State of Illinois
Department of Transportation
Bureau of Materials and Physical Research

POLICY MEMORANDUM

January 1, 2007	Springfield	07-21

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.

Bureau - Bureau of Materials and Physical Research, at 126 East Ash Street, Springfield, Illinois 62704-4766.

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 American 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.

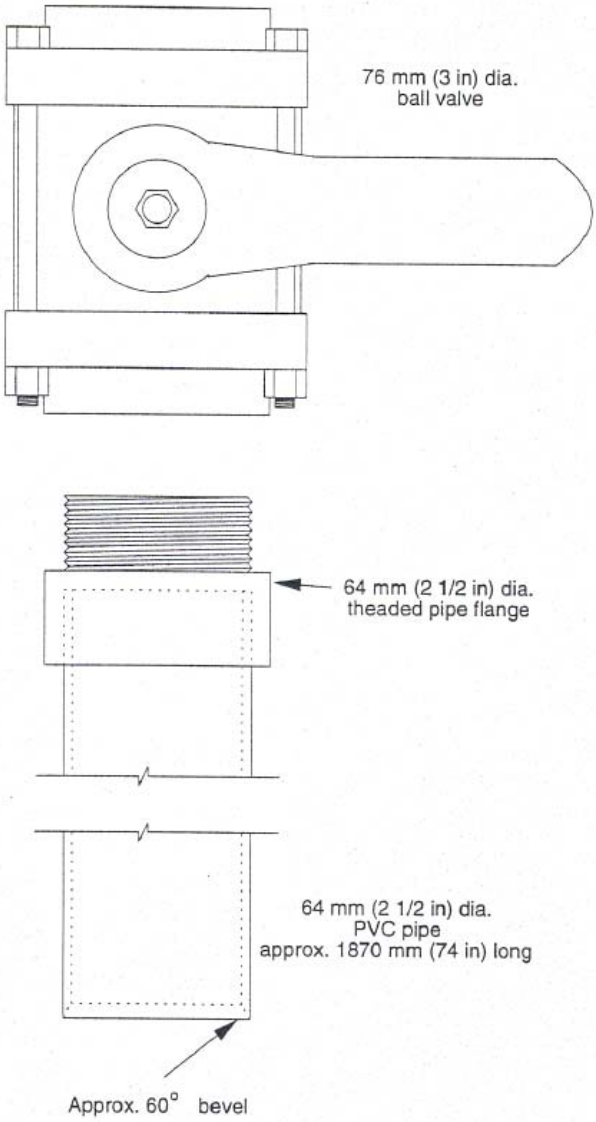
David L. Lippert, P.E.
Acting Engineer of Materials
and Physical Research

Attachment

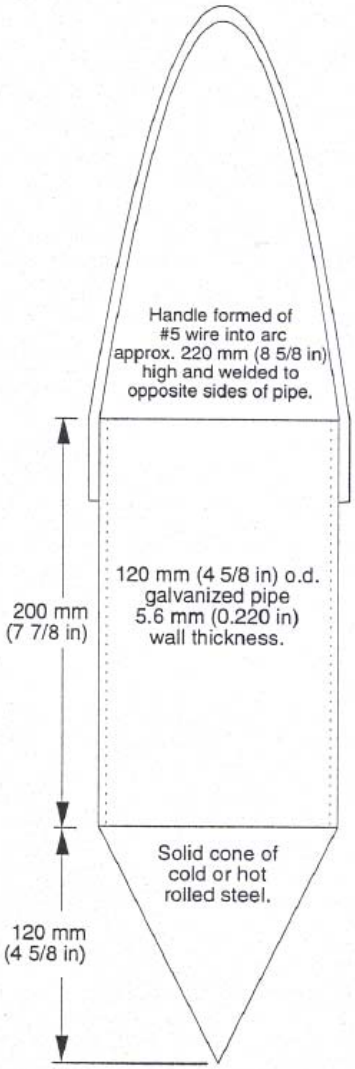
This policy memorandum supersedes Policy Memorandum 06-03 dated January 1, 2006.	

DAD/dt

Vacuum Type Bulk Cement Sampler



Drop Type Bulk Cement Sampler



Note:
Total mass weight of sampler not less than 6 kg (13 lb)

Tube Type Bulk Cement Sampler