



FLY ASH

GENERAL

Acceptance of fly ash will be on the basis of approved sources and upon satisfactory test results on samples obtained at the project site. Test results of fly ash shall meet the requirements of ASTM C618 and the Specifications of the Iowa Department of Transportation. Approval will require identification of the specific sources of the coal from which the ash is derived.

Approval is based upon fly ash produced when the power plant is utilizing specific materials, equipment, and processes. Any change in materials, equipment, and processes will void any source approval and require that a new approval be sought.

Fly ash produced immediately prior to shut down and after start up may be quite different from the fly ash normally obtained. The fly ash can be affected to the point that it does not meet specifications. Monitor samples or assurance samples tested by the Iowa Department of Transportation not meeting specifications will void the source approval.

SOURCE APPROVAL

A. Certified Source

A source may furnish fly ash on the basis of certification provided:

1. The quality-monitoring program meets the minimum sampling and testing frequencies established in ASTM C311. The tonnage units expressed therein are interpreted to refer to as-marketed material. The producer shall test at least one sample for each consecutive 30 days, for the months of March through October for conformance to Iowa Department of Transportation specifications. The test reports for all monitor samples shall be submitted to the Iowa Department of Transportation within 45 days of the sampling date.

In addition to the test frequencies established in ASTM C311, daily control tests shall be made to establish the uniformity of the fly ash being produced. Specific tests shall be agreed to by the engineer and may vary from source to source. As a minimum, the loss on ignition and percent retained on the No. 325 mesh sieve shall be determined.

Sample test records and shipment reports shall be available for inspection by Iowa Department of Transportation personnel for at least three years after the fly ash has been tested.

The Quality Control Laboratory will be considered approved if it is properly equipped and staffed to perform the tests required for an accepted Quality Control Program. Continued approval of the control laboratory will depend on the comparison of its test results with the Iowa Department of Transportation Central Laboratory. If major differences are found, an attempt to resolve them shall be made as quickly as possible. Continued unresolved differences in test results will be considered a basis for discontinuing control laboratory approval.

2. The fly ash has shown conformance to the applicable specifications for a continuous period of at least the last six months.
3. Available alkali in approval sources of fly ashes shall be less than 1.50%. The value of available alkali in fly ash can be either determined by the test method specified in ASTM C-311, or by statistical formula developed by Central Materials Laboratory based on historical data. Fly ash sources that have available alkali between 1.50% and 2.50% will be approved based on satisfactory results of the following test. Mortar bars made per ASTM C-311 with 15% and 30% fly ash, Type I cement with 0.70% to 0.80% of alkali (Na₂O) equivalent, and Pyrex aggregate shall exhibit no more than 10% expansion over non-fly ash mortar bars. Testing shall be performed by a laboratory approved by the Iowa Department of Transportation.
4. Each shipment of fly ash is properly certified.

The supplier of certified fly ash shall furnish for the project records two invoices or bill of lading copies that bear the following certification statement and the signature of a responsible company representative:

Certification Statement

The material herein described has been sampled and tested as prescribed by the Highway Division of the Iowa Department of Transportation and complies with the applicable specification requirements for Class _____ fly ash.

Date _____ Signed _____

The bills of lading or invoices shall include project number, if available, source name, source location, source code, class, and quantity in the shipment.

These copies of the bill of lading or invoice shall accompany each load, and shall be retained at the project or ready mix plant for the Project Engineer records.

The truck tanker shall have a copy of the invoice or bill of lading attached directly to the tanker portion of the truck. When the tanker unloads the contents at the project site, the unloading time and material final destination (storage "pig" number) shall be marked on this copy and left with the invoice or bill of lading copies.

In the case of more than one project being supplied by a ready mix plant, the plant shall furnish the Project Engineer, for each project, either a copy of each bill of lading or invoice, or a listing of the bills of lading or invoices representing the fly ash incorporated in the project. This listing shall bear the signature of a responsible supplier representative.

The source, car or truck number, ticket number, ash type, and quantity of each shipment of fly ash used on a project shall be recorded on Form #830211, or Form #830224, whichever is applicable.

5. Monitor samples secured and tested by the Iowa Department of Transportation indicate compliance with current specifications.

6. Percent Available Alkali

The percent available alkali listed in [Appendix A](#) shall be used in calculating the alkali level of the cementitious materials and for proportions for concrete mixes on construction projects when specified. Any adjustments in mix proportions shall be the responsibility of the contractor, and approved by the engineer.

7. Co-Mingling of Fly Ash

Mixing of fly ash from different sources, different plants, or different types into one storage bin or silo will not be allowed. At ready mixed concrete plants and paving batch plants, a fly ash storage bin shall be emptied, as far as practical, prior to refilling from a different source.

B. Sources for Pavement Subsealing and Jacking

1. Fly ash to be used for pavement subsealing and jacking may be accepted on an approved source basis as listed in [Appendix B](#).
2. A mixture of 3 parts fly ash and 1 part Portland Cement shall have an initial setting time between 30 minutes and 3.0 hours. Initial set is defined as 100-psi resistance when measured in accordance with ASTM C403.

PROJECT ASSURANCE SAMPLING

Required assurance samples will be secured at the project site just before incorporation into the work. Test results, which do not comply with the specifications, may be considered sufficient cause to rescind approval to furnish fly ash on certification basis. Construction, which contains fly ash represented by assurance samples, which show deficient test results, will be subject to the requirements of [Article 1105.04](#) of the Standard Specifications.

Depending upon certain chemical characteristics, fly ash is marketed as either Class F (non-cementing) or Class C (self-cementing) ash. The identification submitted with the assurance samples sent to the Central Laboratory should include the normal descriptive information as well as the source of the ash, the marketer and the class of the ash.

Precautionary measures shall be taken to prevent cement contamination of fly ash samples obtained at the proportioning plants. The samples shall be taken preferably as follows:

1. Directly from the delivery transport vehicles
2. Drop a sufficient amount of material in a clean container or a clean end loader bucket, and obtain a representative sample.