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## QUALITY ASSURANCE PROGRAM FOR CONSTRUCTION OVERVIEW & DESCRIPTION

### INTRODUCTION

The Iowa Department of Transportation (DOT) has established the following Quality Assurance Program to assure that the quality of materials and construction in all highway construction projects is in reasonable conformity with the requirements of the approved plans and Specifications, including approved changes. The program reflects conformance with the criteria contained in the regulation for Quality Assurance Procedures for Construction, published as 23CFR 637(B) on June 29, 1995. It consists of an Acceptance Program and an Independent Assurance Program (IAP), both of which are based on test results obtained by qualified persons and equipment.

This Quality Assurance Program allows for the use of the Contractor's test results as part of the acceptance decision if satisfactory validation is achieved by the Agency in accordance with [IM 216](#), [IM 511](#), and [IM 530](#). The IAP, as presently structured, is conducted exclusively by the Contracting Agency. The acceptance of all materials and workmanship is the responsibility of the Engineer.

In order to avoid an appearance of a conflict of interest, any qualified non-DOT laboratory shall perform only one of the following types of testing on the same project: Verification testing, quality control testing, IAP testing, or dispute resolution testing.

### ACCEPTANCE PROGRAM

Materials incorporated into highway construction projects shall be subject to sampling and testing, including Quality Control (QC) sampling and testing when required by specification. Sampling and testing shall be performed in accordance with location, frequency and procedures identified in [IM 204](#).

#### A. Quality Control Sampling & Testing

Contractor-performed QC sampling and testing may be used as part of an acceptance decision when required or allowed by specifications. Contractor QC sampling and testing personnel, laboratories, and equipment shall be qualified in accordance with the Iowa DOT Technical Training & Certification Program ([IM 213](#)) and the Materials Laboratory Qualification Program ([IM 208](#)), and shall be evaluated under the Independent Assurance Program.

If the Contracting Authority eliminates contractor quality control testing from the contract documents, the Contracting Authority shall perform the quality control testing at the frequencies identified in [IM 204](#). Validation of these test results is not required.

#### B. Verification Sampling & Testing

Verification of quality is performed on critical materials, through independent sampling and testing, at a frequency identified in [IM 204](#). Verification sampling and testing is done by Agency personnel or personnel hired by the Agency excluding the Contractor or vendor. Agency sampling and testing personnel, laboratories, and equipment will be qualified in accordance with the Iowa DOT Technical Training & Certification Program ([IM 213](#)) and the Materials Laboratory Qualification Program ([IM 208](#)), and will be evaluated under the Independent Assurance Program.

Verification samples will be obtained by agency sampling. For some sampling identified in [IM 204](#), the Contractor shall assist with sampling as directed and witnessed by certified Agency personnel. The sample location and time will be randomly selected by the Agency (except when noted elsewhere) and will only be given to the Contractor immediately prior to sampling. To maintain the integrity of the sample, it will either be transported by Agency personnel or secured by a tamper proof method and transported by the Contractor.

QC test results to be used as part of the acceptance decision will be validated by verification test results. Validation of Contractor test results will be done in accordance with [IM 216](#), [IM 511](#), and [IM 530](#). Contractor test results that fail the lot validation shall not be used for acceptance of that lot unless the dispute resolution system resolves the discrepancy. Verification test results will be used for lot acceptance pending the dispute resolution.

#### C. Quality Control Plans

When required by the Specifications, a Quality Control Plan (QCP) must be developed by the Contractor or producer and submitted to the Engineer for review. Minimum requirements for the QCP will be provided in an IM or specification.

#### D. Dispute Resolution System

When QC test results are used as part of the acceptance decision, testing disputes arising between the Contracting Agency and the Contractor shall be resolved in a reliable, unbiased manner or an evaluation performed by the Iowa DOT Central Materials Laboratory. Resolution decisions by the Iowa DOT Central Materials Laboratory will be final.

Unless specified elsewhere, the District Materials Engineer will select some or all of the following steps for the dispute resolution:

1. Check all numbers and calculations.
2. Review past proficiency and validation data.
3. Review sampling and testing procedures.
4. Check equipment operation, calibrations and tolerances.
5. Perform tests on split samples or reference samples.
6. Involve the Central Materials Laboratory.

If the discrepancy cannot be resolved using the steps listed above, or if it is determined that the Contractor's testing is in error, then the Agency test results will be used for the acceptance decision for that lot.

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## **INDEPENDENT ASSURANCE PROGRAM**

The Independent Assurance Program (IAP) will evaluate all sampling and testing procedures, personnel, and equipment used as part of an acceptance decision (Includes Contractor, Contracting Agency, and consultant). Testing performed by the Central Materials Laboratory is not subject to IAP. The Central Materials Laboratory maintains accreditation through the AASHTO Materials Reference Laboratory (AMRL) Program.

The IAP includes both system- and project-based approaches defined as follows:

- **Project Approach.** The frequency of IAP activities is based primarily on quantities of materials being tested and requires minimums (as per [IM 204](#)) on every project.
- **System Approach.** The frequency of IAP activities is based on time intervals, regardless of the number of tests, quantities of materials, or numbers of projects being tested by the individual and equipment being evaluated.

The systems approach for IAP was implemented statewide in 1999 for evaluation of Contractor, consultant, city, county, and state equipment, procedures, and personnel involved with project acceptance. Within implementation of the systems approach, the District Materials Engineer may find it more appropriate to retain use of the project approach for IAP on specific projects when the systems approach cannot be effectively applied.

Independent assurance includes evaluation based on:

Calibration checks  
Split samples  
Proficiency samples  
Observation of sampling and testing procedures

### **A. IAP Personnel & Equipment**

IAP testing equipment must not be the same equipment that was used by the project QC or verification personnel. IAP personnel must not be involved in the project verification testing or QC testing for the sampling and testing procedure they are evaluating on that project.

### **B. Comparison of Test Results**

A prompt comparison of the test results obtained by the individual being evaluated and the IAP tester will be performed by the Engineer. If results of the comparisons do not comply with tolerances provided in [IM 216](#) or criteria in [IM 208](#), [Appendix C](#), a review of the test procedures and equipment shall be performed immediately to determine the source of the discrepancy. Corrective actions must be identified, incorporated as appropriate and followed by additional IAP testing. Test results from all the samples involved in the IAP will be documented and reported in the appropriate District or project files.

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C. Annual Report of IAP Results

The Central Materials Office will compose and submit an annual report to the FHWA Division Administrator summarizing the results of the Iowa DOT's systems approach IA Program. This report will identify the number of sampling and testing personnel evaluated by systems approach IA testing, the number of evaluations found to be acceptable and unacceptable, as well as a summary of any significant system-wide corrective actions taken.

**SIGNIFICANT DIGITS IN TEST DATA**

When comparing test data to the specification limit, a uniform method is used to round the data. When a rounding method is not specified elsewhere for the test data, the method to be used is the Rounding Method in ASTM E29 except that the rounding procedure in section 6.4.3 is replaced as below and 6.4.4 is eliminated.

6.4.3 When the digit next beyond the last place to be retained is 5, and there are no digits beyond this 5, or only zeros, increase by 1 the digit in the last place retained.

When the Iowa DOT provides a computer program or spreadsheet for reporting test results, the rounding method will be as reported by the computer software.