use of the Department representative and qualified Superpave Plant Technologist to perform testing for acceptance and process control purposes.

b) Furnish a level surface (or table) of sufficient size to accommodate all types of acceptance and process-control testing.

c) If chosen as a means of asphalt content acceptance, provide a centrifuge extractor with a permanent mounting base that is sufficiently sturdy to prevent vibration of the laboratory scales. **Department personnel are not permitted to use solvent extraction as a means of verification testing.**

   1) Provide solvent for performing the extraction test by the contractor, and store it in an approved container. An enclosed container should be provided by the contractor to collect the waste solvent from the extractor and contain any toxic fumes. Provide containers that meet all applicable safety standards.

   2) Locate the extractor in an area away from the door so that personnel can safely exit the building in case of fire.

   3) Locate the fire extinguisher near the door so that it will be accessible during an exit from the building.

d) Make provisions for adequate cooling in hot weather and adequate heat in cold weather. **No open-flame heaters are allowed in the lab.**

e) Parking space near the field laboratory; provide spaces in the vicinity of the laboratory as required for Department personnel at each plant.

f) Security of laboratory: provide windows and doors that are capable of being securely locked. Maintain the laboratory walls, roof, and floor in a good state of repair at all times, and provide a laboratory of standard construction that is strong and durable.

g) Sampling platform: provide, near the plant, a sturdily constructed platform of suitable height to inspect and sample from **any size of truck.** Provide a platform having a sturdily constructed stairway with a handrail plus a safety rail around the landing of the platform. If the laboratory is not conveniently located near the plant, the contractor will be required to have a sampling platform at the plant and laboratory.

8. Related Miscellaneous Equipment -

a) Truck-bed solution and sprayer: All truck-bed solution must conform to KM 64-422. Ensure that each shipment of solution is accompanied by a certification of conformance. Apply the solution as recommended, in a fine mist in minimum quantities with a power sprayer.

b) Provide truck beds that do not leak mixture, free from dents, contamination such as dirt, rock, fuel oil, and motor oil; or material stuck in the bed from previous loads. Provide truck covers free of holes and tears and of sufficient size to completely cover the loaded material. Securely fasten all covers in place before the truck leaves the plant. Check for the truck requirements daily.

c) Construct and place a sign visible to all truck drivers before pulling under the plant with the following words in large letters:

"TRUCKS HAULING STATE MATERIAL WILL NOT BE LOADED WHEN BEDS CONTAIN CONTAMINATING MATERIAL AND MUST BE TARPED PRIOR TO LEAVING PLANT"

9. Safety

Cover electrical wiring and all gears, chains, sprockets, and other moving parts of the plant or machinery at the plant site, or install them in such a manner to eliminate the possibility of injury to all personnel. Provide stairways with handrails or guardrails.

10. Thermometer Equipment

Install a non-recording thermometer near the discharge of the aggregate bin and in the asphalt feed line between the storage tank and the charging valve. Ensure all such equipment is tested and calibrated prior to the beginning of each construction season and anytime thereafter when requested by the Department. **If a plant has an automatic burner control system , non-recording thermometers are not required near the discharge of aggregate bin. The automatic system must be capable of heating the aggregate and consistently maintaining the temperature of the mix within + or – 15° F. And when a non-recording thermometer is installed in the asphalt binder storage tank(s), the Dept. will not require a non-recording thermometer in the feed line.**

Furnish documentation with the date that the equipment was last tested and calibrated by the contractor.

(ITEMS NO. 11-14 ARE FOR BATCH PLANTS ONLY)

11. Aggregate Scales -

Scales make _____

Capacity of the scales _____

Least graduation of the scales _____

Scale display location: On plant _____ Control house _____

Batching scales are required to be certified by a scale company as specified in Subsection 109.01.02 of the **Standard Specifications**.

Date certified _____ Certifying Scale Co. _____

12. Measuring asphalt binder material

Method: Weight _____ Volume _____

a) Make of the weight scales _____

(1) Capacity of the scales _____

(2) Graduation of the scales _____

(3) Scale display location: On plant _____ Control house _____

Asphalt binder scales are required to be certified by a scale company as specified in Section 109.01.02 of the **Standard Specifications**.

Date certified _____ Certifying Scale Co. _____

b) Provide a spray bar for the discharge of the asphalt binder that covers a minimum of three-fourths of the length of the pug mill. Ensure the feed lines are free from leaks.

5

13. Pug mill

Heated by: Electric _____ Oil _____ other (specify) _____

Pug mill size _____ ft. x _____ ft.
(Length) (Width)

No. of paddle arms on each shaft _____

Paddle tip clearance_____ in. (maximum of 1.5 in.)

Ensure the liners, paddles, and arms are in good condition at all times during the plant operation. Provide pug mill gates that are free from leaks.

Angle of paddle tips _____ degrees (approximate)

Rotation speed of the mixer shaft _____ RPM

14. Control of mixing time

Mechanical _____ Electrical _____

Equip the plant with time locks to control the dry and wet mixing time during the plant operation.

15. Asphalt mixture surge or storage system

Make: _____

Type of heat _____ Surge _____ Storage _____

If storage, has it been approved? Yes _____ No _____ Date approved _____

If approved, for how many hours? _____

Are there any restrictions or conditions on the approval? _____

_____

Is the approval (with any applicable conditions) posted in a conspicuous location in the laboratory?

Yes _____ No _____

Identify the bin number and location if more than one storage bin is set up at the plant site.

_____

Surge or storage systems for asphalt mixtures may be used by the contractor for overnight storage, **provided that each system is approved by the Division of Materials prior to its use.** Approval of a surge or storage system will be dependent upon tests that indicate the system is capable of conveying, retaining, and delivering the asphalt mixture without (1) balling or hardening, (2) appreciable loss of mixing temperature, (3) segregation of the aggregates, or (4) excessive oxidation of the asphalt binder. Add an approved silicone additive to the asphalt binder for hot-mix asphalt to be stored beyond the day of mixing. Approval of a surge or storage system may be withdrawn when tests and/or inspections indicate the system is having a detrimental effect on the asphalt mixture. Insulate the bins intended for storage, and provide a working seal, top and bottom, to prevent the infiltration of outside air. When storing, completely fill the bins in order to maintain a non-oxidizing condition. Do not increase the temperature of the mixture being stored unnecessarily high as to accelerate hardening of the asphalt binder.

Any asphalt mixture that is damaged in any way, in the judgment of the Department, by use of a surge or storage system will be rejected. Completely empty the surge bins by the end of each working day. When the bin cannot be emptied, store the asphalt mixture(s) overnight in a manner that prevents damage. Obtain the Department's approval prior to placing material stored longer than overnight and up to 72 hrs. Material stored will be subject to the same requirements as specified for normal, unstored asphalt mixture.

(ITEMS NO. 16-28 ARE FOR DRUM PLANT ONLY)

16. Size of the scalping screens _____

Location of the scalping screen _____

17. Describe the means provided to control the aggregate flow from each aggregate bin and the proportion from each bin in relation to the total aggregate flow.

_____

_____

_____

18. List the belt scales or other devices that provide positive weight control of each individual cold feed and the total aggregate feed.

_____

Is the total aggregate flow automatically coupled with the asphalt proportioning device to maintain the required asphalt binder content in the mixture? Yes _____ No _____

19. Is the plant equipped with a sound device or automatic shut-off that operates when the flow from any individual feeder is interrupted or when the flow of asphalt binder to the drum is interrupted?

Sound device _____ Automatic shut-off _____

20. Is the aggregate weighing device capable of being adjusted (to the nearest 0.1 percent) to compensate for moisture in the aggregate and RAP material? Yes _____ No _____

21. Is the plant equipped to use only a portion of the collected fines? Yes _____ No _____

If so, how is the dry-aggregate weight adjusted?

_____

22. Is the asphalt feed line equipped with a non-recording thermometric instrument to monitor the asphalt binder temperature? Yes _____ No _____

23. Is the plant equipped with a thermometric instrument for measuring and displaying the final mixture temperature at the discharge chute of the drum mixer? Yes _____ No _____

24. What means have been provided to obtain samples of individual aggregates and/or combined aggregates from the belt feeders?

_____

25. Type/brand of system controls used for proportioning of aggregates, RAP and PG binder.

_____

_____

26. Is the plant equipped to produce Warm Mix Asphalt (WMA)? _____

27. Brand of Water Injection System for WMA? _____

28. Type/brand of system used to introduce manufactured additives?

_____

a) If used, where and how is the additive introduced into the mixing plant? _____

_____

8

Inspection List for Asphalt Mixing Plants

The following is a list of items which must be provided at the field laboratory and a list of conditions which must be met at the mixing plant. Indicate their presence and proper working conditions by checking on the line provided.
Note: The Kentucky Testing Method (KM) and AASHTO standard defines the equipment required to perform a given test procedure.

Stockpiles

_____ No intermixing or segregation

Method of stockpile construction: Truck _____ Conveyor _____ Loader _____ Other_____

Stockpiles separated by: Walkway _____ Driveway _____ Bulkhead _____ Other_____

Plant

_____ Batch _____ Drum

_____ One Internet access site per company for sending and receiving electronic mail
Email address: _____

_____ Batching scales certified (Batch Plants); date _____
_____ Truck scales certified; date _____
_____ Load cells for PG binder calibration tank certified (asphalt metering pump); date _____
_____ Manufacturer's plate listing maximum rated capacity of plant
Location of maximum capacity rating plate or documentation:
_____
_____ Cold feeders, adjustments total and proportional
_____ No flow paddles attached and working properly
_____ Cold bins in good shape, properly divided
_____ Each hot bin equipped with cutoff device for indication of low supply of material
_____ Hot bin sampling device
_____ Screens in place and free of holes and tears
_____ Adequate and safe stairways to mixer platform
_____ All gears, pulleys, chains, and other moving parts guarded
_____ Automatic burner or recording thermometer and non-recording thermometer near discharge in aggregate bin
_____ Two or more asphalt binder tanks, or one tank for each grade asphalt binder normally stored
_____ Means provided for accurately measuring the volume of asphalt binder material in storage tank
_____ Return discharge line in asphalt binder tank near bottom (preferably located at opposite end of tank from outlet to plant)
_____ Sampling outlet in each asphalt binder tank or feed line to plant
_____ Non-recording thermometer for asphalt binder feed line or storage tank
_____ Drainage receptacle for flushing sampling outlet
_____ Ten test weights of 50 lbs. (Batch Plants)
_____ Scales for checking cold feeds
_____ Clean truck bed signs. (See Standard Specifications 401.02.01, N)
_____ Power Sprayer for truck bed solution
_____ Sturdily constructed platform of suitable height for inspection and sampling the mixture from any size truck 7 to 7.5 feet tall at floor level

Laboratory

_____ One computer installed with and utilizing a minimum system requirement: Microsoft Office 2003 Professional (Full Installation)
_____ One printer utilized for printing test data
_____ Sufficient parking space for state personnel, near the on-site laboratory
_____ Floor space 250 sq. feet
_____ Width, not less than 7 feet
_____ Height of ceiling, no less than 7 feet high
_____ One desk or table and two chairs
_____ One workbench 2.5 ft. by 6 ft. min.
_____ One permanent mounting base for solvent extractor located away from exit
_____ One light over each table and workbench and at least one ceiling light
_____ Electric wall outlets on each wall
_____ A fume hood and exhaust which are adequate for removal of solvent fumes (for solvent extractors)
_____ All contractor's equipment and supplies not pertaining to testing removed from the laboratory
_____ A suitable table or area (1.2 sq. feet) for purposes of mixing and quartering of mixture samples

Laboratory Equipment

_____ Laboratory accreditation documentation on file and updated as required
_____ One Superpave gyratory compactor and specimen extruding system (KM64-435)
_____ Four Superpave gyratory compactor molds (KM64-435)
_____ One set of calibration equipment for the gyratory compactor (including access to internal angle measuring device)
_____ One container meeting the requirements of KM64-411 (Pycnometer for Maximum Specific Gravity)
_____ A mechanical agitator for the Maximum Specific Gravity container
_____ A vacuum pump or water aspirator meeting the requirements of KM64-411 (capable of evacuating air from the vacuum container (pycnometer), to a residual pressure of 30.0 mm Hg or less)
_____ A manometer or vacuum gauge permanently mounted in-line for measuring partial vacuum of 30.0 mm Hg or less
_____ One oven capable of holding two 16 in. x 17 in. sample pans and 4 molds (capable of maintaining a constant temperature up to 360 ^{0} F)
_____ Five aggregate sample buckets
_____ Four sample pans (16 in. x 17 in.)
_____ One set of laboratory scales capable of weighing 5,000 grams to an accuracy of 1.0 gram
_____ All sieves necessary to perform gradation test
_____ One long handled square end shovel
_____ One 5 gallon storage can and sufficient solvent for extraction test (if applicable)
_____ Two dial stem thermometers
_____ One electric hot plate or oven with an adjustable temperature control capable of 1000 watts or greater, and accommodating a 16 in. x 17 in. sample pan
_____ One fire extinguisher (mounted near door)
_____ One first-aid kit
_____ One outside sealable container for collection of waste solvent (if applicable)
_____ Miscellaneous equipment (scoop, spatula, spoon, screen brush, gloves, rags, matches

10

General Certification Statement (all plants)

I certify that all the above items have been checked and worn or damaged parts have been replaced, and all items are on the plant site and are in good working condition. I understand that I will not be permitted to produce material for the Kentucky Department of Highways **if any one item is not available** as required or is not in satisfactory working condition.

Plant Supervisor_____ _____
(Signature) (Title)

For_____ _____
(Company Name) (Date)

Mailing Address _____
(PO Box, Street)

_____
(City)

_____ _____
(State) (Zip Code)

In the event that problems arise that are not suitable to be handled by the Qualified Superpave Plant Technologist or Superintendent, list below the name(s) of the person(s) who can be contacted.

(Name)	(Name)
(Title)	(Title)
(Phone)	(Phone)

11

KENTUCKY TRANSPORTATION CABINET
DIVISION OF MATERIALS
QUARRY REPORT

PAGE 1 OF 1 REV. 6/2008

SOURCE NO.: AGP088801 PRODUCER: XYZ Stone Company TYPE OF OPERATION: OPEN FACE
GEOLOGIC AGE/FORMATION: MISSISSIPPIAN / ST. LOUIS
COUNTY: Franklin LOCATION: TAKE I-234 WEST TO HWY 567 NORTH, GO 8 MILES NORTH, QUARRY ON RIGHT, 123 SOME ROAD, SOME CITY, KY
LAST INSPECTED BY: Joe Rubble DATE REPORTED: 9/4/12

PHYSICAL TEST								CHEMICAL ANALYSIS	LEDGE / BENCH			DESCRIPTION OF LEDGES OR BENCH
SIZE	ID & DATE SAMPLED	ABS.	SP. GR. (SSD)	SP. GR. (BOD)	SOUNDNESS	LA WEAR	PI	CaCO3 MgCO3 SiO2 R2O3 ACID IR	NO.	THICKNESS		
								STRIPPING		25'		SOIL & STONE
57's	11-0260 8/1/2011	0.7	2.70	2.68	0	21	6	SEE REMARKS NOTE # 4 & 5	1	31'	A	Fine grained dark grey crystalline limestone. Massive Bedded.
									2	6'	A	Light grey-white medium bedded, oolitic limestone. Ooliths are small but obvious.
8's	12-0105 4/12/2012	0.8	2.69	2.67	1	23		72 7 15 3 9	3	4"-1'	A	Fine grained dark grey limestone with chert nodules and quartz crystals. Thin Beds.
8's	11-0265 8/1/2011	0.8	2.69	2.67	1	23		69 7 16 4 13	4	7'	A	Coarse grained, grey-green, crystalline limestone with stylolite seams and fossils. Thick Beds.
DGA	11-0263 8/1/2011	0.7	2.69	2.67	0			Sand Equivalent 46	5	18'	B	Fine grained grey limestone with dark streaks. Thin Beds, (4" to 1'). SEE NOTE #6
LSS	11-0266 8/1/2011	0.4	2.68	2.67	0			Sand Equivalent 54				
								FLOOR				

COPIES TO: CO-DME-AGG SECT.
RED.... Indicates Restricted Bench, Waste, and or Poor Quality Ledge
P.I.....Pore Index (Size 57's)

CHEMICAL ANALYSIS
(Performed on 8's)
$CaCO_3$ .....Calcium Carbonate
$MgCO_3$ .....Magnesium Carbonate
R_2O_3 .....Metals
SiO_2 .....Silica
ACID IR .....Acid Insoluble Residue

SUPT.: BOB STONE

TECH.: ROCKY SMITH

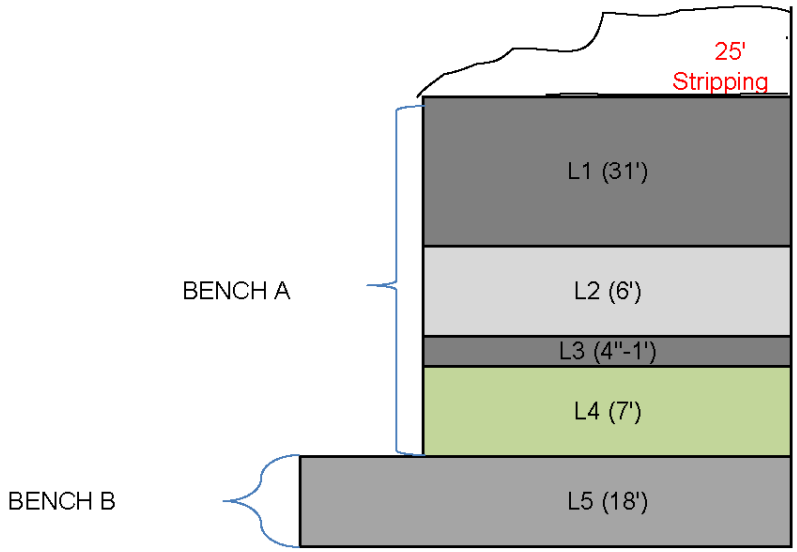
REMARKS:

1. Acceptance samples for aggregate supplied to the Transportation Cabinet will be taken at the last practical sampling point.
2. Aggregate produced for the Transportation Cabinet must be from a bench that has been tested for quality. The finished product must meet all applicable specification requirements.
3. The Division of Materials must be notified when changes are made in bench elevations.
4. Bench A passed Freeze Thaw with 0.02% expansion on Jan. 30, 2012.
5. Bench A passed Carbonate Alkali Reactivity with 0.01% expansion on March 15, 2012.
6. Bench B has not completed Freeze Thaw testing and is not approved for Freeze Thaw use at this time.

PLEASE KEEP THIS QUARRY REPORT AT THE QUARRY.

RESPECTFULLY SUBMITTED

AGGREGATE SECTION SUPERVISOR

PROFILE

XYZ Stone Company
AGP088801
9/4/2012