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**DIVISION 2000
LIME AND CEMENTITIOUS MATERIALS**

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2001 - PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT

SECTION 2001

PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT

2001.1 DESCRIPTION

This specification governs the requirements for portland and blended hydraulic cement utilized in the production of concrete.

2001.2 REQUIREMENTS

a. General. Cement types are to be designated according to the classifications of AASHTO M 85 for portland and AASHTO M 240 for blended cement.

Utilize Type I, IP(x), IS(x), IT(Ax)(By), II(MH), or III cement as allowed in **SECTION 401**. The “x” and “y” in the previous sentence equals the targeted percentage of pozzolan or slag cement in the product expressed as a whole number by mass of final blended product. Likewise, “A” and “B” are either “S” for slag cement or “P” for pozzolan with “A” being the larger material by mass and “B” the smaller.

A cement type and source must be prequalified before it can be utilized in KDOT projects.

Cements of differing types and or sources cannot be intermixed within any singular component of a structure.

A contractor must have moisture protective facilities to store the cement required for 3 active construction days. The Engineer’s representative may waive this requirement if it is determined that a well-regulated supply from the cement producer can be maintained. Any cement that has been contaminated by moisture or reclaimed by any method is not acceptable.

Previously approved cement bulk stored at the source plant or terminal for over 6 months or in bulk or packaged and stored at a contractor or distributor facility for over 3 months after the initial test date is subject to re-sampling, testing, and the requirements of this subsection.

Cement stored at facilities, other than those described in the foregoing, before the initiation of construction or delivered to such facilities during construction of KDOT projects is to be sampled and tested and is subject to the requirements of this Section. This requirement may be waived if certifications documenting that the cement is a prequalified type from a prequalified source are provided to the Engineer’s representative.

b. Portland Cement. Provide Type I, Type II(MH), and Type III portland cement that comply with all applicable requirements (including the optional chemical and physical requirements, annexes, and appendices) of AASHTO M 85, except as modified by the following:

(1) The time of setting may be determined by use of the Gillmore needles method (AASHTO T 154), or the Vicat needle method (AASHTO T 131). Identify which method is being used on the report. KDOT will test using the Gillmore method.

(2) Optimized SO₃ – Provide supporting expansion data whenever SO₃ results exceed the requirements stated in AASHTO M 85, Table 1.

(3) If processing additions are used, report the percentage, composition, and the source of the additions in writing to KDOT.

(4) Heat of hydration requirements as stated in AASHTO M 85, Table 4 will not be enforced.

c. Blended Hydraulic Cement. Supply blended hydraulic cements Type IP(x), Type IS(x), and Type IT(Ax)(By) that comply with AASHTO M 240 except as modified by the following:

(1) Provide a written statement specifying the proportions and materials being blended to produce the blended hydraulic cement, and that the amount of pozzolan or slag cement in the finished cement will not vary more than ± 5.0% by weight of the finished cement from lot to lot or within a lot.

(2) Report the amount retained on the No. 325 sieve, and the fineness by the air permeability method in accordance with the procedures specified in ASTM C 204 at the time of shipment.

(3) Mortar expansion of the finished cement must be within the limits included in Table 2 of AASHTO M240 or the job specific mixture requirements in **subsection 2001.2d.(1)(d)**.

(4) The equivalent alkalis, as defined in Table 2 of AASHTO M 85, may not exceed 1.5% in any application.

For prequalification, or to increase the equivalent alkalis above current production levels, submit results from ASTM C 441 testing showing mortar expansion within the limits in Table 2 of AASHTO M 240 for the maximum

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equivalent alkalis level intended for production. Submit a sample to the Engineer of Tests for verification testing. Monthly quality control test reports will be monitored to verify the equivalent alkalis level of regular production remains below this maximum level. If production at a higher level is desired, complete requalification which establishes a new maximum limit will be required.

d. Field Blended Cements.

(1) Cements for use in concrete that are blended in the field by substituting any pozzolan or slag cement for portland cement whether in the mixer or otherwise, must comply with the following:

- (a) Provide a written statement specifying the proportions and materials being blended to produce the total cementitious content, and that the amount of pozzolan or slag cement will not vary more than $\pm 1.0\%$ by weight of the total cement from batch to batch.
- (b) Use portland cement or blended hydraulic cement from sources prequalified under this specification.
- (c) Use pozzolan or slag cement from approved or prequalified sources.
- (d) Test and provide project mix design results complying with **SECTION 401**.
- (e) Concrete made with these mixtures is subject to strength and other requirements detailed in other parts of the specifications.

(2) Silica fume, which is specified elsewhere, is excluded from the requirements in **subsection 2001.2d.(1)**.

(3) Refer to **SECTION 401** for more specific information regarding the substitution of any pozzolan or slag cement for portland cement as a field blended cement.

2001.3 TEST METHODS

Conduct all tests required by the applicable AASHTO, ASTM or other specifications of **subsection 2001.2** according to the procedures specified in that standard. Field sample cement in accordance with the procedures of Part V, KT-29. Obtain all other cement samples in accordance with the requirements and procedures of ASTM C 183.

2001.4 PREQUALIFICATION

a. Becoming Prequalified.

(1) Submit the following to the Engineer of Tests:

- (a) A copy of the quality control plan for the source. The plan should include information on what cement types are produced, where and how sampling is done, frequency, and what standards (AASHTO, ASTM, etc.) are applied.
- (b) A 2-gallon sample of each cement type produced by the source and permitted through this Section that is representative of the product intended for use on KDOT projects.
- (c) Certified quality control test results of cement, by type, that was produced by the source during the 6 months immediately before the prequalification request. Provide the high, low and average values or statistical analysis for each month.
- (d) Documentation of the source nominal cement production levels, by quantity of each type produced, for the 6 months preceding the prequalification request.
- (e) Documentation of routine Cement and Concrete Reference Laboratory (CCRL) inspection of the source laboratory performing the cement quality control testing. Include the results of the most recent evaluation.
- (f) The names of the individuals responsible for the quality control for cement production at the source.

(2) Submit monthly quality control reports for all prequalified cement Types within 2 weeks after completion of testing. Include supporting expansion data whenever SO_3 results exceed the requirements stated in AASHTO M 85, Table 1. Also include a summary of the amount, composition, and source of all processing additions used for each type of cement manufactured during the month. If none were used, report that fact also.

(3) Prequalification of a cement source, by type, will be based on cement produced when the source is utilizing specific materials, equipment and processes. Any change in materials, materials sources, equipment or processes voids the source prequalification, and a new prequalification will be required.

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b. Maintaining Prequalified Status. After a cement source has acquired prequalified status, the source will be permitted to provide cement, by prequalified type, for use on KDOT projects provided the following conditions are complied with:

(1) The quality-monitoring program meets the minimum sampling and testing frequencies established in ASTM C 183. This frequency may be altered somewhat with the approval of the Bureau Chief, Construction and Materials.

(2) Submit monthly quality control reports for all prequalified cement types within 2 weeks after completion of the testing. Include a summary of the amount, composition and source of all process additions used under ASTM C 465 for each type of cement manufactured during the month. If none were used, report that fact also.

(3) Utilize an approved laboratory to conduct quality control tests. The laboratory will be considered approved if it is properly equipped, has the capabilities to perform the tests required through this subsection and is routinely inspected through the CCRL program. Continued approval of the control laboratory and the source, by cement type, will depend on satisfactory comparison of its test results with the results obtained by the Materials and Research Center on random verification samples of cement produced by the source.

(4) The source has not changed materials, material sources, equipment, or processes since prequalification.

2001.5 BASIS OF ACCEPTANCE

a. Prequalification as specified in **subsection 2001.4.**

b. A proper certification must accompany each shipment of cement. Provide a copy of the bill of lading which includes the following certification statement and the signature of a responsible source representative to the Field Engineer responsible for the project.

Certification Statement

The material herein has been sampled and tested as prescribed by KDOT and complies with the applicable specification requirements for Type __ cement in accordance with the requirements of AASHTO _____.

Date _____ Signed _____

If a processing addition is used in the manufacture of the cement, include the following as a part of the certification statement:

A processing addition, consisting of __% of _____ and complying with the requirements of AASHTO M 85, has been used in the manufacture of this cement.

c. Identify the bills of lading with a project number, and denote the cement source, the type, and the quantity in the shipment. Retain this copy at the project or Contractor or distributor facility for the Engineer's representative's records.

d. In the case of more than one project being supplied by a contractor or distributor facility, the facility must provide the Engineer's representative either a copy of the bill of lading, or a signed listing of the bills of lading representing the cement, by type and source, incorporated into each project.

Note: Verification samples will be obtained by KDOT personnel at the project site. Test results that do not comply with the specifications of this subsection may be considered sufficient cause to rescind approval to furnish cement, by type, on a certification basis.

2002 - HYDRATED LIME

SECTION 2002

HYDRATED LIME

2002.1 DESCRIPTION

This specification covers hydrated lime suitable for use in mortar, portland cement concrete and the treatment of soil, soil-aggregate and asphalt mixtures.

2002.2 REQUIREMENTS

a. General. Ship and store lime in moisture proof containers. Lime that has become partially set or caked will be rejected.

b. Hydrated Lime for Mortar and Concrete. Provide Type N, normal finishing hydrated lime that complies with ASTM C 206.

c. Hydrated Lime for Treating Soil, Soil-Aggregate and Asphalt Mixtures.

(1) Hydrated lime for this purpose is any hydrated lime product consisting of hydrated lime and insoluble inert material and complying to the following:

- Available Lime Index as Calcium Hydroxide, %, min 90

(2) Hydrated lime for treating soil, soil-aggregate and cold in-place recycle asphalt pavement may be manufactured at the jobsite by slaking pebble quicklime. Use equipment specifically manufactured for this purpose and approved by the Field Engineer. Provide a certification stating the purity of the load with each load of quicklime.

Verification sampling of the pebble quicklime is required on the basis of 1 sample per 10 loads. Identify the sample as raw material for lime slaking, and submit a one quart sample with the certification for the load sampled to the MRC for comparison to the laboratory test.

(3) Carbide lime may also be used for treating soil and soil-aggregate. Carbide lime is hydrated lime created as a by-product of acetylene gas manufacturing. It is a relatively pure form of hydrated lime and retains approximately 50% moisture indefinitely after the manufacturing process. Its consistency at delivery is that of a flowable to semi-flowable paste which can be spread evenly over the subgrade. Provide hauling equipment that can be sufficiently sealed to prevent loss of the material during transportation.

During loading of the material, thoroughly mix the upper crust with the lower portions to provide a consistent product. The solids portion of the carbide lime material must comply with all chemical and physical requirements of **subsection 2002.2c** above, except as noted below.

Determine the percent solids of the material by using a rapid method (e.g. microwave), approved by the Engineer. Represent the quantity of material by randomly selecting 1 test per 5 loads for pay, and for determining the rate of application. Provide a copy of each test report to the Engineer along with copies of the weigh tickets represented. If the material demonstrates consistent percent solids content, a reduced testing frequency may be requested according to Part V. Periodic unannounced check tests for moisture content will be conducted by the Engineer.

Verification sampling of carbide lime is required on the basis of 1 sample per 10 loads. Place a one quart sample in a sealed, airtight container and forward it to the MRC for analysis.

The source of carbide lime used on a project must be tested and approved prior to use. The Engineer will take a representative sample of the material and forward it to the MRC for analysis. The source may be approved without testing if the material is currently being used on another KDOT project and has already been tested and approved.

If the available lime index falls below 90% during source qualification or verification testing, the first occurrence will be reported as non-comply (NCPL), and the Project Engineer will be notified. The DME may allow continued use of the source, and adjust the application and pay rates based on the test results, or may require the Contractor to use lime in another form or from another source. All subsequent verification samples from the same source that fail the available lime index will be reported as pass, attention advised (PAAA).

(4) Gypsum may be added, no more than 1% by weight, to assist in the pumpability of the lime slurry. If gypsum is used, it shall be incorporated into the process prior to slaking. Any addition of gypsum will be considered subsidiary to the Contract Documents.

2002 - HYDRATED LIME

2002.3 TEST METHODS

Sample and test according to the following methods:

- Chemical Analysis ASTM C 25
- Sampling, other than field ASTM C 50
- Sampling, Field KT-29
- Physical Tests ASTM C 110

2002.4 PREQUALIFICATION

None required, except for source qualification of carbide lime as outlined above. No prequalified lists are maintained for any hydrated lime products.

2002.5 BASIS OF ACCEPTANCE

a. Hydrated Lime.

- (1) Receipt and approval of a Type D certification as specified in **DIVISION 2600**.

b. Pebble Quicklime (for slaking).

- (1) Receipt and approval of the certified lime purity for each load of quicklime.
- (2) Visual inspection of the final product in the field.

c. Carbide Lime (for use as hydrated lime).

- (1) Approval of the source as outlined in **subsection 2002.2c(3)**.
- (2) Receipt and approval of a Type C certification as specified in **DIVISION 2600**.
- (3) Visual inspection of the material in the field.
- (4) Adjustments for moisture and available lime index as outlined in **subsection 2002.2c(3)**.

2003 - PEBBLE QUICKLIME

SECTION 2003

PEBBLE QUICKLIME

2003.1 DESCRIPTION

This specification covers pebble quicklime suitable for treatment of soil and soil-aggregate mixtures for purposes of stabilization. Pebble quicklime is a calcined material, the major part of which is calcium oxide or calcium oxide in natural association with a lesser amount of magnesium oxide capable of slaking with water. This specification applies specifically to lime made from calcium type limestone.

2003.2 REQUIREMENTS

Provide material that complies with the requirements of AASHTO M 216. When pebble quicklime is used as lime slurry, gypsum may be added (no more than 1% by weight) to assist in pumping the material. If Gypsum is used, incorporate into the process prior to slaking. Any addition of gypsum is considered subsidiary to the Contract Documents.

2003.3 TEST METHODS

Test according to the applicable provisions of ASTM C 25 and ASTM C 110.

2003.4 PREQUALIFICATION

Not Required.

2003.5 BASIS OF ACCEPTANCE

Receipt and approval of a Type D certification as specified in **DIVISION 2600**.
Satisfactory performance in the field.

2004 - FLY ASH FOR USE IN CONCRETE

SECTION 2004

FLY ASH FOR USE IN CONCRETE

2004.1 DESCRIPTION

This specification covers fly ash that may be used as a partial replacement for portland cement and blended hydraulic cement in concrete, when allowed by other parts of the Contract Documents.

2004.2 REQUIREMENTS

a. Fly ash sources must be prequalified.

b. Provide material that complies with the chemical and physical requirements of ASTM C 618, Class C or Class F, except the loss on ignition may not exceed 3.0%. The supplementary optional physical requirements apply, except that with the "Effectiveness in Controlling Alkali-Silica Reaction," the expansion of the test mixture as a percentage of the low-alkali cement control at 14 days may not exceed 120%. Conduct this testing with 15% fly ash and a Type I/II cement with an alkali content between 0.40% and 0.44%.

c. The quality-monitoring program must comply with the minimum sampling and testing frequencies established in ASTM C 311. This frequency may be altered slightly with the approval of the Bureau Chief of Construction and Materials, provided the monitoring intent of ASTM C 311 is met or exceeded.

d. There are other requirements that must be met for the fly ash/cement mixture in addition to those cited above for qualification of the fly ash alone. Additional testing will be required for specific applications. Consult the Contract Documents before proposing the use of fly ash in concrete.

2004.3 TEST METHODS

Sample and test fly ash according to ASTM C 311. Field sample according to Part V, KT-29.

2004.4 PREQUALIFICATION

a. **Becoming Prequalified.**

(1) Submit the following to the Engineer of Tests:

(a) A copy of the quality control plan for the source. The plan should include information on where and how sampling is performed, frequency, and what standards (ASTM, etc.) are used.

(b) A 2-gallon sample of fly ash representative of material intended for use on KDOT projects.

(c) Certified test results of fly ash produced by the power plant during the 6 months immediately before the prequalification request. Show the high, low and average values or statistical analysis for each month.

(d) Written information regarding the sources of coal utilized in the production of fly ash for the preceding 6 months, and that anticipated for the future.

(e) Written evidence of the latest Cement and Concrete Reference Laboratory (CCRL) inspection of the laboratory performing the fly ash testing.

(2) The Engineer of Tests will test the submitted sample and review the information submitted by the source, for compliance with the Contract Documents. The Bureau Chief of Construction and Materials will notify the source of the results in writing. Power plants complying with all requirements will be placed on a list of prequalified fly ash sources maintained by the Bureau of Construction and Materials.

(3) Prequalification of the source of fly ash will be based on material produced when the power plant is using specific materials, equipment and processes. Any change in materials, materials sources, equipment or processes voids the source prequalification, and a new prequalification will be required.

b. Maintaining Prequalified Status. After a fly ash source has gained prequalified status, the source will be permitted to furnish fly ash for use on KDOT projects provided the following conditions are met.

(1) Submit quality monitoring test reports monthly for all monitoring samples.

2004 - FLY ASH FOR USE IN CONCRETE

(2) Use an approved laboratory to conduct quality control tests. The laboratory will be considered approved if it is properly equipped, has the capabilities to perform the tests required by the Contract Documents and is regularly inspected by the CCRL program. Continued approval of the control laboratory and the source will depend on satisfactory comparison of its test results with the results obtained by the Materials and Research Center.

(3) The source has not changed materials, material sources, equipment or processes since prequalification.

2004.5 BASIS OF ACCEPTANCE

a. Prequalification as specified in **subsection 2004.4.**

b. A proper certification must accompany each shipment of fly ash. Provide to the Field Engineer 2 copies of the bill of lading which includes the following certification statement and the signature of a responsible company representative.

Certification Statement

The material herein has been sampled and tested as prescribed by KDOT and complies with the applicable specification requirements for Class ___ fly ash.

Date _____ **Signed** _____

Identify the bills of lading with a project number, and denote the fly ash source, the type and the quantity in the shipment. Retain these copies at the project or ready mix plant for the Field Engineer's records.

In the case of more than one project being supplied by a ready mix plant, the plant must provide the Field Engineer with a copy of the bill of lading, or a signed listing of the bills of lading representing the fly ash incorporated in each project.

Note: Verification samples will be obtained by KDOT personnel at the project site. Test results which do not comply with the Contract Documents may be considered sufficient cause to rescind approval to furnish fly ash on a certification basis.

**2005 - FLY ASH FOR STABILIZATION, MODIFICATION
AND COLD RECYCLE ASPHALT MATERIAL**

SECTION 2005

**FLY ASH FOR STABILIZATION, MODIFICATION
AND COLD RECYCLE ASPHALT MATERIAL**

2005.1 DESCRIPTION

This specification covers fly ash which is suitable for treatment of sub-grade stabilization and modification, and cold recycle asphalt material. Using fly ash to improve strength is the primary benefit for cold recycle asphalt material and sub-grade stabilization. Changing the moisture sensitivity of sub-grade is the primary benefit of modification, however; soil strength improvements are also expected. Fly ash is a finely divided residue that results from the combustion of ground or powdered coal.

2005.2 REQUIREMENTS

a. General. Comply with the physical requirements of ASTM D 5239, paragraph 6.4, and the chemical requirements of ASTM C 618, Table 1, for Class C fly ash. Sample and test production a minimum of once per month for quality control.

b. Fly Ash for Stabilization and Cold Recycle. Do not use fly ash as a substitute for lime. Meet or exceed a compressive strength of 500 psi at 7 days.

c. Fly Ash for Modification. Meet or exceed a compressive strength of 100 psi at 7 days.

d. Storage and Handling. Store and handle fly ash in closed waterproof containers before distribution on the roadway or fill. Other methods of storage and handling are subject to the approval of the Engineer. Partially caked or set fly ash is unacceptable for use.

2005.3 TEST METHODS

Sample the fly ash using KT-29. Test the chemical composition of fly ash in accordance with ASTM C 311. Test physical properties of fly ash by ASTM D 5239, paragraph 6.4.

2005.4 PREQUALIFICATION

New sources, sources that have not been used on a KDOT project within the last 12 months, and sources which have allowed the required monthly reporting of quality control test results to lapse, must be prequalified. Submit certified analyses of the quality control tests completed during the 90 day period immediately prior to the prequalification request. Certified analyses are defined as representative materials tested by a laboratory regularly inspected and certified by the Cement and Concrete Reference Laboratory (CCRL).

Forward the certified analyses and a 2-quart sample to the Engineer of Tests. The sample will be tested in accordance with this specification, and compared to the certified analysis of the quality control test.

If the material satisfies all requirements, the source will be placed on a prequalified list. Monthly results of the producers quality control testing are required to be forwarded to the Bureau of Construction and Materials to maintain status on the prequalified list. Active sources will remain on the prequalified list so long as verification samples and monthly test results comply with all requirements and indicate acceptable quality control.

2005.5 BASIS OF ACCEPTANCE

Prequalification as required by **subsection 2005.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

2006 – SILICA FUME

SECTION 2006

SILICA FUME

2006.1 DESCRIPTION

This specification covers silica fume, or microsilica, that may be used as a partial replacement for portland cement and blended hydraulic cement in concrete, when allowed by other parts of the Contract Documents. Silica fume is a by-product resulting from the reduction of high purity quartz with coal in electric arc furnaces in the manufacture of silicon and ferrosilicon alloys.

2006.2 REQUIREMENTS

Provide material which complies with ASTM C 1240.

2006.3 TEST METHODS

As specified in ASTM C 1240.

2006.4 PREQUALIFICATION

a. Sources of silica fume must be prequalified. Submit certified analyses of the quality control tests completed during the 6-month period immediately before the prequalification request. Certified analyses are defined as the range of test results of the properties specified above on representative materials tested by a laboratory which is regularly inspected and certified by the Cement and Concrete Reference Laboratory (CCRL). Include mill certifications for the raw material.

b. Forward the certified analysis to the Bureau Chief of Construction and Materials. If the material satisfies all requirements, the source will be placed on a prequalified list.

c. Verification samples will be taken by each District, at the rate of one per year, for each silica fume producer supplying material to that District's projects.

d. Semi-annual results of the producer's quality control testing, as defined above, are required to be forwarded to the Bureau of Construction and Materials to maintain status on the prequalified list. Sources will remain on the prequalified list, so long as verification samples and semi-annual test results complies with all requirements, and indicate acceptable quality control.

2006.5 BASIS OF ACCEPTANCE

a. Prequalification as specified in **subsection 2006.4**.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

2007 – SLAG CEMENT FOR USE IN CONCRETE AND MORTARS

SECTION 2007

SLAG CEMENT FOR USE IN CONCRETE AND MORTARS

2007.1 DESCRIPTION

This specification covers slag cement for use in concrete and mortars.

2007.2 REQUIREMENTS

Provide material that complies with the requirements of ASTM C 989, "Slag Cement for Use in Concrete and Mortars."

2007.3 TEST METHODS

As specified in ASTM C 989.

2007.4 PREQUALIFICATION

a. Manufacturers desiring to provide material under this specification are to submit the following to the Engineer of Tests:

- (1) A 2-gallon prequalification sample of each product they wish to prequalify.
- (2) Complete instructions on the use of the material and a Material Safety Data Sheet (MSDS).
- (3) Copies of quality control test reports for the 6 months before to the date of submittal to substantiate a history of satisfactory quality control. Also, provide evidence that the quality control laboratory is regularly inspected by the Cement and Concrete Reference Laboratory (CCRL).

b. If the prequalification samples comply with the requirements of **subsection 2007.2**, and the other submittals are satisfactory, the name of the product will be placed on a list of prequalified products maintained by the Bureau of Construction and Materials.

c. A prequalified plant will retain its prequalified status as long as test results of random samples obtained by KDOT and quality control samples obtained by the producer indicate that the plant is exercising acceptable quality control.

d. A terminal established by a prequalified plant will be considered prequalified to supply slag cement under this specification.

2007.5 BASIS OF ACCEPTANCE

Prequalification as required by **subsection 2007.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

**2008 – BLENDED SUPPLEMENTARY CEMENTITIOUS
MATERIALS FOR USE IN CONCRETE**

SECTION 2008

BLENDED SUPPLEMENTARY CEMENTITIOUS MATERIALS FOR USE IN CONCRETE

2008.1 DESCRIPTION

This specification covers blended supplementary cementitious materials (SCMs) that may be used as a partial replacement for portland cement in concrete, when allowed by other parts of the Contract Documents.

2008.2 REQUIREMENTS

a. All individual SCMs to be blended must be prequalified according to **DIVISION 2000**.

b. Provide material that complies with the chemical and physical requirements of ASTM C 1697, except the loss on ignition may not exceed 3.0%. The supplementary optional physical requirements apply, except that with the “Effectiveness in Controlling Alkali-Silica Reaction,” the expansion of the test mixture as a percentage of the low-alkali cement control at 14 days may not exceed 120%. Conduct this testing with 15% blended supplementary material and a Type I/II cement with an alkali content between 0.52% and 0.60%. Do not vary the amount of pozzolan or slag cement in the finished blended supplementary cementitious material from the target value by more than 2.5% for silica fume and not more than 5% for other supplementary cementitious materials.

c. The quality-monitoring program must comply with the minimum sampling and testing frequencies established in **DIVISION 2000** for the individual materials being blended. If the required sampling and testing frequencies of two or more SCMs vary, the sampling and testing plan of the SCM with the higher frequency will govern. This frequency may be altered with the approval of the Bureau Chief of Construction and Materials, provided the monitoring intent of each material is met or exceeded.

d. There are other requirements that must be met for the blended supplementary cementitious materials /cement mixture in addition to those cited above for qualification of the blended supplementary cementitious materials alone. Additional testing will be required for specific applications. Consult the Contract Documents before proposing the use of blended supplementary cementitious materials in concrete.

2008.3 TEST METHODS

Sample and test blended supplementary cementitious materials according to **DIVISION 2000**. Field sample according to Part V, KT-29.

2008.4 PREQUALIFICATION

a. **Becoming Prequalified.** Each supplemental cementitious material to be blended must be prequalified for use by KDOT on an individual basis prior to approval of the blended SCMs. Refer to **DIVISION 2000** for prequalification requirements for each individual type of material. Each blended SCM must also be prequalified as follows:

(1) Submit the following to the Engineer of Tests:

(a) A copy of the quality control plan for the source. The plan should include information on where and how sampling is performed, frequency, and what standards (ASTM, etc.) are used.

(b) A 2-gallon sample of blended product representative of material intended for use on KDOT projects.

(c) Certified test results of SCM produced by the material source during the 6 months immediately before the prequalification request. Show the high, low and average values or statistical analysis for each month.

(e) Written evidence of the latest Cement and Concrete Reference Laboratory (CCRL) inspection of the laboratory performing the SCM testing.

(2) The Engineer of Tests will test the submitted sample and review the information submitted by the source, for compliance with the Contract Documents. The Bureau Chief of Construction and Materials will notify the source

**2008 – BLENDED SUPPLEMENTARY CEMENTITIOUS
MATERIALS FOR USE IN CONCRETE**

of the results in writing. Sources complying with all requirements will be placed on a list of prequalified blended supplemental cementitious materials sources maintained by the Bureau of Construction and Materials.

(3) Prequalification of the source of product will be based on material produced when the material producer is using specific materials, equipment and processes. Any change in materials, materials sources, equipment or processes voids the source prequalification, and a new prequalification will be required.

b. Maintaining Prequalified Status. After a source has gained prequalified status, the source will be permitted to furnish the product for use on KDOT projects provided the following conditions are met.

(1) Submit quality monitoring test reports monthly for all monitoring samples.

(2) Use an approved laboratory to conduct quality control tests. The laboratory will be considered approved if it is properly equipped, has the capabilities to perform the tests required by the Contract Documents and is regularly inspected by the CCRL program. Continued approval of the control laboratory and the source will depend on satisfactory comparison of its test results with the results obtained by the Materials and Research Center.

(3) The source has not changed materials, material sources, equipment or processes since prequalification.

2008.5 BASIS OF ACCEPTANCE

a. Prequalification as specified in **subsection 2008.4.**

b. A proper certification must accompany each shipment of blended product. Provide to the Field Engineer 2 copies of the bill of lading which includes the following certification statement and the signature of a responsible company representative.

Certification Statement

The material herein has been sampled and tested as prescribed by KDOT and complies with the applicable specification requirements for Blended Supplementary Cementitious materials with the following designation: _____.

Date _____ Signed _____

Identify the bills of lading with a project number, and denote the product source, the type and the quantity in the shipment. Retain these copies at the project or ready mix plant for the Field Engineer's records.

In the case of more than one project being supplied by a ready mix plant, the plant must provide the Field Engineer with a copy of the bill of lading, or a signed listing of the bills of lading representing the blended product incorporated in each project.

Note: Verification samples will be obtained by KDOT personnel at the project site. Test results which do not comply with the Contract Documents may be considered sufficient cause to rescind approval to furnish blended supplementary cementitious material on a certification basis.