



## **INDIANA DEPARTMENT OF TRANSPORTATION Division of Materials and Tests**

### **Directive 104**

#### **District Laboratory Inspections**

The purpose of the District Laboratory Inspections is to assure the uniformity of all Department laboratories that are testing highway construction materials. The Division of Materials and Tests will conduct the laboratory inspections. The District laboratories and District Production laboratories will be included in these inspections. The procedures for verification of test equipment, testing, reporting, and response to deficiencies will be as follows:

#### **TESTS**

The District laboratory sections that will be inspected include the Aggregate, Asphalt, Concrete, Hot Mix Asphalt, and Soils sections. The District Production laboratory sections that will be inspected include the Aggregates and Hot Mix Asphalt sections. The required tests within these sections for the District and District Production laboratories are listed in Attachments I and II, respectively. All current AASHTO, ASTM, and ITM test methods listed for these tests are required to be on file for the inspection, if applicable.

#### **EQUIPMENT**

The test equipment for each laboratory will be required to be presented for inspection. The calibration or verification of calibration (C/V) test methods and the minimum frequency of these procedures are included in Attachment III. The forms used to record the C/V data are attached to the appropriate test methods or will be distributed to the Districts. All District and District Production laboratories are required to maintain records to indicate compliance with these C/V procedures.

#### **TEST PROCEDURES**

Each laboratory is required to conduct a procedural demonstration of the applicable tests listed in Attachments I and II. Any deficiency noted during the test demonstration will be indicated to the technician by the Inspector.

#### **FREQUENCY OF INSPECTION**

Each District and District Production laboratory will be inspected once within each calendar year.

#### **FINAL REPORT**

A final report will be sent to the District Testing Engineer upon completion of the inspection. The report will include the following:

1. The scope of the inspection and a description and observation of the equipment that was generally available for use in one or more of the lab sections.
2. A summary of findings on the test equipment and procedural demonstrations in each lab section.
3. Footnotes on departures from the specification requirements, mechanical deficiencies in apparatus, and other important matters that were observed.

**DISTRICT RESPONSE**

All deficiencies noted in the final report will be addressed by the District Testing Engineer, and corrective action will be taken for each. District comments of the corrective actions will be sent to the Division of Materials and Tests within 30 days of the receipt of the final report.

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**ATTACHMENT I****DISTRICT LABORATORY TESTS****Aggregates**

AASHTO T 11	Decantation
AASHTO T 21	Organic Impurities
AASHTO T 27	Sieve Analysis
AASHTO T 84	Specific Gravity of Fine Aggregate
AASHTO T 85	Specific Gravity of Coarse Aggregates
AASHTO T 96	Los Angeles Abrasion
AASHTO T 112	Clay Lumps and Friable Particles
AASHTO T 113	Lightweight Pieces
AASHTO T 248	Reducing Field Samples
AASHTO T 255	Total Moisture Content
AASHTO T 304	Uncompacted Void Content
ASTM D4791	Flat and Elongated
ASTM D5821	Crushed Particles
ITM 212	Leachate for ACBF

**Asphalt Materials**

AASHTO R 28	Pressurized Aging Vessel (PAV)
AASHTO T 240	Rolling Thin-Film Oven Test
AASHTO T 313	Bending Beam Rheometer (BBR)
AASHTO T 315	Dynamic Shear Rheometer (DSR)

**Concrete**

AASHTO T 22	Compressive Strength
AASHTO T 231	Capping Cylindrical Specimens
ASTM C495	Compressive Strength of Lightweight Concrete

**Hot Mix Asphalt**

AASHTO T 30	Mechanical Analysis of Extracted Aggregate
AASHTO T 166	Bulk Specific Gravity
AASHTO T 209	Maximum Specific Gravity
AASHTO T 275	Bulk Specific Gravity of Paraffin Specimens
AASHTO T 305	Draindown of Open-Graded Mixtures
AASHTO T 312	Gyratory Compactor
AASHTO T 331	Bulk Specific Gravity by Corelok
ITM 571	Binder Content by Extraction
ITM 572	Moisture Content
ITM 586	Binder Content by Ignition
ITM 587	Reducing HMA Samples to Testing Size

# ATTACHMENT I

## DISTRICT LABORATORY TESTS

### Soils

AASHTO R 58	Dry Preparation
AASHTO T 89	Liquid Limit
AASHTO T 90	Plastic Limit
AASHTO T 99	Moisture-Density Using 5.5 lb Rammer and 12 in. Drop
AASHTO T 265	Moisture Content
AASHTO T 267	Determination of Organic Content in Soils by Loss on Ignition
AASHTO T 289	Determining pH of Soil for Use in Corrosion Testing
ASTM D1140	Amount of Material in Soils Finer than 75 $\mu$ m Sieve
ITM 507	Determination of Calcium Carbonate Content in Soil using Sequential Loss on Ignition

# ATTACHMENT II

## DISTRICT PRODUCTION LABORATORY TESTS

### Aggregates

AASHTO T 11	Decantation
AASHTO T 27	Sieve Analysis
AASHTO T 84	Specific Gravity of Fine Aggregate
AASHTO T 85	Specific Gravity of Coarse Aggregates
AASHTO T 248	Reducing Field Samples
AASHTO T 255	Total Moisture Content
ASTM D4791	Flat and Elongated
ASTM D5821	Crushed Particles
ITM 212	Leachate for ACBF

### Hot Mix Asphalt

AASHTO T 30	Mechanical Analysis of Extracted Aggregate
AASHTO T 166	Bulk Specific Gravity
AASHTO T 209	Maximum Specific Gravity
AASHTO T 275	Bulk Specific Gravity of Paraffin Specimens
AASHTO T 305	Draindown of Open-Graded Mixtures
AASHTO T 312	Gyratory Compactor
AASHTO T 331	Bulk Specific Gravity by Corelok
ITM 571	Binder Content by Extraction
ITM 572	Moisture Content
ITM 586	Binder Content by Ignition
ITM 587	Reducing HMA Samples to Testing Size

# ATTACHMENT III

## AGGREGATE TESTING EQUIPMENT

<b>Equipment</b>	<b>Calibration/ Verification (C/V)</b>	<b>Method Used</b>	<b>Minimum Frequency</b>
Balances	Verify	ITM 910	12 mo.
Conical Molds & Tampers	Check Critical Dimensions	IH #28	24 mo.
Los Angeles Machines	Check RPM & Dimensions	IH #29	24 mo.
Mechanical Shakers	Check Sieving Thoroughness	ITM 906	12 mo.
Ovens	Verify Temperature Settings	ITM 903	12 mo.
Sieves	Check Physical Condition and Openings	ITM 902	12mo.
Steel Spheres	Check Individual Weights & Charge Weight	IH #29	24 mo.
Thermometers	Calibrate	ITM 909	12 mo.
Calipers	Verify	IH #71	12 mo

# ATTACHMENT III

## ASPHALT TESTING EQUIPMENT

<b>Equipment</b>	<b>Calibration/ Verification (C/V)</b>	<b>Method Used</b>	<b>Minimum Frequency</b>
Balances	Verify	ITM 910	12 mo.
Bending Beam Rheometer	Check Dimensions of Beams, Verify Weights	IH #74	12 mo.
Bending Beam Rheometer	Verify Front-to-Back Alignment of Loading Shaft	IH #70	6 mo.
Dynamic Shear Rheometer	Verify Temperature, Run Reference Fluids	IH #75	6 mo.
Ovens	Verify Temperature Settings	ITM 903	12 mo.
Pressure Aging Vessel	Verify Temperature and Pressure	IH #72	6 mo.
Rolling Thin-Film Oven (RTFO)	Check Rotation Speed of Shelf, Check Temperature	IH #21	12 mo.
RTFO Flow Meter	Calibrate	IH #11	12 mo.
Thermometers	Calibrate	ITM 909	12 mo.
Timer	Verify	IH #19	12 mo.
Multi-meter	Calibrate Ohms to NIST	Vendor SOP	6 mo.

# ATTACHMENT III

## CONCRETE TESTING EQUIPMENT

<b>Equipment</b>	<b>Calibration/ Verification (C/V)</b>	<b>Method Used</b>	<b>Minimum Frequency</b>
Balances	Verify	ITM 910	12 mo.
Capping Compounds	Verify Strength of Compound	AASHTO T 231	3 mo.
Compression Machine	Verify Calibration of Machine	ASTM E 4	12 mo.
Curing Tanks	Verify Temperature	---	weekly
Ovens	Verify Temperature Settings	ITM 903	12 mo.
Thermometers	Calibrate	ITM 909	12 mo.



# ATTACHMENT III

## HOT MIX ASPHALT TESTING EQUIPMENT

<b>Equipment</b>	<b>Calibration/ Verification (C/V)</b>	<b>Method Used</b>	<b>Minimum Frequency</b>
Balances	Verify	ITM 910	12 mo.
Gyratory Compactors	Verify Ram Pressure, Angle of Gyration, Frequency of Gyration, LVDT	ITM 908	1 mo.
Gyratory molds, top plates, and base plates	Check Critical Dimensions	AASHTO T 312 Annex A	12 mo.
Mechanical Shakers	Check Sieving Thoroughness	ITM 906	12 mo.
Ovens	Verify Temperature Settings	ITM 903	12 mo.
Sieves	Check Physical Condition	ITM 902	12 mo.
Thermometers	Calibrate	ITM 909	12 mo.
Vacuum Gauge *	Standardize Vacuum	ITM 905	12 mo.
Corlok	Verify Vacuum	ITM 905	3 mo.
Cordry	Verify Vacuum	ITM 905	3 mo.

\* Vacuum verification required for digital gauges

# ATTACHMENT III

## SOILS TESTING EQUIPMENT

<b>Equipment</b>	<b>Calibration/ Verification (C/V)</b>	<b>Method Used</b>	<b>Minimum Frequency</b>
Balances	Verify	ITM 910	12 mo.
Grooving Tools	Check Critical Dimensions	IH #7	12 mo.
Mechanical Compactors (5.5 lb.)	Calibrate	IH #8	12 mo.
Molds, Proctor (4 in.)	Check Critical Dimensions	ITM 913	12 mo.
Rammers	Check Critical Dimensions	ITM 914	12 mo.
Sieves	Check Physical Condition and Openings	ITM 902	12 mo.
Straightedges	Check Planeness of Edge	IH #2	12 mo.
Ovens	Verify Temperature Settings	ITM 903	12 mo.