

DMS-4635**Natural Pozzolan****Effective Date: July 2023****1. DESCRIPTION**

2. This Specification establishes requirements and test methods for natural pozzolans. Pozzolans are finely divided siliceous or siliceous and aluminous material that will not react chemically with water but will react with calcium hydroxide and water at ordinary temperature to form compounds possessing cementitious properties. Raw or calcined natural pozzolans may be diatomaceous earths; opaline cherts and shales; tuffs and volcanic ashes or pumicites, calcined or uncalcined; and carious materials requiring calcination to induce satisfactory properties, such as some clays and shales units of measurements.

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

3. MATERIAL PRODUCER LIST

The Materials and Test Division (MTD) maintains the Material Producer List (MPL) of all materials conforming to the requirements of this Specification. Materials appearing on the MPL, entitled "Natural Pozzolan," require no further sampling and testing before use, unless deemed necessary by the Project Engineer or MTD.

4. BIDDERS' AND SUPPLIERS' REQUIREMENTS

The Department will only purchase or allow on projects those products accepted into the NPQMP and listed by producer and product code or designation shown on the MPL.

Use of qualified product does not relieve the Contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

5. QUALIFICATION PROCEDURE

- 5.1. **Qualification Request.** Submit a request for evaluation under DMS-4635 to DMS_Prequal@txdot.gov.

Include the following information in the request:

- name, address, and contact information for the supplier;
- name and location of the source;
- natural pozzolan origin and classification raw or calcined being submitted;
- capacity of the storage facilities;
- six mo. of weekly physical and chemical test data meeting Article 6., "Quality Monitoring," of this Specification;

- details of the supplier’s Quality Control Program, including measures taken to ensure that natural pozzolan meeting the requirements of this specification is kept separate from natural pozzolan that does not. For the imports, the Quality Control Program of the supplier in Texas is also required; and
- Information about the laboratory that performs all test required in Article 6.

5.1.1. **Criteria for Acceptance.** The laboratory or laboratories performing the physical and chemical tests for the supplier must be inspected by the Cement and Concrete Reference Laboratory (CCRL) and participate in the Pozzolan Proficiency Program, for the tests performed in Article 7., “Material Requirements.”

The supplier must:

- for foreign and domestic sources maintain an established terminal within Texas through which all natural pozzolan must pass, or
- for domestic sources, supplier must agree to reimburse the Department for all sampling expenses based on mileage and per diem costs for Department personnel traveling outside the State or for direct costs of sampling and shipping when sampling is accomplished through third-party agreements.

5.2. **Sampling and Testing.** Schedule sampling at the mutual convenience of the Department and the producer. Sampling will be in accordance with [Tex-733-I](#). Testing will be in accordance with the requirements of Article 7.

Monthly QM samples should be received by the 15th of each month. The Department reserves the right to conduct random sampling of materials for testing and to perform random audits of test reports.

Department representatives may sample material from the plant, terminal, transportation containers, and concrete plants to verify compliance with this Specification.

5.3. **Evaluation.** MTD will notify prospective bidders and suppliers after completion of material evaluation. If approved for Department use, MTD will accept the material to the NPQMP and add it to the MPL.

To remain on the NPQMP, producers must submit the following:

- monthly test report containing the following information:
 - test results, performed by a CCRL inspected laboratory, that shows the natural pozzolan complies with the requirements of this Specification,
- monthly sample from each approved storage unit collected in accordance with [Tex-733-I](#).

Major changes to the natural pozzolan produced will require re-qualification of the source. Notify the Department when a change in production occurs.

5.3.1. **Qualification.** If approved for Department use, MTD will add the material to the MPL.

Report changes in the composition or in the manufacturing process of any material to MTD. Significant changes reported by the producer, as determined by MTD, may require a re-evaluation of performance. The Department reserves the right to conduct whatever tests it deems necessary to identify a pre-qualified material and determine if there is a change in the composition, manufacturing process, or quality that may affect its durability or performance. In case of variance, the Department’s tests will govern.

5.3.2. **Failure.** Producers not qualified under this Specification may not furnish materials for use on Department projects.

Producers failing to qualify may submit a request for re-evaluation after 12 mo. have elapsed from the date of the original request. MTD may modify this time limit at its discretion. In the request for re-evaluation, document the cause of the issue and corrective action taken.

The Department normally bears the costs of sampling and testing; however, the producer will bear the costs associated with materials failing to conform to the requirements of this Specification and any re-evaluation testing. MTD will assess this cost at the time of testing and amounts due will be billed to the producer.

6. QUALITY MONITORING

6.1. **Reporting Requirements.** For each type of Natural Pozzolan on the NPQMP, submit:

- monthly test report containing the following information:
 - test results, performed by a CCRL inspected laboratory, that shows the natural pozzolan complies with the requirements of this Specification,
- monthly sample from each approved storage unit collected in accordance with [Tex-733-1](#).

For Pozzolans on the NPQMP or approved for a specific project, producers will submit monthly samples at the beginning of each month for all certified cements. Monthly QM samples should be received by the 15th of each month.

6.2. **Periodic Evaluation.** The Department reserves the right to conduct random sampling and testing of qualified materials to verify performance and Specification compliance and to perform random audits of documentation. Department representatives may sample material from the plant, terminal, transportation containers, and concrete plants.

Failure of materials to comply with the requirements of this Specification as a result of periodic evaluation may be cause for removal of those materials from the MPL. In case of variance, the Department's tests will govern.

6.3. **Disqualification.** Causes for disqualification and removal from the MPL may include, but are not limited to:

- failure to supply Natural Pozzolan to any Department project for 1 yr.
- any change in production procedures impacting natural pozzolan quality or composition,
- producers fails to meet the reporting testing requirements of this specification,
- falsification of documentation,
- producer fails to report any change in material composition or manufacturing process to MTD,
- material fails to meet the requirements of this Specification as a result of periodic evaluation, or
- producer has unpaid charges for failing samples.

MTD will remove disqualified producers from the MPL and will not allow submission of material for re-qualification for 12 mo., at the discretion of the Department.

6.4. **Re-Qualification.** Once the disqualification period established by MTD has elapsed, producers disqualified and removed from the MPL may begin the re-qualification process by submitting a request in accordance with Article 5. "Qualification Procedure," including additional documentation identifying the cause of the problem and corrective action taken. The re-qualification process will then follow all subsequent Sections of Article 5.

The Department normally bears the costs of sampling and testing; however, the disqualified producer will bear the costs associated with re-qualification. MTD will assess this cost at the time of re-evaluation and amounts due will be billed to the producer.

7. MATERIAL REQUIREMENTS

7.1. Natural pozzolan must meet all the physical and chemical requirements listed in Table 1.

Table 1

Natural Pozzolan Specification Requirements

Item	Limit	Test Method
Sum of Silica and Alumina Oxides, %	70	ASTM C114
CaO content, %	Report Only	ASTM C114
Sulfur Trioxide (SO ₃), maximum, %	5.0	ASTM C114
Magnesium Oxide (MgO), %	Report Only	ASTM C114
Total Alkali Content, expressed as NaO _{2,eq} , %	Report Only	ASTM C114
Strength Activity Index ¹ : <ul style="list-style-type: none"> • 7-day, Min, % of control • 28-day, Min, % of control 	80 80	ASTM C311
Fineness: Amount retained when wet-sieved on 45-µm sieve, Max, % or Particle Size Analyzer: D50 (µm) Uniformity of Fineness: % points from average of last 10 test results or by all preceding tests if the number is less than 10	Report Only Report Only Report Only	ASTM C311
Water requirement, maximum % of control <ul style="list-style-type: none"> • Raw • Calcined 	115 Report Only	ASTM C311
Moisture content, Max, %	4.0	ASTM C311
Loss on ignition, Max, %	Report Only	ASTM C311
Density Uniformity of Density: Max variation from average of last 10 test results or by all preceding tests if the number is less than 10, %	Report Only 5	ASTM C188
7 – Day Reactivity/Pozzolanicity Min (J/g of pozzolan) ²	125	ASTM C1897
The Department will determine the Effectiveness in Controlling Alkali-Silica Reaction ³ : 14-day Max expansion limit, %, when tested using a fine aggregate with ASTM C1260 expansion ≥0.30% at 14 days	<0.10	ASTM C1567

1. Meeting either the 7-day or 28-day is acceptable.

2. The Department will perform ASTM C1897 to determine compliance.

3. The Department will perform this test annually. Testing will begin with 20% replacement and be tested iteratively until requirements are satisfied.

The Department will report on the Material Producer’s List:

- the minimum dosage needed to control alkali-silica reaction
- sources that must use Item 421 Option 8 to determine minimum dosage needed to effectively control alkali-silica reaction, and
- sources not allowed to be used when sulfate resistant concrete is specified on the plans.

8. ARCHIVED VERSIONS

Archived versions are available.