5.7. INSPECTION AND SAMPLING OF MATERIALS

1. ASPHALT MATERIALS

1.1. GENERAL

These instructions cover the inspection and sampling of asphalt materials.

1.1.1. Performance Graded Asphalt Binders and Cutback Asphalt.

Asphalt is a natural constituent of most crude petroleum oils. The crude petroleum is refined to separate the various components including naphtha, gasoline, kerosene, diesel fuel, lubricating oils, etc., and to recover the asphalt.

Asphalt binder is the basic result of this recovery and it is produced in a variety of grades. For highway uses, these are Performance Graded (PG) Binders ranging from PG52-22 to PG82-22. At normal temperatures asphalt binder is semi-solid and is brought to and maintained in a liquid state by the application of heat.

Rapid curing (RC) and medium curing (MC) cutback asphalts consist of an asphalt base fluxed with suitable petroleum distillates or diluents. Blending of the asphalt binder and diluents is done either in tanks or by automatic blending devices which draw the individual ingredients from storage tanks, mix them in pre-determined proportions and discharge the mixture into railroad tank cars or trucks.

1.1.2. Emulsified Asphalt.

Emulsified asphalt is a homogeneous liquid mixture consisting of asphalt binder, water and a small amount of emulsifying chemicals. Some emulsified asphalt grades also contain added petroleum distillate to improve mixing conditions and give long term stockpile life. Asphalt emulsions are of the anionic or cationic types. In general the anionic type deposits the asphalt binder by evaporation of the water while in the case of the cationic type the asphalt binder is deposited because of an electro-chemical attraction to the aggregate.

1.1.3. Asphalt Rejuvenating Agent.

Asphalt Rejuvenating Agent (ARA) is composed of a polymer modified asphalt emulsion. It is used to increase the ductility and penetration of the asphalt binder in an existing pavement.

1.2. Storage Facility

Special storage facilities (terminals) may be established on approval of the Chief, Bureau of Materials and Research at a location other than a refinery. A producer's certification must accompany each shipment.

1.3. Sampling Procedure.

Asphalt materials must be sampled in accordance with Department of Transportation Test Methods as set forth in subsection KT-26.

1.4. Asphalt Sampling Frequency.

The following Sampling Frequency can be used for Performance Graded Asphalt Binders, Cutback Asphalt, and Emulsified Asphalt.
**SAMPLING FREQUENCY LEVEL I** - one out of every three trucks is sampled and tested. When 5 consecutive samples from all sources statewide have been tested, by the Central Laboratory, and all comply with specification requirements, the producer will be upgraded to Level II.

**SAMPLING FREQUENCY LEVEL II** - one out of every six trucks is sampled and tested. When 5 consecutive samples from all sources statewide have been tested, by the Central Laboratory, and all comply with specification requirements, the producer will be upgraded to Level III.

**SAMPLING FREQUENCY LEVEL III** - one out of every 12 trucks is sampled and tested.

The sampling frequency levels are entered into CMS. All newly prequalified asphalts begin at Level I. Sampling frequency levels can carry over from year to year. Changes to sampling frequencies for a producer are entered in CMS as soon as they change, and will show up as an update on the next DTMTP030 report, which is printed weekly at the headquarters and the districts. To check or verify the frequency in CMS, enter the producer materials screen (DTMTB010), (hot key M, B, B) with the producer code. In addition, District Materials Engineers and Lab Chiefs will be notified of changes by e-mail as soon as the change is made. Indicate the sampling frequency level used on the sample container or information sheet.

Some samples may be disposed of in the Materials and Research Center Lab queue as soon as the sampling frequency changes. The disposal will not be entirely random, as all projects will be represented, but will be random within projects. The sample ID will be cleared with the explanation, “Not tested due to change in sample frequency requirements.” Samples over 14 days old when received will be disposed.

1.5. Testing performed for each sampling frequency level.

1.5.1. Performance graded asphalt binder.

**SAMPLING FREQUENCY LEVEL I** - of the 5 samples, all will get a complete analysis.

**SAMPLING FREQUENCY LEVEL II** - of the 5 samples, all will get a complete analysis.

**SAMPLING FREQUENCY LEVEL III** - once this level is reached all samples will get a partial analysis. Each month, a complete analysis will be performed on at least one sample per grade per producer.

1.5.2. Asphalt rejuvenating agent, cutback asphalt, and emulsified asphalt.

All samples, regardless of Sampling Frequency Level will get a complete analysis.
1.6. Analysis of Performance graded (pg) asphalt binder

<table>
<thead>
<tr>
<th>COMPLETE ANALYSIS</th>
<th>PARTIAL ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Binder:</td>
<td>Original Binder:</td>
</tr>
<tr>
<td>Flash Point, COC</td>
<td>Dynamic Shear</td>
</tr>
<tr>
<td>Brookfield Viscosity, 135°C</td>
<td></td>
</tr>
<tr>
<td>Dynamic Shear</td>
<td></td>
</tr>
<tr>
<td>Separation Test, 163°C (modified only)</td>
<td></td>
</tr>
<tr>
<td>Rolling Thin Film Oven Residue:</td>
<td>Rolling Thin Film Oven Residue:</td>
</tr>
<tr>
<td>Mass Loss</td>
<td>Dynamic Shear</td>
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<td>Dynamic Shear</td>
<td></td>
</tr>
<tr>
<td>Elastic Recovery, 77°F (modified only)</td>
<td></td>
</tr>
<tr>
<td>Pressure Aging Vessel Residue:</td>
<td></td>
</tr>
<tr>
<td>Dynamic Shear</td>
<td></td>
</tr>
<tr>
<td>Creep Stiffness, 60 seconds</td>
<td></td>
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<tr>
<td>Slope</td>
<td></td>
</tr>
</tbody>
</table>

2. BRICK AND CONCRETE MASONRY UNITS

2.1. Methods of inspection

2.1.1. At the Source.

Inspection of brick and concrete masonry units will, if possible, be made at the manufacturer's storage yard and will be made by an authorized representative of the Chief, Bureau of Materials and Research. Inspection at the source will consist of subjecting each lot to a careful visual inspection and obtaining a representative sample of the lot to be submitted to the Materials and Research Center, Topeka, Kansas for test.

The number of samples required is shown in section 5.5 of this manual. Each size of unit will constitute a separate lot. Specimens selected for sampling shall be representative of the lot of units from which they are selected. After sampling, the lot represented shall be marked for identification.

2.1.2. At Destination.

Inspection of masonry units delivered to the project will be the responsibility of the Field Engineer or the District Materials Engineer.

If the units have been tested and accepted before delivery, a visual inspection should be made to check the condition of the units and their identification. Slight imperfections, minor indentations or surface cracks incidental to the usual method of manufacture, or the chipping resulting from the customary methods of handling in shipment, should not be deemed grounds for rejection.

Units which have not been sampled before delivery must be sampled and inspected on the project. Sampling and inspection will be in accordance as above.
3. CONCRETE CURING MATERIALS

3.1. Burlap

All burlap is visually inspected prior to use to determine compliance with applicable portions of the specifications. Normally, burlap will only be sampled to check the weight. However, if the inspector suspects the material is contaminated with a water soluble ingredient which retards setting of the concrete, the materials should be sampled in accordance with section 5.5 of this manual. Such samples are submitted to the Materials and Research Center.

3.2. Liquid Membrane Forming Compounds

Acceptance by certification will be discontinued if tests show poor quality control during production.

Samples are taken from the containers in which the material is shipped. Prior to sampling, the material must be thoroughly mixed so that a representative sample is obtained.

Sample size shall be in accordance with the requirements of section 5.5 of this manual.

4. JOINT SEALING AND JOINT FILLER MATERIALS

4.1. Hot Type Joint Sealing Compound

Inspection and sampling of hot type joint compound is limited to securing samples from filled shipping containers and submitting them to the Materials and Research Center for testing. Samples will be taken by a representative of the Department, and must be available for testing in the Materials and Research Center a minimum of 10 working days prior to the date the material is required for installation.

Samples shall be taken as set forth in KT-27.

4.2. Cold Applied, Chemically Cured Joint Sealing Compound

Inspect the material visually before it is used. The Engineer should be satisfied that the shipment can be identified with the certification.

4.3. Preformed Elastomeric Compression Joint Seals for Concrete

The Type C certification shall be reviewed and the material will be inspected by the Engineer before it is used. The Engineer should be satisfied that the shipment is identified and that the proper material has been received.

4.4. Materials for Filling and Sealing Joints in Pipe

4.4.1. Compound Type Joint Filler

Inspection and sampling is limited to securing samples from filled shipping containers and submitting them to the Materials and Research Center for testing. If the material has been sampled, tested and accepted prior to shipment, the Engineer should inspect the material before it is used to satisfy that each package is identified with the test report and that no damage has occurred during handling, shipping and storage. If the material has not been sampled, the District Materials Engineer should be advised so arrangements can be made for sampling. Samples shall be taken as set forth in KT-27.

4.4.2. Flexible Gasket Type Joint Filler
The Engineer should inspect each piece of pipe at destination before it is placed so that it is identified with the test report and that the pipe and joint materials have not been damaged during shipping, handling, and storage.

4.4.3. Factory Molded Joints

Since these types of materials are not inspected prior to shipment, they must be inspected by the Engineer. The jute should be inspected for cross-sectional uniformity and freedom from defects that would allow the entrance of the melted lead into the pipe.

4.4.4. Materials for Sealing Joints in Cast Iron Pipe

The seals should be inspected at destination and prior to installation to determine the presence of imperfections that could cause leakage of the joint.

4.4.5. Expanded Closed-Cellular Rubber Gaskets for Reinforced Concrete Pipe and Precast Boxes

Visual Inspection by the Engineer for workmanship, fit, and final installation practices.

5. MISCELLANEOUS MATERIALS

5.1. ADMIXTURES FOR PORTLAND CEMENT CONCRETE

The inspection of admixtures is the responsibility of the Engineer. Since admixtures are delivered to the project without inspection, the Engineer must ensure that the product is on the prequalified list and that certifications as specified are available for each lot of material. If the Engineer has doubt as to the condition of the product or if the material fails to perform as expected, the material should be sampled immediately and submitted to the materials and Research Center for testing. Samples should be accompanied by a letter stating the deviation from expected performance.

5.2. CALCIUM CHLORIDE

This material will be inspected at destination and a verification sample is to be obtained from the first unit delivered.

Solid calcium chloride will be sampled by selecting at random not less than three containers. Each container so chosen is to be sampled by scraping aside the top layer to a depth of approximately 1 inch (25 mm) and taking samples by means of a sampling thief or other method which will ensure obtaining a representative cross section in the container to a depth of at least 6 inches (150 mm). Precautions must be taken during the sampling to avoid unduly exposure of the sample to atmospheric moisture. The individual samples are immediately and thoroughly mixed to form a representative composite sample which is placed in a moisture tight container for shipment to the laboratory.

Liquid calcium chloride will be sampled using the thief method as describe in KT-26 to obtain a 1 qt (1 liter) sample.

5.3. REFLECTIVE SHEETING

All reflective sheeting will be sampled according to ASTM D 4956. A full width X 1 yd (1 m) long specimen is selected at random to represent the entire sheet, roll or lot.
5.4. ELECTRIC LIGHTING AND TRAFFIC SIGNAL EQUIPMENT

When miscellaneous hardware and span and guy wire is shipped from a warehouse located within or near State borders, arrangements will be made to have the various items sampled and tested prior to shipment. When these items arrive on the project without previous sampling and testing, they will be inspected and sampled by the Engineer. The Engineer should review test reports and certifications to ensure that all items on the project are covered by the necessary documents, and should be satisfied that the entire shipment meets the required specifications.

A report covering items accepted by certification and visual inspection is issued by the Engineer. Items sampled and tested by the Materials and Research Center are covered by a copy of the laboratory report.

5.5. CENTER MOUNT REFLECTORS

Center Mount reflectors will be sampled by the Engineer and submitted to Materials and Research Center according to section 5.5 of this manual.

When only 1 reflector per sample fails testing the entire sample will be accepted for use on KDOT projects. A failure of 2 reflectors per sample will require resampling and testing. A failure of 3 or more will cause the entire sample to be rejected without resampling.

5.6. BEARING PADS OR MATS FOR STRUCTURES

Inspection and the issuance of acceptance reports is the responsibility of the Engineer. The Engineer is responsible for visual inspection on all Elastomeric and Preformed fabric pads.

6. MISCELLANEOUS METALS

6.1. ALUMINUM ALLOYS AND CAST ALUMINUM

Cast products that will be subjected to appreciable stress are the exception to this policy. The aluminum from which the castings are made is shipped to the foundry in ingots where it is remelted, cast and heat treated to a prescribed temper. Since there is a possibility that the alloy might lose its identity, or that heat treatment might not be adequate, it is the Department’s policy to test such items prior to acceptance. This policy is especially applicable to stress designed bridge handrail posts cast from Aluminum Association Alloy A444-T4.

Since all aluminum products except castings are shipped to the project without inspection, the Engineer must visually inspect the items for compliance with dimensional requirements, identification with certifications, workmanship, damage during handling, shipment, storage, erection, etc.

While cast items have usually been inspected at the point of production, they should be subjected to visual inspections by the Engineer to determine manufacturing flaws, dimensional defects and possible handling and shipping damage. If castings have not been inspected and sampled at the point of production, sampling in the field will be necessary. If field sampling is required, take one or more castings to represent each lot as defined in the specifications. Forward the samples to the Materials and Research Center for testing. If radiographs accompanied the shipment, forward these to the Materials and Research Center with the samples. If radiographs have not been furnished, the castings will be subjected to radiographic examination. In either case specimens will be removed for physical and chemical test, which will destroy the sample. Therefore, the Contractor must furnish additional castings at no charge to replace those taken for samples.
6.2. SHEET METAL FOR SIGNS

Sheet thickness should be measured with a micrometer.

7. BRIDGE PAINTS AND PAVEMENT MARKING MATERIALS

7.1. BRIDGE PAINT

7.1.1. Inspection at the Source

Inspection of paint or paint materials at the factory or at a distributer’s or dealer’s storage area will be made by the Engineer and will be limited to the taking of a representative sample and submitting it to the Materials and Research Center for testing. Except for mixed paints that may have settled badly, this is readily accomplished by following the methods in KT-28. If the inspector is asked to sample paint that has settled badly, with pigment caked on the bottom of the container to such an extent that it is impossible to properly mix, the Engineer should reject it on visual inspection and refuse to sample. Make sure all paints have been thoroughly mixed prior to sampling.

7.1.2. Inspection at the Destination

Inspection of paint delivered to a job site will normally be the responsibility of the Engineer. Since the paint should have been tested and accepted prior to delivery, the inspection will usually consist only of visual inspection for identification marks and for the condition of the paint in the container. The Engineer shall see that all paint is properly mixed before application. Paint that has been tested and accepted by the laboratory may be unfit for use if held in storage for extended periods of time. If the contractor is unable to mix the paint so that the pigment is completely and uniformly incorporated with the vehicle, the Engineer should reject it and require the contractor to obtain new material. Attention is called to the fact that it is extremely difficult to properly mix a five gallon can of paint by stirring with a paddle. If any hard pigment settlement is present it is impossible to do so. If necessary, the Engineer should insist that the paint be mixed according to KT-28. Make sure all paints have been thoroughly mixed prior to sampling.

7.1.3. Types of Packaging

Paint will usually be offered for sampling in the ready mixed form and may be either in a bulk storage tank or sealed packages such as one gallon and five gallon cans. Aluminum Paint, Inorganic Zinc Primer, Aluminum Epoxy Mastic Primer, and Polyurethane Field Coat will be offered in two or more containers with the paste or pigment in one container and the vehicle in the other container.

The source of the material will usually be the paint factory where the product will be in storage tanks or sealed packages, but it may be a distributer’s warehouse or dealer’s storage area where the material will be in sealed packages only. Occasionally materials such as linseed oil or thinners will be at a manufacturer’s plant other than a paint factory where the manufacturer will be compounding other products used in maintenance or construction.

7.1.4. Thinning

If thinning is permitted, the Engineer should inspect the thinner and see it is the type allowed by the Specifications. If a thinner is used, it must be one specified by the paint manufacturer.
7.1.5. Shop Coat

The shop coat primer on structural steel delivered to the job should be inspected by the Engineer. If the shop coat has been damaged by moving the steel before complete drying, or if the surface is contaminated by dirt, cinders, etc., it should be cleaned and repainted. In extreme cases the Engineer should require the damaged shop coat to be completely removed and the steel repainted with the shop primer. After erection of the steel, the Engineer should check the condition of the shop coat. Any skips, small areas left unpainted because of erection marks, rivets, bolt heads, and welded areas should be properly cleaned and touched up with an appropriate primer. The cleaning of field welded areas should be given careful attention. All slag, spatter, and excess reinforcing should be ground off and the weld area sand blasted before painting.

7.1.6. Methods of Sampling

Unless otherwise specified, all bridge paints will be sampled according to KT-28.

7.2 TRAFFIC LINE PAINT

7.2.1. Inspection at the Destination

Inspection of paint delivered to a job site will normally be the responsibility of the Engineer. Inspection will usually consist only of visual inspection for identification marks and for the condition of the paint in the container. The Engineer shall see that all paint is properly mixed before application. Paint may be unfit for use if held in storage for extended periods of time. If the contractor is unable to mix the paint so that the pigment is completely and uniformly incorporated with the vehicle, the Engineer should reject it and require the contractor to obtain new material. Attention is called to the fact that it is extremely difficult to properly mix a five gallon can of paint by stirring with a paddle. If any hard pigment settlement is present it is impossible to do so. If necessary, the Engineer should insist that the paint be mixed according to KT-28. Make sure all paints have been thoroughly mixed prior to sampling.

7.2.2. Types of Packaging

Paint will usually be offered for sampling in single component form and may be either in a bulk storage tank or sealed packages such as 55, 5 or 1 gallon containers.

7.2.3. Method of Sampling

Unless otherwise specified, all pavement marking paints will be sampled according to KT-68.

7.3. EPOXY PAVEMENT MARKING MATERIAL

7.3.1. Inspection at the Destination

Inspection of Epoxy Pavement Marking Material delivered to a job site will normally be the responsibility of the Engineer.

7.3.2. Types of Packaging

Epoxy Pavement Marking Material will usually be offered for sampling in a ready form and be in a heated bulk tanks. The source of the material will usually be the contractor.
7.3.3. Method of Sampling

Unless otherwise specified, all pavement marking paints will be sampled according to KT-66.

7.4. THERMOPLASTIC PAVEMENT MARKING MATERIAL

7.4.1. Inspection at the Destination

Inspection of Thermoplastic Pavement Marking Material delivered to a job site will normally be the responsibility of the Engineer.

7.4.2. Types of Packaging

Thermoplastic Pavement Marking Material will usually be offered for sampling in the melted form in heated bulk tanks or in powder form in sealed sacks. The source of the material will usually be the contractor.

7.4.3. Method of Sampling

Unless otherwise specified, all pavement marking paints will be sampled according to KT-30.

7.5. PERFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL

7.5.1. Inspection at the Destination

Inspection of Performed Thermoplastic Pavement Marking Material delivered to a job site will normally be the responsibility of the Engineer.

7.5.2. Types of Packaging

Performed Thermoplastic Pavement Marking Material will usually be offered for sampling in performed markings that are heat fused to the pavement. The source of the material will usually be the contractor.

7.6. SPRAYED THERMOPLASTIC PAVEMENT MARKING MATERIAL

7.4.1. Inspection at the Destination

Inspection of Sprayed Thermoplastic Pavement Marking Material delivered to a job site will normally be the responsibility of the Engineer.

7.4.2. Types of Packaging

Sprayed Thermoplastic Pavement Marking Material will usually be offered for sampling in the molten form that is applied to the pavement by spray means. The source of the material will usually be the contractor.
8. CULVERT, SEWER AND UNDER-DRAIN PIPE

8.1. CAST IRON PIPE

If pipe with a push-on or a mechanical joint is furnished, the joint elements should be examined carefully to determine whether or not they will produce a pressure tight seal. Each length should be carefully examined for all manufacturing defects or damage during handling that will impair its usefulness.

8.2. CORRUGATED METAL PIPE, PIPE ARCHES AND END SECTIONS

As a minimum, the Engineer should inspect the pipe at destination for possible damage during handling and shipping. A tag with the project number and station number should be attached to each section of pipe by the manufacturer. Defective pipe or pipe of questionable quality should be reported to the District Materials Engineer. If the pipe has not been inspected at the fabricator’s plant or some other location, a more stringent inspection will be required at the job site, consult the District Materials Engineer for guidance.

8.3. ASPHALT COATED CORRUGATED METAL PIPE, PIPE ARCHES, COUPLING BANDS AND STRUCTUAL PLATE

The pipe is identified by tags attached to each piece. The tags bear the laboratory number under which the pipe was inspected and the date of inspection.

9. CEMENTITIOUS MATERIAL

9.1. PORTLAND CEMENT

Many types of cement are manufactured, the kinds most commonly used for KDOT is Type I, Type IP, Type I (PM), Type II (MH), Type I/II (MH) and Type III. All these are covered by Kansas Department of Transportation Specifications Section 2001. Type II (MH) cement is usually required for concrete pavement and bridge decks with Type I, Type IP, Type I (PM) or Type II (MH) being allowed for all other concrete uses. Type I/II (MH) meets the requirements of both Type I and Type II (MH) and may be used when either type is specified. Type III cement reaches high strength earlier than other types and is sometimes permitted for use with small structures when it is important to finish a job quickly.

Portland cement may be delivered to the project in bags or in bulk. Most shipments to projects and to ready-mix plants are in bulk.

9.1.1. Responsibility

It is the responsibility of the Engineer to assure that cement manufacturers, concrete producers, and contractors comply with the Standard Specifications and Special Provisions. Complete and sincere cooperation of all persons involved is essential for successful and efficient cement inspection. The current list of prequalified cement plants is available from Kansas Department of Transportation’s website.

9.1.1.1. The operator of a prequalified cement plant or terminal furnishes all necessary information and facilities for adequate sampling by the Engineer to maintain prequalified status.
9.1.1.1.1. The plant operator exercises good quality control of the products and submits a monthly report of the test results and a statistical analysis (including standard deviations and means) of all the plant’s quality control tests for the month to the Chief of Materials and Research for all products for which the plant is prequalified.

9.1.1.1.2. A representative of the cement company must issue a certification to accompany each shipment consigned to State work. The certifications shall show compliance with the specification and is to be attached to or made a part of the scale ticket, weigh bill, or other shipping document accompanying the shipment.

9.1.1.2. Terminals are described as storage facilities established by cement companies in urban or large market areas some distance from a cement plant. The terminal is considered approved to supply cement to the Department of Transportation projects if the cement plant which produced it is prequalified. Cement shipped from terminals established by a prequalified cement company is to be handled the same as if shipped direct from the cement plant. A certification indicating compliance with the specifications, signed by a representative of the cement company, must accompany each shipment.

9.1.1.3. The Contractor, when purchasing cement from a prequalified cement plant advises the plant of the type of cement required and that a certification must accompany each shipment. The contractor must submit a copy of each certification to the Engineer. When purchasing concrete from a ready-mix operator, the contractor advises the operator of the need for certification of the cement by a representative of the cement company, and furnishes the ready-mix operator information relative to project number, type of cement, and class concrete.

9.1.1.4. The Ready-Mix Plant Operator, when furnishing concrete for State work requires certifications from the cement company for all cement delivered during the progress of work. In the case of cement in storage at the ready-mix plant at the beginning of a project which cannot be certified to be the producing cement company, or which has been in storage for more than three months, the Engineer must be notified so that appropriate sampling and testing may be done prior to the beginning of the work. The Ready-Mix operator certifies each week to the Engineer that all cement used to produce concrete for State work during that week was State approved, and lists certified cement received during the week.

9.1.1.5. The Engineer determines if the project is to be constructed of job mix or ready-mix concrete and reminds the Contractor that cement company certifications or State tests are required for all cement in storage at the beginning of the work and that all shipments received during the progress of the work must be accompanied by certifications. The Engineer verifies that the plant furnishing the cement is prequalified for the type being furnished. The Engineer determines during the construction of the project that certifications are available for all cement being used. The cement is acceptable for immediate use provided each shipment is accompanied by a certification showing compliance with specifications. The Engineer is to review the certifications from the contractor or ready-mix plant operator and at the completion of the project issues an acceptance report covering all cement used on each State project. (Use CMS Screen 130, Sample I.D. or Miscellaneous Report Form DOT 623, separate report for each producer supplying cement to a project. The type reported must match the type prequalified.)

9.1.1.6. Regional and District Laboratories perform sampling, record keeping and reporting necessary for monitoring compliance with specifications at cement plants and terminals in their area. Information Samples are obtained at the frequency of one per type prequalified every other month throughout the year. Offices sampling more than one plant should stagger their plants on opposing months to level out their sampling and MRC testing workloads. Samples of cement are to be obtained from one or more of the following sources.
Production Streams (only when agreed to by the producer)
Loading streams
Loaded containers
Transfer streams (from storage silo to shipping silo)

Verification samples are taken by each District at the rate of one sample per each one half calendar year from each mill or source providing cement in the District during that period.

Additional verification samples and tests may be required if any of the producer submitted data, or KDOT Verification or Information Sampling indicate a problem with quality control or compliance with Kansas specification limits. The increased sample frequency will be established in writing by the Chief of Materials and Research, and will remain in effect until the problem is resolved.

Test reports are issued to the Bureau of Materials and Research and to the appropriate cement plants on special request.

9.1.2. Basis of Acceptance.


9.1.3. Reporting.

Acceptance reports covering shipments of cement from unqualified plants are issued by the Materials and Research Center.

An acceptance report covering cement received from each qualified plant or approved terminal storage unit is issued by the Engineer. The report is issued after all concrete work is completed and covers the quantity of each brand and type of cement used on the project.

9.6.4. Sample Forms and Reports.

The following report forms and suggested certification statements illustrate references in the preceding sections.

9.6.4.1. Certification from the Prequalified Cement Plant or Terminal.

A certification similar to this suggested statement must accompany each shipment destined for State Projects. (See Figure 1)

9.6.4.2. DOT Form 697 (697A) - Certification of Cement used by Ready-Mix Company.

9.6.4.2.1. One copy of this form is sent to the Engineer by the Ready-Mix producer for the cement received and/or used during each week. If cement is neither received nor used during a weekly period, this form need not be submitted. (See Figure 2)

9.6.4.2.2. A certification is supplied to the Engineer covering cement in storage at the beginning of a project. (See Figure 3)

9.6.4.3. The following forms are used by the Engineer to report cement produced by prequalified companies and used on State Projects.
9.6.4.3.1. CMS Screen 130, Sample I.D. with assignment to the plant using CMS Screen 265 (See Figure 4). Follow procedures outlined in Materials Operations Memo 1007.

9.6.4.3.2. DOT Form 623 - Miscellaneous Report Form for those projects not on CMS. (See Figure 5)
SUGGESTED CERTIFICATION FROM A PREQUALIFIED CEMENT PLANT OR TERMINAL

Date:_________________________________________________

Truck or Car No._____________________________________

Shipped to:___________________________________________

_________________________________________________________________

_________________________________________________________________

This certifies that the Type _____ Portland Cement in this shipment was loaded from silo Number _____ , and that it complies with Kansas Department of Transportation specifications.

CEMENT COMPANY:_____________________________________

PLANT LOCATION:_____________________________________

TERMINAL (IF DIFFERENT):_____________________________

SIGNED:_____________________________________________

Figure 1
KANSAS DEPARTMENT OF TRANSPORTATION
CERTIFICATION OF MATERIALS USED BY READY MIX COMPANY

Project No.:____________________________________________
Date:______________________________________________

MEMORANDUM TO:__________________________________________, CONSTRUCTION ENGINEER

Re: Certification of Cement

This is to certify that all of the cement used in the production of concrete for the above project during the week of

___________________________ to__________________________ was Type________________________________ cement and

that the company from which this cement was received has certified that the cement meets the specifications of the Kansas Department of Transportation. Certifications covering this cement are on file in this office.

The following shipments of certified cement have been received by this company during the weekly period listed above:

<table>
<thead>
<tr>
<th>BRAND</th>
<th>QUANTITY</th>
<th>DATE OF CERTIFICATION</th>
</tr>
</thead>
</table>

Re: Certification of Aggregates

Type of Aggregate | Location of Deposit | Total Approx. Tons/Yds. This Week |
|------------------|---------------------|----------------------------------|

<table>
<thead>
<tr>
<th>Type of Aggregate</th>
<th>Location of Deposit</th>
<th>Total Approx. Tons/Yds. This Week</th>
</tr>
</thead>
</table>

This is to certify (Check applicable box or boxes)

1. All of the aggregates described above were:
   ☐ (A) Produced at the deposit location described.
   ☐ (B) Loaded from State tested and approved stockpile at the production site or from the plant while it was
         producing aggregate meeting applicable specifications.
   ☐ 2. Only State tested and approved aggregates were used to produce ready-mixed concrete delivered to State work.

______________________________________  
Name of Ready Mix Co

________________________________________________________________________________________

(Signature)  (Title)

Figure 2
KANSAS DEPARTMENT OF TRANSPORTATION

CERTIFICATION OF MATERIALS USED BY READY MIX COMPANY

Project No.:____________________________________________

Date: _________________________________________________

MEMORANDUM TO:_________________________________, CONSTRUCTION ENGINEER

Re: Certification of Cement

This is to certify that all of the cement used in the production of concrete for the above project during the week of _____________________________ to _____________________________ was Type _________________________ cement and that the company from which this cement was received has certified that the cement meets the specifications of the Kansas Department of Transportation. Certifications covering this cement are on file in this office.

Re: Certification of Aggregates

<table>
<thead>
<tr>
<th>Type of Aggregate</th>
<th>Location of Deposit</th>
<th>Total Approx. Tons/Yds. This Week</th>
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<td>Sec.</td>
<td>Twp.</td>
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This is to certify (Check applicable box or boxes)

1. All of the aggregates described above were:
   (A) Produced at the deposit location described.
   (B) Loaded from State tested and approved stockpile at the production site or from the plant while it was producing aggregate meeting applicable specifications.

2. Only State tested and approved aggregates were used to produce ready-mixed concrete delivered to State work.

__________________________________________
Name of Ready Mix Co

__________________________________________
(Signature) (Title)

Figure 3
Example of Sample ID Record

Example of Materials Assignment Screen DTMT 265

Figure 4
KANSAS DEPARTMENT OF TRANSPORTATION

REPORT OF SAMPLE OF ___________________________________________

Laboratory No. _______________________________

_____________________________________20_____

Received _____________________________20_____

Specification No. _____________________ ______________________________________________________________________________________

Quantity Represented ________________________________

Source of Material ______________________________________________________________________________________

Sample From __________________________________________________________________________________________

Submitted By __________________________________________________________________________________________

Identification Marks ___________________________________

________________________________________________________________________________________

Project or POV ___________________________________

Type of Construction ___________________________________

Contractor ___________________________________

TEST RESULTS

Reported By ________________________________

Title ________________________________

D.O.T. Form No. 623
9.2. HYDRATED LIME AND QUICKLIME

9.2.1. Inspection and Sampling

Lime shipped from plants having a satisfactory record of quality control is not inspected the Engineer prior to its arrival at destination. Therefore, the Engineer is responsible for the identification of the shipment with the accompanying certifications and the taking of verification samples from shipments selected at random. Samples are to be taking in accordance with the requirements of KT-29.

The Engineer obtains samples from shipping containers selected at random to verify the certifications issued by the producer. Should these samples indicate inadequate internal quality control by the producer, acceptance on certification is halted and each shipment is sampled and tested prior to use.

9.2.2. Reporting

The Engineer issues reports for lime covered by producer’s certifications.

9.3. FLY ASH

Fly ash is finely divided residue that results from the combination of ground or powdered coal. See KDOT Standard Specification section 2004. Samples are to be taken in accordance with the requirements of KT-29.

10. MATERIALS FOR ROADSIDE IMPROVEMENTS

10.1. This section covers the inspection, sampling and testing of materials used for roadside improvements, including safety rest areas.

Where reference is made to regular sampling and testing procedures or regular inspection procedures, the intent is that the material receives such testing or inspection as is prescribed in the Standard Specifications or in this manual. Reports should be issued for these materials.

Individual material items that do not require regular testing should be judged on the basis of visual inspection and, where indicated, approved catalog cuts. Reports of these inspections are not generally required.

Visual inspection reports of completed bid items should be based on the use of accepted materials in the construction of such items as indicated by tests, approved catalog cuts or visual inspection of the materials as indicated above. Specific reference to the individual tests or inspections need not be made. On visual inspection reports of completed bid items, only a general statement need be made to the effect that all materials used were acceptable.

10.2. PLANTS

Plants used in roadside improvements are either nursery grown or collected from their natural growing site. For acceptance criteria see Standard Specifications Manual Subsection 2102. Preliminary inspection may be made at the nursery or collecting field when deemed desirable by the Engineer. Final inspection and acceptance or rejection is made at the planting site in accordance with the Standard Specifications.
10.3. SEEDS

Seed used for highway projects is field grown, usually in Kansas or neighboring states. Contractors may procure seed from the grower or from individuals or companies engaged in buying and selling seed. Seed intended or offered for sale for planting must be processed and handled in accordance with the Kansas Seed Law and applicable rules and regulations of the Kansas State Board of Agriculture. For acceptance criteria see Standard Specifications Manual Subsection 2103. The appearance of the seed must not indicate improper storage or handling resulting in damage by rodents, excess humidity, free moisture, overheating or other cause.

10.3.1. Labels - Untreated Seed: The labels must be in the English language and must contain the following information:

10.3.1.1. The commonly accepted name of the kind and the variety, of each agricultural seed component in excess of five percent (5%) of the whole, and the percentage by weight of each in the order of its predominance. Where more than one component is required to be named, the word "mixture" or the word "mixed" shall be shown conspicuously on the label.

10.3.1.2. The percentage by weight of pure seed.

10.3.1.3. The percentage by weight of all weed seeds.

10.3.1.4. The percentage by weight of inert matter.

10.3.1.5. For each named agricultural seed:

10.3.1.5.1. The percentage of germination, exclusive of hard seed.

10.3.1.5.2. The percentage of hard seeds, if present.

10.3.1.5.3. Total germination percentage including hard seed may be shown.

10.3.1.5.4. The calendar month and year the test was completed to determine such percentages. (Seeds shipped within Kansas which have not been planted within 9 months after testing shall be resampled and retested. Seeds shipped across state lines which have not been planted within 5 months after testing shall be resampled and retested.)

10.3.1.6. The percentage by weight of agricultural seeds (which may be designated as "crop seeds") other than those required to be named on the label.

10.3.1.7. The lot number or other lot identification.

10.3.1.8. The origin: i.e., the state where grown, except for lawn grass seeds in quantities of less than 5 kg (10 pounds).

10.3.1.9. The name and rate of occurrence per unit weight of each kind of "restricted noxious weed seeds" present, which shall not exceed the limit stated in the Kansas Seed Law.

10.3.1.10. The name and address of the person responsible for such statement.

10.3.2. Labels - Treated Seed: Agricultural seed which has been treated with chemicals for insect or disease control, shall be labeled to show the following:
10.3.2.1. A word or statement indicating that the seed has been treated.

10.3.2.2. The commonly accepted, coined, chemical or abbreviated chemical (generic) name of the applied substance.

10.3.2.3. If the substance in the amount applied is harmful to human or other vertebrate animals, a caution statement, such as: "Do not use for food, feed or oil purposes." The caution for mercurials and similarly toxic substances must include in a contrasting color the word "poison" along with a skull and crossbones.

10.3.2.4. A separate label may be used to show this information, or it may be a component part of the main label.

10.3.3. Sampling.

Sampling of seed by Department personnel will seldom be required; however, should such sampling become necessary, it should be accomplished in a manner which will produce a representative sample in accordance with the Rules and Regulations of the Kansas State Board of Agriculture.

10.4. NITROGEN FIXING BACTERIA

Media for the inoculation of legume (bean) seed with nitrogen fixing bacteria are produced by only a few specialists in this field. Legume (bean) plants, when properly inoculated, form nodules on the root systems which contain millions of bacteria, called Rhizobia, that are fed by the host plant and in turn produce nitrogen. This nitrogen is then available to the legume plant to aid growth and making it independent of the supply of nitrogen in the soil. These bacteria are very sensitive to high temperatures and to drying. For acceptance criteria see Standard Specifications Manual Subsection 2106.

Observe the contractor's handling and storage of the inoculating material. Heat and drying must be avoided as either will cause extremely rapid death of the nitrogen fixing bacteria. The treating of the seed must be done in strict accordance with the supplier's directions and must result in heavy coating of the seed. Leguminous seed must be planted as soon as possible after inoculation. The maximum number of live bacteria will be on the seed at the time of inoculation after which the live bacteria decrease at a rate dependent on storage conditions. Exposure of the inoculated seeds to sunlight, high temperatures or drying conditions will increase the death rate of the bacteria.

No sampling of Nitrogen Fixing Bacteria is required, but perform a visual inspection of the container label to verify that the bacteria is of the proper culture, supplied in the proper quantity and properly dated.

10.5. AGRICULTURAL LIMESTONE

Ground limestone for agricultural purposes is almost always produced as a by-product of commercial quarrying and crushing limestone for other purposes such as highway and building construction. For acceptance criteria see Standard Specifications Manual Subsection 2107.

Sources supplying this material shall have been qualified by the State Board of Agriculture.

10.6. FERTILIZERS

Commercial mixed fertilizers are blended or formulated of ingredients which will furnish the desired amounts of nitrogen (N), phosphorus (P) and potassium (K) together with an inert material.
Usually this item will be listed in the contract proposal as "Fertilizer (xx-xx-xx)." The first number in parenthesis denotes the minimum percentage of nitrogen (N) required, the second number indicates the minimum percentage of available phosphorus (P) required and the third number indicates the minimum percentage of water soluble potassium (K) required. The particular fertilizer required for a contract is chosen by the Landscape Architect to best supply the needs of the crop being planted and the soil conditions on the project. For acceptance criteria see Standard Specifications Manual Subsection 2108.

10.7. SUMMARY OF INSPECTION, TESTING AND REPORTING REQUIREMENTS

Many roadside improvement projects contain a number of items not directly related to seeds or plants. These occur in rather variable quantities or numbers and often the Inspector is uncertain of the required inspection. The following gives the requirements for a number of such items.

10.7.1. AGRICULTURAL LIMESTONE - By receipt of proper certification.

10.7.2. AUTOMATIC WATERING SYSTEM - Use regular sampling and testing or inspection procedures on concrete, concrete reinforcing bars, cast iron pipe, steel pipe and corrugated metal pipe used for casing under roadways. Use regular procedure for plastic pipe if plans or specifications require conformance with an ASTM or other specifications. Other items are to be visually inspected. Issue a visual inspection report on the entire completed system.

10.7.3. BERMUDA GRASS SOD RETARDS - Issue visual inspection report.

10.7.4. BURLAP BAG SOD RETARDS - Issue visual inspection report.

10.7.5. CHARCOAL GRILL - Issue visual inspection report.

10.7.6. CHARCOAL GRILL BASE - Use regular sampling and testing or inspection procedures for concrete and reinforcing steel. Issue a visual inspection report for completed base.

10.7.7. COMBINATION TOOL SHED AND COMFORT STATION - Use regular sampling and testing or inspection procedures for concrete, concrete masonry units and reinforcing steel. Issue a visual inspection report for completed shelter.

10.7.8. CONCRETE SHELTER WITH WINDBREAK - Use regular sampling and testing or inspection procedures for concrete, curing material and concrete reinforcing steel. Issue a visual inspection report for completed shelter and windbreak.

10.7.9. ELECTRIC LIGHTING SYSTEM - Use regular sampling and testing or inspection procedures for anchor bolts, concrete, conduit and conduit fittings. Issue a visual inspection report on completed system.

10.7.10. FERTILIZER - Use regular inspection system.

10.7.11. FIREPLACE - Use regular sampling and testing or inspection procedures for concrete and reinforcing steel. Issue a visual inspection report for completed fireplace.

10.7.12. GLASS FIBER MAT (DITCH LINING, RIPRAP, WEED CONTROL) - Use regular procedures for glass fiber mat and subsidiary items such as seed, fertilizer, cover material, etc. Issue a visual inspection report for completed work.

10.7.13. GRILL - Use regular sampling and testing or inspection procedures for concrete and reinforcing steel. Issue a visual inspection report for completed grill.
10.7.14. JUTE MESH EROSION CONTROL MATERIALS - Use regular sampling and testing procedure. Issue a visual inspection report for completed erosion control.

10.7.15. MANURE - Issue visual inspection report.

10.7.16. MULCHING - Issue visual inspection report.

10.7.17. PEAT MOSS - Use regular sampling and testing procedure.

10.7.18. PIPE UNDERDRAIN - Use regular sampling and testing procedures for clay tile and underdrain aggregate.

10.7.19. SANITARY SEWER - Use regular sampling and testing or inspection procedures for pipe and materials for sealing and filing pipe joints.

10.7.20. SEEDS AND REQUIRED NITROGEN FIXING BACTERIA - Use regular inspection procedures.

10.7.21. SOD – Issue a visual inspection report for completed item.

10.7.22. TABLE (WOOD WITH OR WITHOUT BASE: CONCRETE WITH BASE) - Use regular sampling and testing or inspection procedures for concrete and reinforcing steel. Issue a visual inspection report for completed table.

10.7.23. TABLE SHADE - Issue a visual inspection report for completed shade.

10.7.24. TOPSOIL - Issue a visual inspection report.

10.7.25. TREES, SHRUBS, ETC. - Issue a visual inspection report.

10.7.26. WATERING SYSTEM - Use regular sampling and testing or inspection procedures for concrete, reinforcing steel and pipe. Issue a visual inspection report for completed system.

10.7.27. WATER WELL PUMP - Use regular sampling and testing or inspection procedures for concrete and reinforcing steel. Issue a visual inspection report for complete pump.

11. STEEL AND IRON

11.1. STRUCTURAL STEEL

11.1.1. Shapes and Plates.

For acceptance criteria see Standard Specifications Manual Subsection 1605. Acceptance reports issued by engineers who inspect items fabricated from structural steel also include the acceptance of the steel used in the fabrication of such units.

11.1.2. Structural Steel Fasteners.

Acceptance reports covering fasteners for bridge connections, splices and sign supports are issued by the Materials and Research Center. Acceptance reports for uncoated fasteners for other uses will be issued by the Field Engineer.
11.2. DEEP BEAM GUARDRAIL AND FITTINGS

Guardrail terminal sections, rail elements and hardware including bolts, nuts and washers must be visually inspected by the Field Engineer for conformance with dimensional requirements, including gage of metal, width, configuration of corrugations, condition of galvanized coating and identification of the shipment with the manufacturer's certification.

12. TIMBER, LUMBER, PILING AND POSTS

12.1. These instructions cover the inspection of timber products used for construction and maintenance purposes. The majority of timber products are produced in the southern states or the west coast region. The treating of most timber products is performed in the general region where the products are produced.

12.2. Basis of Acceptance.

For acceptance criteria see Standard Specifications Manual Subsections 2303, and 2304.

12.2.1. Pre-qualification required for wood posts and blocks

12.2.2. Appropriate certification packets required for all wood products


12.3.1. Inspection.

Timber products from treatment plants will be pre-qualified and monitored by Department employees working out of the Wichita Regional Laboratory.

12.3.2. Inspection Methods.

12.3.2.1. All wood products will meet the requirements as specified in the Standard Specification Manual subsections, as listed above.

12.3.2.2. Identification: Each piece of inspected timber product is identified by supplier, or their representative, for the required material grade. Following treatment, a lot number is stamped on each piece, or it may be stamped on a small piece of thin metal which is tacked to one end of the piece. As a minimum, the supplier identification, the treatment lot number, and minimum treatment requirement will be identifiable.

12.3.2.3. Inspection at Destination: Timber products should be inspected by the Field Engineer for identification marks, possible damage during handling and shipment, and serious defects that will impair the utility or durability of the piece. Defects that may have escaped the notice of the inspector include oversize knots, shakes, splits, checks, rot or decay, and straightness. Damage incurred during handling and shipment includes damaged ends and broken surfaces which expose untreated wood.

12.3.2.4. Notify the District Materials Engineer of any timber products that arrive on the project without proper documentation.

12.4. Reporting.

Acceptance reports will be written by field personnel, based on correct and complete documentation, covering all wood products received for use on Kansas Department of Transportation projects.
13. WATER FOR USE WITH PORTLAND CEMENT

13.1. Water from Domestic or City Supplies.

Water from domestic or city supplies and from other sources approved by health authorities for domestic use may be accepted without testing for all concrete except that to be used in the production of prestressed concrete units. All water must be tested before it is used in concrete for the production of prestressed units.

13.2. Untreated Water from Lakes, Ponds, Wells and Streams.

Water from these sources must be sampled and tested in the Materials and Research Center and accepted before it is used in the production of all classes of concrete.

13.3. Sampling.

Care should be exercised to insure that the sample of water is representative of the source of supply. Equipment used to take the sample and containers for shipping it to the laboratory should be clean. Samples are to be shipped in plastic or glass containers. If glass containers are used they must be carefully packed for shipment. Metal containers are not acceptable for shipping samples of water.

13.4. Reporting.

13.4.1. Water from Domestic or City Supplies. A visual inspection report is issued by the Engineer to cover the water used for regular concrete work. CMS projects do not require this report, because it is handled within the mix design.

13.4.2. Untreated Water and Water for Prestressed Concrete. The Materials and Research Center will issue a report showing the results of tests conducted on samples submitted by the Engineer.