



INDIANA DEPARTMENT OF TRANSPORTATION
Division of Materials and Tests

Directive 107

**Independent Assurance and
 Qualified Acceptance Personnel Program**

The purpose of the Independent Assurance and Qualified Acceptance Personnel Program (hereinafter referred to as "the IA Program") is to establish a program that ensures Acceptance Personnel are capable of correctly and accurately conducting the appropriate acceptance sampling and testing procedures. All Acceptance Personnel performing acceptance testing or sampling are subject to the IA Program, including Construction, Testing, CAPP Producer, HMA Producer, Contractor, Local Public Agency (LPA), and Consultant Firm and Laboratory personnel.

In general, for each acceptance sampling and testing procedure, the IA Program includes: 1) A written examination, 2) Independent Assurance observation of the equipment being used and of Acceptance Personnel conducting material sampling, sample reduction, or materials testing, and 3) Conducting comparison tests with an IA Technician, as required. Only at the successful completion of all three of the above indicated steps, will Acceptance Personnel be allowed to perform the given acceptance sampling or testing procedure for a specified period of time.

The District Testing Engineer is directly responsible for Independent Assurance (IA) sampling, testing, and observation done at the District level. The State Materials Engineer at the Department's Division of Materials & Tests (M&T) will be directly responsible for IA sampling, testing and observation done at the consultant run hot mix asphalt (HMA) testing labs, and at the M&T HMA acceptance lab. The respective Engineer (hereinafter referred to as "the Engineer") will be represented by the Independent Assurance Technician (IAT). The IAT will not conduct any contract acceptance sampling or testing. The cooperation of all personnel is essential for the performance of the IAT duties. The IAT and Acceptance Personnel will use the same procedure(s) for sampling and testing. When conducting a comparison test, the IAT will use an independent set of equipment. When a discrepancy occurs, whether procedural or test result, the IAT and Acceptance Personnel will cooperate in locating the source of the discrepancy and take corrective action.

The Department's IA Program was developed to meet the provisions of Federal Regulations 23 CFR 637, Subpart B, Quality Assurance Procedures for Construction. Further, the Department intends to qualify all Acceptance Personnel and equipment for the specified amount of time and prior to them conducting sampling or testing for acceptance, with a goal of 90% compliance.

Terminology

AASHTO – American Association of State Highway and Transportation Officials

Acceptance Personnel – Groups of individuals representing and/or employed by Department Construction, Department Testing, Contractor, CAPP Producer, HMA Producer, Consultant, Local Public Agency, or Geotechnical Laboratory conducting sampling or testing for the purpose of

acceptance. Refers to and includes groups of as few as one, consisting of Project Engineers, Project Supervisors, Lab Supervisors, Technicians, Seasonal Employees, or other representatives or employees conducting acceptance sampling or testing for any contract that is administered by the Department.

Acceptance Procedure – The ASTM, AASHTO, and ITM sampling or testing procedures specified by the Department for the determination of the quality and conformity to the contract specifications as listed in Attachment II.

ASTM – American Society for Testing and Materials

Comparison Test – A test procedure conducted, as applicable, by both Acceptance Personnel and the IAT on a single test specimen, on a split sample of a material, or as otherwise specified, for which the IAT's and Acceptance Personnel's test results are compared. Comparison test requirements are set out in Attachment II. Comparison test results are required to meet the comparison tolerances as set out in Attachment III.

Department – The Indiana Department of Transportation as constituted under the laws of Indiana for the administration of highway work.

Engineer – The District Testing Engineer as related to IA at the District Level, or the State Materials Engineer at the Department's M&T as related to IA at Consultant run HMA testing labs or the M&T HMA acceptance lab.

ITM – Indiana Test Method

Observation – The IAT inspection of the equipment used by Acceptance Personnel to ensure that it is properly calibrated or verified in accordance with the frequencies shown in Attachment I, and the IAT witness of all steps required to be taken by Acceptance Personnel in conducting a sampling or testing procedure as compared to a standardized checklist. A PowerPoint presentation or similar type training may be given by the IAT to the Acceptance Personnel in lieu of an observation, as otherwise herein specified, at the direction of the State Materials Engineer.

Qualified – To have successfully completed the written examination, observation, and comparison test requirements for a given acceptance sampling or testing procedure, and not to have surpassed the expiration date determined in accordance with the IA Program.

Written Examination – An open book test developed by the Division of Materials & Tests Division of the Department that is intended to evaluate the knowledge of Acceptance Personnel on a sampling or testing procedure.

General Requirements

In general, in order for Acceptance Personnel to become initially qualified to conduct a sampling or testing procedure for acceptance purposes, said Acceptance Personnel must first complete three steps. First, Acceptance Personnel must pass the respective written examination. Second, Acceptance Personnel must successfully complete an IA observation, as applicable. And third, Acceptance Personnel must successfully complete an IA comparison, as applicable. Only at the successful completion of these three steps, will Acceptance Personnel be permitted to conduct the acceptance sampling or testing procedure for which they were evaluated for a

specified period of time, after which their qualification will expire. All acceptance sampling and testing procedures to which this program applies are listed in Attachment II.

Written examinations are administered by the Department at each of the respective Districts. Written examinations are only required to be successfully completed by Acceptance Personnel for the initial qualification for a sampling or testing procedure. The written examination is not required to be taken again by Acceptance Personnel for any subsequent qualifications on the same sampling or testing procedure, unless otherwise deemed necessary by the Engineer. This includes situations where qualification may have lapsed or expired. Written examinations may be administered, proctored, scored, and recorded by any Department employee who is designated to do so by the Engineer. A minimum score of 70% is required to successfully pass the written examination.

IA observations may only be conducted after Acceptance Personnel have passed the written examination. The IAT and Acceptance Personnel will coordinate when the required sampling and testing for a specific test will occur. A procedural checklist will be followed to ensure uniformity during the observation. The IAT will record the date, test results, and resolutions of any non-compliance. If a failure of the observation occurs, a re-attempt will be allowed after a review of the applicable procedure(s).

Comparison tests are not required for all testing procedures. The requirement for a comparison test is indicated in Attachment II. Comparison tests are not required to be conducted on material that is incorporated into an INDOT contract, nor is the material required to meet contract specifications. Comparison tolerances for each category of tests are listed in Attachment III. A successful comparison will be when the test results measured by the IAT and the Acceptance Personnel are within the respective comparison tolerance. Upon completion of each test, the IAT is responsible for documenting the comparison of Acceptance Personnel and IAT test results. Remarks pertaining to material specification compliance are not required. If there are test result disagreements, an immediate re-test will be allowed. Remarks are required to be added to the test report describing the deficiency and any corrective actions taken.

Proper field acceptance sampling and testing is the primary objective of the IA Program. However, at the discretion of the Engineer, IA observations may also be conducted in a controlled environment away from the jobsite (i.e. laboratory). Also, at the discretion of the Engineer or IAT, the IAT may conduct additional field observations to verify proper equipment use and application of sampling and/or testing procedure(s) on the jobsite. Acceptance Personnel qualification periods for sampling or testing procedures will begin on the date the applicable, respective written examination, observation, and comparison have all been successfully completed. Qualification for the same sampling or testing procedure will then expire on January 1st; specified as follows. Qualification periods starting on any day from January 1st to June 30th of the same calendar year will expire on January 1st in the calendar year that is 2 years from the qualification start date (Example #1: March 31, 2018 through January 1, 2020). Qualification periods that start on any day from July 1st to December 31st of the same calendar year will expire on January 1st in the calendar year that is 3 years from the qualification start date (Example #2: August 3, 2018 through January 1, 2021).

Acceptance Personnel are responsible for maintaining their qualifications. Acceptance Personnel unable to successfully complete the required steps to become qualified to conduct an

acceptance sampling or testing procedure are prohibited from conducting that procedure for the purpose of contract acceptance.

Contractors, CAPP Producers, HMA Producers, Local Public Agencies, and Consultant Firms and Laboratories are responsible for providing adequate training to their employees, coordinating with the Department to schedule written examinations, and for notifying the respective Engineer when Acceptance Personnel are in need of IA observations or comparisons.

One IA observation and one comparison test, as applicable, are the minimum requirements for qualification. The Department reserves the right to require additional IA observations and comparison tests during a Qualified Period to ensure that acceptance sampling and testing procedures are being properly conducted.

Observations for all test methods for which an IAT is involved will be conducted on the IAT by another IAT. Comparison tests will not be required to be completed by the IAT.

Non-Conforming Written Examinations

If a failure of the written examination occurs, a re-examination will be allowed; however, the second attempt at the examination may not occur within 24 hours after completing the original examination. If a failure of the second attempt at the written examination occurs, all subsequent attempts may not occur within one week of the previous attempt nor within 48 hours after completing additional training. The District Construction Director will be notified, as appropriate, if Acceptance Personnel do not successfully pass the written examination after two attempts.

Non-Qualified Acceptance Personnel Conducting Acceptance Sampling or Testing

The Project Engineer/ Supervisor will ensure that all project sampling and testing for acceptance is conducted only by qualified Acceptance Personnel. The test results from non-qualified Acceptance Personnel shall not be used for acceptance.

If acceptance sampling or testing is conducted by non-qualified Acceptance Personnel, both the Engineer and the District Construction Director shall be notified within seven calendar days. Additional acceptance testing may be required as determined by the Engineer. Occurrences of Department Acceptance Personnel that knowingly conduct acceptance sampling or testing and are not qualified, and supervisors that knowingly direct non-qualified Acceptance Personnel to conduct acceptance sampling or testing may be reported to the employee's supervisor and Department HR for guidance.

Occurrences of Non-Department personnel that knowingly conduct acceptance sampling or testing and are not qualified, and supervisors that knowingly direct non-qualified Acceptance Personnel to conduct acceptance sampling or testing will be reported to the Department Area Engineer and Consultant Services.

Reporting

The District Testing Office or M&T will record the IAT results in SiteManager (or other current electronic materials management system utilized by the Department). A record of written examinations, observations, comparison tests, and all investigations will be maintained.

The District Testing Engineer will submit an annual IA Program summary report to the Department's M&T by January 15th. An annual department IA Program report will be submitted to the FHWA-Indiana Division by the Department's M&T by February 1st.

The annual Department IA Program report will include a summary of the written examinations, observations, and comparison tests completed for the calendar year, as well as discussions related to comparisons throughout the year, discussions on testing equipment calibration or verification checks, a summary of all IA Program investigations, and any noted exceptions. The annual Department IA Program report will also include the resolution of any outstanding findings noted during the previous two years.

SPECIAL INSTRUCTIONS

Hot Mix Asphalt

QC/QA HMA and SMA plate samples and cores obtained for the purpose of acceptance shall be conducted by qualified Contractor Acceptance Personnel and witnessed by qualified INDOT Acceptance Personnel.

QC/QA HMA, HMA, and CMA sampling and testing for acceptance by certification shall be conducted by qualified Contractor Acceptance Personnel.

Observations for HMA sampling may be done by training presentations rather than by monitoring technicians performing this procedure for contracts.

The IAT comparison sample will be obtained from a diagonally opposite portion of a split sample. When the ignition oven is used for determination of the binder content, the IAT will use the same calibration factor and oven test temperature used by Acceptance Personnel for that particular mixture.

When the maximum specific gravity (AASHTO T 209) and bulk specific gravity (AASHTO T 166 Method A or T 275) comparison tests are conducted, the IAT will test the same samples tested by Acceptance Personnel. When using AASHTO T 209, the IAT is required to verify which procedure was used by Acceptance Personnel. Also, if AASHTO T 275 was used by Acceptance Personnel, the IAT will use the same weight of the dry specimen in air and the same specific gravity of the paraffin used by Acceptance Personnel.

Profilograph

When pavement smoothness is accepted by means of a profilograph, the profilograph shall be operated by qualified Contractor Acceptance Personnel and witnessed by qualified INDOT Acceptance Personnel. Observation for profilograph testing may be conducted by training

presentations rather than by witnessing Acceptance Personnel performing this procedure on contracts.

Pavement Marking Materials

When the retro-reflectivity of pavement markings is accepted by means of a retro-reflectometer, the INDOT Acceptance Personnel monitoring the Contractor operating the said device shall be qualified. Observations for retro-reflectivity testing may be conducted by training presentations rather than by monitoring INDOT Acceptance Personnel conducting this procedure on contracts.

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ATTACHMENT I

Equipment

The following frequency and procedures will be used:

Equipment	Requirements	Minimum Frequency	Procedure
Air Meter (Type B)	Standardize	3 mo.	AASHTO T152
Air Meter (Volumetric)	Standardize	12 mo.	ASTM C173
Balances	Verification	12 mo.	ITM 910
Beam Breaker	Verification	12 mo.	ASTM E4
Dynamic Cone Penetrometer (DCP)	Check Physical Condition	12 mo.	ITM 509
Gyratory Compactor	Verification	1 mo.	ITM 908
Gyratory Compactor Internal Angle	Verification	12 mo.	AASHTO T 344
Gyratory Mold and Plate Dimensions	Verification	12 mo.	AASHTO T 312
Ignition Oven	Conduct Lift Test	Weekly	Operators Manual
Mechanical Shaker	Check Sieving Thoroughness	12 mo.	ITM 906
Ovens	Verify Temperature Settings	12 mo.	ITM 903
Profilograph	Inspection	12 mo.	ITM 912
Sand Cone Calibration Container	Calibrate	12 mo.	AASHTO T 191
Sieves	Check Physical Condition	12 mo.	ITM 902
Slump Cone	Check Critical Dimensions	12 mo.	ITM 911
Unit Weight Measure	Calibrate	12 mo.	AASHTO T 121
Vacuum Chamber	Verification	3 mo.	ITM 905
Vacuum Pump	Check Pressure	12 mo.	ITM 905

Note: Equipment that has not been properly calibrated or verified or that has a calibration or verification that has expired shall not be used.

ATTACHMENT II

Sampling and Testing Procedure Requirements

Procedure Designation	Procedure Description	Steps Required		
		Written Exam	Observation	Comparison Test (Attachment III)
AASHTO R 60	Sampling Freshly Mixed Concrete	Yes	Yes	No
AASHTO R 66	Sampling Asphalt Materials	Yes	Yes	No
AASHTO R 76	Sample Reduction of Aggregate Samples	Yes	Yes	No
AASHTO R 100	Making and Curing Concrete Test Specimens in the Field	Yes	Yes	No
AASHTO T 11	Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregate by Washing	Yes	Yes	Yes
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregate	Yes	Yes	Yes
AASHTO T 30	Mechanical Analysis of Extracted Aggregate	Yes	Yes	Yes
AASHTO T 97	Flexural Strength of Concrete	Yes	Yes	No
AASHTO T 112	Clay Lumps and Friable Particles	Yes	Yes	No
AASHTO T 84	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate	Yes	Yes	Yes
AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate	Yes	Yes	Yes
AASHTO T 119	Slump of Hydraulic Cement Concrete	Yes	Yes	Yes
AASHTO T 121	Unit Mass (Weight) of Concrete	Yes	Yes	Yes
AASHTO T 152	Air Content of Freshly Mixed Concrete by the Pressure Method (Type B)	Yes	Yes	Yes
AASHTO T 164	Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt (HMA)	Yes	Yes	Yes
AASHTO T 166	Bulk Specific Gravity of Compacted Hot Mix Asphalt Using Saturated Surface-Dry Specimens	Yes	Yes	Yes
AASHTO T 191	Density of Soil In-Place by the Sand Cone Method	Yes	Yes	Yes
AASHTO T 209	Maximum Specific Gravity of Hot Mix Asphalt	Yes	Yes	Yes
AASHTO T 217	Moisture in Soils by Means of Calcium Carbide Gas Pressure Moisture Tester	Yes	Yes	No
AASHTO T 255	Total Moisture Content of Aggregate by Drying	Yes	Yes	No
AASHTO T 275	Bulk Specific Gravity of Compacted Bituminous Mixtures using Paraffin-Coated Specimens	Yes	Yes	Yes
AASHTO T 305	Draindown in Uncompacted Asphalt Mixtures	Yes	Yes	No
AASHTO T 312	Preparation of Hot Mix Asphalt Specimens by Means of the Superpave Gyrotory Compactor	Yes	Yes	No

ATTACHMENT II (Continued)

Sampling and Testing Procedure Requirements

Procedure Designation	Procedure Description	Steps Required		
		Written Exam	Observation	Comparison (Attachment III)
AASHTO T 331	Bulk Specific Gravity of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing Method	Yes	Yes	Yes
ASTM C173	Air Content of Freshly Mixed Concrete by the Volumetric Method	Yes	Yes	Yes
ASTM C495	Compressive Strength of Lightweight Insulating Concrete	Yes	Yes	No
ASTM D5821	Fractured Particles in Coarse Aggregates	Yes	Yes	Yes
ASTM D6103	Flow Consistency of Flowable Backfill	Yes	Yes	No
ITM 206	Scratch Hardness of Coarse Aggregate Particles	Yes	Yes	Yes
ITM 207	Sampling Stockpiled Aggregates	Yes	Yes	No
ITM 212	Leachate Determination of Air Cooled Blast Furnace Slag	Yes	Yes	No
ITM 216	Lightweight DCP Testing of Flowable Backfill	Yes	Yes	No
ITM 219	Deleterious Determination of Steel Slag	Yes	Yes	Yes
ITM 403	Water-Cementitious Ratio	Yes	Yes	No
ITM 506	Soil Field Moisture Content Determination	Yes	Yes	No
ITM 508	Field Determination of Deflection Using Light Weight Deflectometers	Yes	Yes	No
ITM 509	Dynamic Cone Penetrometer in Shallow Pavement Applications	Yes	Yes	No
ITM 512	Field Determination of Max Dry Density and Optimum Moisture Content of Soil	Yes	Yes	Yes
ITM 571	Binder Content of Hot Mix Asphalt by the Extraction Method	Yes	Yes	Yes
ITM 572	Field Drying of Hot Mix Asphalt	Yes	Yes	No
ITM 580	Sampling Hot Mix Asphalt	Yes	Yes	No
ITM 586	Binder Content of Hot Mix Asphalt by the Ignition Method	Yes	Yes	Yes
ITM 587	Sample Reduction of Hot Mix Asphalt Samples	Yes	Yes	No
ITM 912	Profilographs	Yes	Yes	No
ITM 931	Measurement of retroreflective pavement marking materials	Yes	Yes	No

ATTACHMENT III

Comparison Test Requirements

Procedure Designation	Procedure Description	Comparison Tolerance
AASHTO T 11	Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregate by Washing	0.5% if Decant < 5.0% 1.0% if Decant \geq 5.0%
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregate	Refer to Aggregate Table
AASHTO T 30	Mechanical Analysis of Extracted Aggregate	Refer to HMA Table
AASHTO T 84	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate	0.035
AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate	0.025
AASHTO T 119	Slump of Hydraulic Cement Concrete	1.0 inch
AASHTO T 121	Unit Mass (Weight) of Concrete	1.9 lbs/ft ³
AASHTO T 152	Air Content of Freshly Mixed Concrete by the Pressure Method (Type B)	0.5%
AASHTO T 164	Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt (HMA)	0.4%
AASHTO T 166	Bulk Specific Gravity of Compacted Hot Mix Asphalt Using Saturated Surface-Dry Specimens	0.020
AASHTO T 191 ⁽¹⁾	Density of Soil In-Place by the Sand Cone Method	Max Dry Density: Soils = 3.0 lbs/ft ³ Granular Soil = 3.5 lbs/ft ³ Aggregates = 3.5 lbs/ft ³
AASHTO T 209	Maximum Specific Gravity of Hot Mix Asphalt	0.020 (Supplemental Procedure = 0.060)
AASHTO T 275	Bulk Specific Gravity of Compacted Bituminous Mixtures using Paraffin-Coated Specimens	0.020
AASHTO T 331	Bulk Specific Gravity of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing Method	0.020
ASTM C173	Air Content of Freshly Mixed Concrete by the Volumetric Method	0.5%
ASTM D5821	Fractured Particles in Coarse Aggregates	5.0%

Note (1): IAT density test to be conducted on same compacted material and within 3-ft of Acceptance Personnel test location.

ATTACHMENT III (Continued)

Comparison Test Requirements

Procedure Designation	Procedure Description	Comparison Tolerance
ITM 206	Scratch Hardness of Coarse Aggregate Particles	40% of lower result or 1%, whichever is greater
ITM 219	Deleterious Determination of Steel Slag	Deleterious $\leq 3.0\%$ = 0.5% Deleterious $> 3.0\%$ = 1.0%
ITM 512	Field Determination of Max Dry Density and Optimum Moisture Content of Soil	Density = 4.5 lb/ft ³ Moisture Content = 2.0%
ITM 571	Binder Content of Hot Mix Asphalt by the Extraction Method	0.4%
ITM 586	Binder Content of Hot Mix Asphalt by the Ignition Method	0.3%

Aggregate Comparison Tolerance Table				
AASHTO T 27	GRADATION:			
	Coarse Aggregate		Fine Aggregate	
	1 in.	= 5.0%	No. 8	= 2.0%
	3/4 in.	= 5.0%	No. 16	= 3.0%
	1/2 in.	= 5.0%	No. 30	= 4.0%
	3/8 in.	= 5.0%	No. 50	= 3.0%
	No. 4	= 3.0% *	No. 100	= 2.0%
	No. 8	= 3.0% *	No. 200	= 2.0%
* The agreement tolerance for #43, #53, and #73 aggregate is 5.0%				

HMA Comparison Tolerance Table					
AASHTO T 30	Sieve Size	25.0 mm	19.0 mm	12.5mm	9.5 mm
	1 1/2 in.	2.0			
	1 in.	3.0	2.0		
	3/4 in.	4.0	3.0	2.0	
	1/2 in.	6.0	3.5	2.5	2.0
	No. 8	3.0	3.0	3.5	3.5
	No. 30	2.0	2.0	2.0	2.0
	No. 200	1.0	1.0	1.0	1.0