



WSDOT Standard Practice QC 5

Standard Practice for Ground Granulated Blast-Furnace Slag Producers/Importers/ Distributors That Certify Ground Granulated Blast-Furnace Slag

1. Scope

This standard specifies requirements and procedures for a certification system that shall be applicable to all Producers/Importers/Distributors of Ground Granulated Blast-Furnace Slag.

This standard may involve hazardous materials, operations and equipment. It does not address all of the safety problems associated with their use. It is the responsibility of those using this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 AASHTO Standards

M 302 Standard Specifications for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars

R 18 Establishing and Implementing a Quality System for Construction Materials Testing Laboratories

2.2 ASTM Standards

C 989 Standard Specifications for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars

2.3 Agency's Standard Specifications

3. Terminology

3.1 AASHTO – American Association of State Highway and Transportation Officials

3.2 ASTM – American Society of Testing and Materials

3.3 CCRL – Cement and Concrete Reference Laboratory

3.4 NIST – National Institute of Standards and Technology

3.5 Import/Distribution Facility – A facility that receives finished ground granulated blast-furnace slag for distribution.

3.6 Production Facility – A facility that has the capacity for producing and/or grinding ground granulated blast-furnace slag.

3.7 Supplier – A supplier stores and then delivers ground granulated blast-furnace slag produced by another entity to a concrete plant or another supplier.

- 3.8 Supplier Certification – Certification of ground granulated blast-furnace slag provided by the supplier or importer using representative test results obtained in accordance with an agency approved QC plan and approved testing lab.
- 3.9 Agency – State highway agency or other agency responsible for the final acceptance of ground granulated blast-furnace slag. Samples and documentation shall be sent to:
- WSDOT State Materials Laboratory
Attn: Cement Acceptance Program Director
PO Box 47365
Olympia, WA 98504-47365
- 3.10 Specification Compliance Testing – Complete testing in accordance with the specification requirements.
- 3.11 Quality Control Testing – The quality control testing shall be described in the Production/Import/Distribution Facility’s quality control plan. The Production/Import/Distribution Facility’s quality control plan must be approved by the Agency.
- 3.12 CAP – Cement Acceptance Program
- 3.13 Mill Test Report – A document provided to the Agency on a monthly basis by a ground granulated blast-furnace slag producer that is actually produced at a U.S. or Canadian production facility. This document will list the actual chemical and physical test results of the product sample along with the appropriate AASHTO or ASTM specification limits.
- 3.14 Certificate of Analysis – A document provided to the Agency on a per shipload basis by a ground granulated blast-furnace slag importer/distributor for imported ground granulated blast-furnace slag. This document shall represent a specific shipload of imported ground granulated blast-furnace slag. This document will list the actual chemical and physical test results of the product sample along with the appropriate AASHTO or ASTM specification limits.

4. Significance and Use

- 4.1 This standard specifies procedures for accepting ground granulated blast-furnace slag. This is accomplished by a certification system that evaluates quality control and specification compliance tests performed by the Production/Import/Distribution Facility according to their quality control plan.

5. Laboratory and Tester Requirements

- 5.1 Laboratories shall be AASHTO accredited in all tests required by specification compliance testing or meet the following requirements:
- 5.1.1 Laboratory facilities shall adequately house and allow proper operation of all required equipment in accordance with the applicable test procedures.
- 5.1.2 The laboratory shall use personnel qualified in accordance with the appropriate sections of AASHTO R 18.
- 5.1.3 The laboratory shall use testing equipment that has been calibrated/standardized/checked to meet the requirements of each test procedure in accordance with the appropriate sections of AASHTO R 18.

- 5.1.4 Documentation of personnel qualifications and the equipment certification/standardization/checked records shall be maintained.
- 5.1.5 The agency at their discretion may review the laboratory in accordance with WSDOT [QC 3](#).
- 5.1.6 The laboratory must participate in the NIST's CCRL proficiency sample program.

6. Production/Import/Distribution Facility Qualification

- 6.1 The Production/Import/Distribution Facility shall submit a written request for acceptance into the Cement Acceptance Program to the Agency along with a copy of the Production/Import/Distribution Facility's Quality Control Plan.
- 6.2 The Production/Import/Distribution Facility shall submit one sample with its "Mill Test Report" or "Certificate of Analysis" for the initial lot for each grade of ground granulated blast-furnace slag it intends to provide to the Agency.
- 6.3 Initial lots shall be tested for conformance to Agency Standard Specifications and both physical and chemical requirements of either AASHTO M 302 or ASTM C 989.
- 6.4 The Production/Import/Distribution Facility shall allow the Agency to visit and observe the quality control activities and obtain samples for testing.

7. Production/Import/Distribution Facility Quality Control Plan

- 7.1 The quality control plan, as a minimum, shall identify the following:
 - 7.1.1 Facility type.
 - 7.1.2 Facility location.
 - 7.1.3 Name and telephone number of the contact person responsible for the quality control of the facility.
 - 7.1.4 The quality control tests to be performed on each grade of ground granulated blast-furnace slag.
 - 7.1.5 Name of the laboratory performing quality control tests on the ground granulated blast-furnace slag if independent of the Production/Import/Distribution Facility.
 - 7.1.6 Declaration stating that if a test result indicates that a lot of ground granulated blast-furnace slag is not in compliance with the specifications, the facility shall immediately notify the Agency of the lot in question.
 - 7.1.7 Description of the method and frequency for sampling, quality control testing, and specification compliance testing.
 - 7.1.8 Type of ground granulated blast-furnace slag the Production/Import/Distribution Facility intends to provide to the Agency.
 - 7.1.9 Show compliance with Section 5.
- 7.2 The Quality Control Plan shall be submitted to the Agency annually for review.

8. Documentation Requirements

- 8.1 Each Production/Import/Distribution Facility shall document its conformance to the Agency's Standard Specifications and both physical and chemical requirements of AASHTO M 302 or ASTM C 989 by means of either, a "Mill Test Report" or "Certificate of Analysis" that certifies the sample test results.
- 8.2 "Mill Test Reports" of all ground granulated blast-furnace slag shall be submitted by the producer on a monthly basis to the Agency. Negative reports (i.e., reports indicating no production for the month) are required to insure that a continuous flow of documentation is maintained.
- 8.3 "Certificates of Analysis" shall be provided by the importer/distributor to the Agency whenever a new shipment of imported ground granulated blast-furnace slag is received for distribution.
- 8.4 Separate sequences of "Mill Test Reports" shall be provided for each individual production facility and a unique lot number traceable to a production run shall be included in each report.
- 8.5 "Mill Test Reports" and "Certificates of Analysis" shall show the applicable test results and the applicable specifications of AASHTO M 302 or ASTM C 989 for each component or property tested and shall show the test requirements specified by the Agency.

9. Agency Requirements

- 9.1 The Agency will review the Production/Import/Distribution Facility's quality control plan listed in Section 6 and respond to the Production Facility within 30 days.
- 9.2 The Agency may perform quality assurance or acceptance sampling and testing in accordance with the agency standards.

10. Requirements for Shipping Ground Granulated Blast-Furnace Slag to Projects

- 10.1 The Production/Import/Distribution Facility's quality control plan as approved by the Agency (see Section 9) shall be implemented.
- 10.2 Each shipment shall identify the applicable "Mill Test Report" or "Certificate of Analysis." This may be included on the Bill of Lading for the shipment, or provided by other means as long as each shipment can be traced to the applicable "Mill Test Report" or "Certificate of Analysis."

11. Quarterly Split Sample Testing

- 11.1 Production/Import/Distribution Facilities, on a quarterly basis, shall split a production sample into two portions (10 pounds each) for each type of ground granulated blast-furnace slag being produced.
- 11.2 For the purpose of this standard, quarters are defined as January through March, April through June, July through September, and October through December.
- 11.3 All ground granulated blast-furnace slag test samples required by this standard shall be obtained as provided in the applicable standard specification or the Production Facility's quality control plan.

- 11.4 The Production/Import/Distribution Facility or an independent test facility meeting the requirements specified in Section 5 shall conduct chemical and physical testing on one portion.
- 11.5 The other portion, along with accompanying chemical and physical analysis, shall be submitted to the Agency. The sample will include the “Mill Test Report” or “Certificate of Analysis” for the lot number that is traceable to the production run of ground granulated blast-furnace slag.
- 11.6 The Production/Import/Distribution Facility shall submit a letter in lieu of split sample(s) indicating the grade(s) of ground granulated blast-furnace slag (if any) for which they were accepted under this program that were not produced during the quarter.

12. Comparison of Split Sample Test Results

- 12.1 The Agency may elect not to test their portion, but when the Agency does elect to test, the Agency may conduct chemical and/or physical tests.
- 12.2 The results of split sample tests must conform to the applicable AASHTO or ASTM specification requirements.
- 12.3 If any discrepancies or problems are identified between the Production/Import/Distribution Facility’s test results and the Agency’s test results the Production/Import/Distribution Facility shall respond to the Agency within 30 days and address the following points concerning their results:
 - a. Did the results reported accurately reflect the results obtained?
 - b. Were the test results properly transferred to the report?
 - c. Were the calculations leading to the test result correct?
 - d. Did the equipment used to perform the test meet specification requirements?
 - e. Did the test procedures conform to specification requirements?
 - f. Was corrective action taken to repair or replace defective equipment?
 - g. Was the technician instructed of the correct procedure?
- 12.4 The Production/Import/Distribution Facility shall prepare a response to the Agency, summarizing the results of the investigation, identifying the cause, if determined, and describing any corrective action taken. Comments may include the test facility’s data from CCRL Proficiency Tests.

13. Revocation of Certification Status

- 13.1 A Production/Import/Distribution Facility may have its certification status with the Agency revoked if found in nonconformance with the Standard Specifications or this Standard Practice.
- 13.2 The following criteria will be used to judge the conditions of nonconformance:
 - 13.2.1 Failure to follow the Production/Import/Distribution Facility’s approved quality control plan as required in Section 8.

- 13.2.2 Failure to declare that test results indicated that a lot of ground granulated blast-furnace slag was not in compliance with the specifications as required under Section 8.1.
- 13.2.3 When a test report shows nonconformance to the applicable specification, the results will be referred for comment and action to the Production/Import/Distribution Facility.
 - 13.2.3.1 The Production Facility shall submit one sample for retest from the next two available production runs.
 - 13.2.3.2 The Import/Distribution Facility shall submit two random samples for retest.
 - 13.2.3.3 If two of three successive samples show nonconformance, the Agency will revoke certification status.
- 13.3 A Production/Import/Distribution Facility that has had its certification status revoked may seek reinstatement by demonstrating conformance to the qualification criteria shown in Section 7.