TO: REGIONAL ENGINEERS, HIGHWAY BUREAU CHIEFS, AND MANUFACTURERS AND SUPPLIERS OF FINELY DIVIDED MINERALS

SUBJECT: ACCEPTANCE PROCEDURE FOR FINELY DIVIDED MINERALS USED IN PORTLAND CEMENT CONCRETE AND OTHER APPLICATIONS

DEFINITIONS

**Department** - Illinois Department of Transportation.


**Finely Divided Mineral** - A finely divided material which has cementitious or pozzolanic properties. Examples are fly ash, microsilica (silica fume), ground granulated blast-furnace (GGBF) slag, and high-reactivity metakaolin (HRM).

**Manufacturer** - A company that manufactures a finely divided mineral. The term Producer is also used.

**Supplier** - A company that supplies a finely divided mineral which it does not manufacture.

**Source** - The name and location of the manufacturing process from which the finely divided mineral is obtained.

**Approved Source** - A source that is approved by the Bureau to ship a finely divided mineral for immediate use on Department projects.

**Unapproved Source** - A source that ships a finely divided mineral which must be sampled, tested, and approved by the Bureau before it is used on Department projects.

**Cement** - Portland cement.

**Fly Ash** - A finely divided residue that results from the combustion of ground or powdered coal, transported from the combustion chamber by exhaust gas, collected by mechanical or electrical means, and stored in stockpiles or bins.

**Microsilica** - An amorphous silica of high silica content and purity possessing high pozzolanic activity.
Ground Granulated Blast-Furnace (GGBF) Slag - A glassy granular material, formed when molten blast-furnace slag is rapidly chilled, and then finely ground.

High-Reactivity Metakaolin (HRM) - A reactive aluminosilicate pozzolan formed by calcining purified kaolinite at a specific temperature range.

Reference Material - A portland cement used for the control mortar and corresponding test mortars, of a finely divided mineral, to determine its strength activity index.

Preliminary (PRE) Sample - A sample used to determine, in advance, if the finely divided mineral will comply with Department specifications.

Process Control (PRO) Sample - A sample used for the purpose of controlling production of finely divided minerals proposed for incorporation into Department projects.

Acceptance (ACC) Sample - A sample used for accepting/rejecting finely divided minerals prior to its use on Department projects and/or unassigned stock for future use on projects. The quantity represented by acceptance samples must be given.

Independent Assurance (IND) Sample - A sample used to provide an independent check on the reliability of the manufacturer's quality control program.

Investigation (INV) Sample - A destination sample used to verify the acceptability of a finely divided mineral from a source.

Grab Sample - A sample secured from a conveyor, from bulk storage, or from a bulk shipment in one operation.

Composite Sample - Combined grab samples taken at prescribed intervals over a period of time.

NIST - National Institute of Standards and Technology.

CCRL - Cement and Concrete Reference Laboratory.

ISO 9000 Series - A program of international quality management system standards developed by the International Organization for Standardization (ISO).

1.0 PURPOSE

To establish procedures whereby materials of mineral origin, furnished by a Manufacturer or Supplier, will be accepted for use on Department projects.

2.0 SCOPE

This procedure is available to all Manufacturers or Suppliers of domestic and foreign Finely Divided Minerals. Sources in North America may be Approved or Unapproved. Sources located outside of North America will not be given Approved Source status, and the procedures in Sections 5.1 and 5.3 shall apply.
3.0 SPECIFICATION REQUIREMENTS, SAMPLING, AND TEST PROCEDURES

3.1 Finely Divided Minerals used on Department projects shall meet the material requirements of the Department’s “Standard Specifications for Road and Bridge Construction (January 1, 2007)” and current special provisions.

4.0 APPROVED SOURCE PROCEDURE

4.1 A Manufacturer or Supplier requesting Source approval of a Finely Divided Mineral shall provide the following to the Bureau:

(1) The Manufacturer’s or Supplier’s name and location.

(2) The Source name, location (station), and number of generating units.

(3) The name of the Finely Divided Mineral and its class or grade.

(4) A certification that the Finely Divided Mineral meets the applicable requirements of Section 3.0.

(5) A 6-month testing history.

(6) A copy of the Manufacturer’s or Supplier’s quality control program.

(7) A copy of the last CCRL inspection report of the testing laboratory used by the Manufacturer or Supplier of the Finely Divided Mineral, with documentation of resolution of any discrepancies noted therein. The Manufacturer or Supplier of HRM or Microsilica shall provide a copy of the testing laboratory’s CCRL inspection report and/or an ISO 9000 Series certificate.

(8) A copy of the Material Safety Data Sheet (MSDS) for the Finely Divided Mineral.

At the time of application, the Manufacturer or Supplier shall obtain a Preliminary (PRE) Grab Sample of the Finely Divided Mineral from current production. The Manufacturer or Supplier shall split the PRE Sample and place one portion in an airtight container and deliver it to the Bureau. A sample of the Reference Material used by the Manufacturer or Supplier for testing shall be included. The Manufacturer or Supplier shall assume the cost to deliver the samples to the Bureau. The size of the Bureau’s portion of the PRE Sample, and the Reference Material, shall not be less than 3 kg (6 lb.) each and the samples shall be properly identified as required in Attachment 1. The Manufacturer or Supplier shall test the retained portion of the PRE Sample for the standard physical and chemical properties listed in the applicable specification in Section 3.0 and deliver a copy of the test results to the Bureau for comparison.

The Bureau will test its portion of the PRE Grab Sample for conformance to Section 3.0. The Bureau will compare the results obtained by both laboratories to determine compliance with the allowable difference between two laboratories set forth in the precision statement of each test method. Additional split sample testing will be required if the test results obtained on the PRE Grab Sample do not comply with the specification requirements of this policy memorandum.
An inspector from the Bureau may conduct a scheduled visit to inspect the laboratory facilities designated by the Manufacturer or Supplier to test the Finely Divided Mineral; the Source manufacturing process, the Source storage facilities; and the quality control policies, procedures, and practices used by the Manufacturer or Supplier. The Manufacturer of Supplier shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the Department.

The Bureau will notify the Manufacturer or Supplier, in writing, if the request for Approved Source status is granted or denied. A request may be denied if the Manufacturer or Supplier fails to meet the requirements of this policy memorandum, or for other reasons determined by the Department.

4.2 Quality Control Requirements for Approved Sources:

The Manufacturer or Supplier shall establish and maintain quality control policies and procedures for sampling and testing that are approved by the Bureau. The Bureau shall be notified of any changes in the Manufacturer's or Supplier's quality control program.

Testing laboratories used by the Manufacturers or Suppliers of Fly Ash or GGBF Slag shall participate in the CCRL pozzolan program of the NIST, which includes inspection of facilities and testing of comparative samples. As an alternative to the CCRL pozzolan program of the NIST, Manufacturers or Suppliers of GGBF Slag may participate in the CCRL cement program. Testing laboratories used by the Manufacturers or Suppliers of Microsilica or HRM shall participate in the CCRL pozzolan program of the NIST and/or shall have implemented a quality management system based on the ISO 9000 Series standards.

4.3 Reporting Requirements for Approved Sources:

The Manufacturer or Supplier shall deliver a test report to the Bureau which lists the results of all Grab and/or Composite Samples taken and tested for the specified reporting period.

For Fly Ash, the report shall be monthly, and shall be delivered no later than forty calendar days after the end of the month. If the Fly Ash Source is sampling more frequently than once per month according to ASTM C 311, then the report shall be delivered no later than forty calendar days after the end of the composite date. If the deadline falls on a Saturday, Sunday, or State Holiday, the deadline shall be the next work day.

For GGBF Slag, HRM, and Microsilica, the report shall be quarterly and shall be delivered no later than forty calendar days after the end of each quarter. For the purpose of the reports, the quarters shall end March 30, June 30, September 30, and December 31. If the deadline falls on a Saturday, Sunday, or State Holiday, the deadline shall be the next work day.

Sampling, testing, and reporting shall be done according to the applicable specification in Section 3.0.

4.4 Record Requirements for Approved Sources:
Records of production control tests shall be maintained by the Manufacturer or Supplier for a minimum period of 5 years, and shall be made available to the Bureau upon request.

Copies of bills of lading of quantities of Finely Divided Minerals shipped shall be maintained by the Manufacturer or Supplier for a minimum period of 3 years, and shall be made available to the Bureau upon request.

4.5 Sampling and Test Requirements for Approved Sources:

For Fly Ash, each February, May, August, and November, the Supplier shall obtain a Process Control (PRO) Grab Sample.

For GGBF Slag, HRM, and Microsilica, each January, April, July, and October, the Manufacturer or Supplier shall obtain a PRO Grab Sample.

The PRO Grab Sample shall be split for testing by the Manufacturer or Supplier and the Bureau. At this time, a sample of the current Reference Material used by the Manufacturer or Supplier for testing shall also be split.

The Bureau may require that more frequent PRO Grab Samples be obtained and tested. Increasing the sampling frequency may be required due to significant changes in the material or process, variations in test results between the Bureau and Manufacturer or Supplier, field test results, or other reasons as determined by the Bureau. The Bureau samples shall be placed in airtight containers, properly identified on form BMPR CM01 (www.dot.il.gov/materials/materialforms.html), and delivered to the Bureau no later than the last work day of the month. Each Finely Divided Mineral sample and Reference Material sample shall not be less than 3 kg (6 lb).

The Manufacturer or Supplier shall test the retained portion of each PRO Sample, using the retained portion of the Reference Material, for the standard physical and chemical properties listed in the applicable specification in Section 3.0. When all tests are completed, the Manufacturer or Supplier shall record the test results on a report form that identifies the sample as a PRO Sample, and deliver the report to the Bureau no later than the last work day of the following month from the date of sample.

The test results obtained by the Manufacturer or Supplier and the Bureau on all split samples will be compared for compliance with the allowable differences for two laboratories set forth in the precision statement of each test method and for compliance with Section 3.0. If significant differences exist in the split sample test results, the Department will investigate sampling and test procedures, or require additional comparative sampling to determine the cause of the variation.

4.6 Department Inspections of Approved Sources:

An inspector from the Bureau may conduct unscheduled visits, at Department expense, to each Approved Source or one of its terminals. During this visit, the inspector will either take or witness the taking of a random Independent Assurance (IND) Grab Sample. The inspector will split the sample and deliver an equal portion to the Manufacturer or Supplier. The Manufacturer or Supplier shall test the retained portion of the split sample for the standard physical and chemical properties
listed in the applicable specification and deliver the test results to the Bureau, as specified in Section 4.5, for comparison and compliance with Section 3.0.

Random Investigation (INV) Samples of the Finely Divided Minerals and the project Cement will be obtained at final destination by a representative of the Department. The representative will either take or witness the taking of the INV Samples. INV Samples will be Grab Samples and shall not be less than 3 kg (6 lb). (Note: Cement samples will be taken according to ASTM C 183). The sampling location and frequency for obtaining INV Samples will be determined by the Bureau in consultation with the district offices.

The Bureau will test INV Samples to ascertain the results of Finely Divided Mineral-project Cement combinations. To verify that Finely Divided Minerals shipped from Approved Sources meet the requirements of Section 3.0, the Bureau will test INV Samples with the appropriate Reference Material.

4.7 Revocation of Approved Source Status:

Failure of a Manufacturer or Supplier to meet the requirements of Sections 3.0 and 4.0 of this policy memorandum will be sufficient cause to revoke Approved Source status. However, a total of three late submittals in a twelve month period for any of the following: test report (Grab or Composite Samples), PRO Sample, or PRO test results will be permitted. Revocation will occur if a fourth late submittal occurs in a twelve month period. The Manufacturer will be notified in writing when the third late submittal in a twelve month period occurs.

Failure to resolve significant differences in testing, as indicated by the test results obtained on PRO or IND Samples split with the Manufacturer or Supplier will be sufficient cause to revoke Approved Source status.

Failure of the testing laboratory, used by the Manufacturer or Supplier of a Finely Divided Mineral, to satisfactorily resolve the discrepancies noted in the CCRL inspection report and/or to maintain a quality management system based on the ISO 9000 Series will be sufficient cause to revoke Approved Source status.

Revocation of Approved Source status will be reported to the Manufacturer or Supplier in writing. The Manufacturer or Supplier may not re-apply for Approved Source status until 30 days have elapsed from the date of the written notice of revocation.

5.0 UNAPPROVED SOURCE PROCEDURE

5.1 A Manufacturer or Supplier requesting approval of a Finely Divided Mineral from an Unapproved Source shall provide the following to the Bureau:

(1) The Manufacturer's or Supplier's name and location.

(2) The Source name, location (station), and number of generating units.

(3) The name of the Finely Divided Mineral and its class or grade.
(4) A current test report, in English, which indicates the standard physical and chemical composition of the Finely Divided Mineral as per Section 3.0.

(5) The transportation method and location at which an inspector from the Bureau will be able to obtain Acceptance (ACC) Samples.

(6) If requested by the Bureau, the Manufacturer or Supplier shall deliver to the Bureau a 24-hr Composite Preliminary (PRE) Sample of the Finely Divided Mineral from current shipments. The Manufacturer or Supplier shall assume the cost to deliver it to the Bureau. The size of the PRE Sample shall not be less than 3 kg (6 lb) and the sample shall be properly identified as required in Attachment 1.

5.2 Sampling and Test Requirements for Unapproved Sources in North America:

(1) Finely Divided Minerals from an Unapproved Source will be sampled, tested, and approved by the Bureau before use on Department projects. The Bureau has the option to affix a seal to secure Finely Divided Minerals in storage (e.g. silo, truck, railroad car, or barge) until the Bureau’s testing is completed.

(2) Upon arrival of the Finely Divided Mineral to Illinois, an inspector from the Bureau will obtain Acceptance (ACC) Grab Samples according to the applicable specifications. The Bureau will determine the number of representative samples required.

(3) The Manufacturer or Supplier may request the Bureau to sample the Finely Divided Mineral prior to arrival in Illinois. In the event the request is approved, the Manufacturer or Supplier shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the Department inspector. If the Department determines that it lacks the resources to accomplish out-of-state inspection, the Finely Divided Mineral may be sampled and tested according to the procedures in Section 5.3.

(4) Acceptance (ACC) Samples will be tested by the Bureau for conformance to Section 3.0, and to approve the Finely Divided Mineral for use on Department projects.

(5) Random Investigation (INV) Samples of Finely Divided Minerals may be obtained at final destination by a representative of the Department. The representative will either take or witness the taking of the INV Samples. INV Samples will be Grab Samples and will be taken according to the applicable specification. The sampling location and frequency for obtaining INV Samples will be determined by the Bureau in consultation with the district offices. The Bureau will use INV Samples to verify that the Finely Divided Mineral shipped meets the requirements of Section 3.0.

5.3 Sampling and Test Requirements for Unapproved Sources Located Outside North America:
An agent of the importer shall obtain an Independent Assurance (IND) Grab Sample from each barge of foreign Finely Divided Mineral loaded at the port of entry and destined for Illinois.

The agent shall split each barge Grab Sample and mail one portion to the Bureau. The other portion shall be mailed to the importer’s testing laboratory that is approved by the Department. The importer of the Finely Divided Mineral shall be responsible for all sampling and mailing costs.

The importer’s laboratory shall test its portion of each barge Grab Sample for the standard physical requirements of the applicable specifications. One random barge Grab Sample, representing the Finely Divided Mineral in each hold of the vessel shall be tested for chemical composition.

Upon completion of the tests, the importer shall deliver to the Bureau a certification that states the Finely Divided Mineral in the vessel unloaded at the port of entry has been tested by the importer, and complies with the applicable specifications. Attached to the certification shall be a test report of all barge samples. The report shall include the name of the vessel, the source of the Finely Divided Mineral, the barge number, the hold number, the date the sample was taken, the quantity of Finely Divided Mineral in the barge, and the physical and chemical test results obtained on the samples.

The importer shall immediately notify the Bureau if a barge sample fails to meet the applicable specification requirements.

The Bureau will review the certification and compare the importer’s test data to the test data obtained by the Bureau on its portion of each split sample.

When the certification and the accompanying test report are examined and determined to be correct, the Bureau will notify the importer and the district offices that the Finely Divided Mineral is approved for state projects.

Random Investigation (INV) Samples, from one or more barges, may be taken by a Department inspector when the barges arrive at the Illinois terminal(s).

The Department will reject any foreign Finely Divided Mineral tested by the Bureau, or the importer, that does not meet the specification requirements. The Department may reject any barge of Finely Divided Mineral wherein the differences in test values, obtained by the Department and the importer on the split sample, exceeds the multilaboratory precision of the test method, but the Finely Divided Mineral is within specifications.

Alternative proposals to the sampling and test requirements stated in this section will be considered for Finely Divided Minerals which have an acceptable quality history, and which have previously been approved by the Department. Requests shall be directed to the Bureau of Materials and Physical Research for approval.

6.0 ACCEPTANCE OF FINELY DIVIDED MINERALS
6.1 Finely Divided Minerals will be accepted according to the Department’s current “Standard Specifications for Road and Bridge Construction,” current special provisions, and this policy memorandum.

6.2 The Bureau will maintain and circulate a current list of Approved Sources of Finely Divided Minerals which meet the requirements of this policy memorandum. This list will include the name, location, and Producer/Supplier Number of each approved Manufacturer or Supplier of Finely Divided Minerals. These Manufacturers or Suppliers may ship Finely Divided Minerals for immediate use on Department projects.

6.3 Finely Divided Minerals from Unapproved Sources will be approved by the Bureau before use on Department projects.

7.0 REJECTION OF FINELY DIVIDED MINERALS

7.1 A Finely Divided Mineral that fails to conform to the requirements of Section 3.0 of this policy memorandum shall be rejected for use on Department projects.

7.2 The Bureau will notify the Manufacturer or Supplier when a Finely Divided Mineral is rejected for use on Department projects.

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Attachment

This policy memorandum supersedes Policy Memorandum 06-03 dated January 1, 2006.
Vacuum Type Bulk Cement Sampler

- 75 mm (3 in) dia. ball valve
- 64 mm (2 1/2 in) dia. threaded pipe flange
- 64 mm (2 1/2 in) dia. PVC pipe approx. 1970 mm (74 in) long
- Approx. 60° bevel

Drop Type Bulk Cement Sampler

- Handle formed of #5 wire into arc approx. 220 mm (8 6/8 in) high and welded to opposite sides of pipe.
- 120 mm (4 5/8 in) o.d. galvanized pipe 5.6 mm (0.220 in) wall thickness.
- Solid cone of cold or hot rolled steel

Note: Total mass weight of sampler not less than 6 kg (13 lb)
Tube Type Bulk Cement Sampler

- Swivel Handle
- 76 mm (3 in) dia PVC Pipe
- Hole 51 mm x 127 mm (2 x 5 in)
- Hole 51 mm x 127 mm (2 x 5 in)
- 70 mm (2.75 in)
- Solid Aluminum Point

Dimensions:
- 1905 mm (75 in)
- 711 mm (28 in)
- 305 mm (12 in)