

Portland Cement Mill Certification

1. Scope:

Mills furnishing Portland cement to South Dakota Department Transportation projects shall be classified by the Chief Materials and Surfacing Engineer as certified mills or non-certified mills in accordance with this procedure.

2. Apparatus:

2.1 The apparatus for sampling cement shall be as shown in SD 401.

3. Procedure:

3.1 Certified mill.

A. Basis for qualification.

- (1) A certified mill is any mill that furnishes Portland cement on a relatively continuous basis or a volume sufficient to justify the sampling and testing necessary to qualify and maintain a "Certified" status. The mill shall:
 - (a) Have an acceptable quality history based upon the manufacturer's data or Department of Transportation test records, as required by the Chief Materials and Surfacing Engineer.
 - (b) Maintain mill laboratory facilities which are periodically inspected by the Bureau of Standards Cement and Concrete Reference Laboratory (CCRL); or by an authorized representative of the Office of Materials and Surfacing.
 - (c) Maintain a record of cooperative test results conducted with the CCRL or the Department of Transportation Laboratory.
 - (d) As production warrants, and as directed by the Chief Materials and Surfacing Engineer, at the beginning of each month, make available to the local Region Materials Engineer a minimum of one random composite sample for each type of cement produced during the previous month. This sample will be tested by the Department.

Additional samples may be requested as deemed necessary, to determine the quality of cement being produced.

- (e) In addition to making a sample available as specified in (d) above, the certified mill shall also furnish the Region Materials personnel a copy of the most current Certificate of Compliance to represent each type of cement obtained that day.

Results of the following tests shall be reported on the Certificate of Compliance:

1. Physical tests (All types of cement):

Fineness (Specified surface).
Soundness (Autoclave expansion).
Time of setting.
Air content of mortar.
Compressive strength, Types I-II, and V, 3 day and 7 day.
Compressive strength, Type III, 1 day and 3 day.

2. Chemical analysis (All types of cement):

Silicone dioxide (SiO_2).
Aluminum oxide (Al_2O_3).
Ferric oxide (Fe_2O_3).
Calcium oxide (CaO).
Magnesium oxide (MgO)
Sulfur trioxide (SO_3).
Loss on ignition.
Insoluble residue.
Tricalcium silicate ($3 \text{CaO} \cdot \text{SiO}_2$).
Dicalcium silicate ($2 \text{CaO} \cdot \text{SiO}_2$).
Tricalcium aluminate ($3 \text{CaO} \cdot \text{Al}_2\text{O}_3$).
Sodium oxide (Na_2O).
Potassium oxide (K_2O).
Equivalent alkali ($\text{NaO} + 0.658\text{K}_2\text{O}$).

The Certificate of Compliance shall accompany the sample and Sample Data Sheet (DOT-1) to the laboratory.

- (f) If any individual sample fails to meet requirements of the applicable specification, the mill may be removed from the certified list, by letter from the Chief Materials and Surfacing Engineer.

Certification may be reinstated at the discretion of the Chief Materials and Surfacing Engineer when sufficient sampling and testing has determined that cement meeting specifications is being maintained.

3.2 Non-certified mills.

A. Basis for qualification.

- (1) Any mill not currently identified as a certified mill shall be a non-certified mill.
 - (a) The manufacturer and appropriate Department of Transportation personnel will be notified by the Office of Materials and Surfacing when a mill is certified and when there is a change in a mill's certification.

3.3 Portland cement delivery.

A. From a certified mill.

- (1) A Certificate of Compliance for each conveyance will not be required.
- (2) Samples shall be obtained in accordance with SD 401 at the minimum frequency prescribed.

B. From a non-certified mill.

- (1) Two copies of a properly executed Certificate of Compliance shall be submitted by the cement manufacturer for each conveyance, prior to or at time of delivery. Information required by the Certificate may be included as part of the standard bill of lading, loading or weight ticket, or shipping invoice.

The original shall be placed in the project file. The copy shall be forwarded to the Office of Materials and Surfacing.

- (2) Sampling shall be in accordance with SD 401, at the minimum frequency prescribed.

C. Portland cement deliveries without required documentation.

- (1) Shipments of Portland cement received without the required certification shall not be used until the Engineer in charge of the project has obtained the documents or has received satisfactory test results on samples of the cement.

4. Report:

Report the test results as set forth in AASHTO M 85.

5. References:

AASHTO M 85
SD 401