HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Excavation	Acceptance	(5)	Gradation, P.I., Moisture (or visual description if organic)	1 per 5,000 C.Y. waste or undesignated waste cut	Number consecutively EX-W-1. No need to test if waste is designated on plans.
Embankment	Acceptance	(5)	Standard Density	As required by changes in material	Number consecutively BM-SD-1 or EX-SD-1
			Field Density	1 per 5,000 C.Y. or 1 per 10,000 Tons (6)	Number consecutively BM-D-1 or EX-D-1.
			Gradation, P.I. (4) and Deleterious (visual)		Number consecutively BM-G-1 or EX-G-1.
	Independent Assurance	(5)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density (1), Gradation, P.I. and Deleterious (visual)	1 per 50,000 C.Y. or 1 per 100,000 Tons	
Bedding & Backfill for Conduits and Minor Structures	Acceptance	(5)	Standard Density	As required by changes in material	
			Field Density	(3)	
			Gradation, P.I., and Deleterious (visual)	1 per source or as required by change in material	
Backfill and Foundation Fill for Major Structures	Acceptance	(5)	Standard Density	As required by changes in material	
			Field Density (1)	1 per layer	
			Gradation, P.I., and Deleterious (visual)	1 per source or as required by change in material	

General: Independent Assurance **(IA)** Testing may be waived when Acceptance Testing is performed in DOT&PF Regional Laboratories accredited in the specified test method. When DOT&PF Regional Laboratories perform Acceptance Testing they may also perform the IA Testing if using different personnel and equipment than was used for the Acceptance Testing. Any material can be rejected based on failure to meet any one of the criteria.

(1) If material is impractical to test for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form. IA testing is not required when material (as shown by gradation testing) is Too Coarse to Test **(TCTT)**.
(2) Required when Standard Density test is run in project laboratory.
(3) One density per structure (manhole, catch basin, inlet, utility vault, etc.) or pipe, with a minimum of one density per 100 lineal feet of trench (for pipes, conduit, buried cables, etc.) installed same day and same manner. Perform densities within 18 inches of the structure or outside diameter of pipe.
(4) Perform Plasticity Index **(P.I.)** tests on the first five samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional tests need only be performed on the IA samples. The Regional Quality Assurance Engineer **(RQE)** or Regional Materials Engineer **(RME)** may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
(5) See the specified test method for minimum sample size.
(6) For large unclassified embankments, a field density and gradation testing frequency of 1/10,000 C.Y. or 1/20,000 Tons is acceptable subject to the approval of the RQE, RME or Statewide Materials Engineer **(SME)**.

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Subbase	Source Quality	150 lbs.	L.A. Wear, Degradation	1 per source prior to use or as required based on changes in material	Allow minimum of 14 days for testing and transport. Number consecutively Q-SB-1.
	Acceptance	(5)	Standard Density (1)	1 per source and as required based on change in material	Number consecutively SB-SD-1
			Field Density (1)	1 per 2,500 C.Y. or 1 per 5,000 Tons (3) (4)	Number consecutively SB-D-1
			Gradation, L.L., P.I., Fracture, Deleterious		Number consecutively SB-G-1
	Independent Assurance	(5)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density	1 per 25,000 C.Y. or 1 per 50,000 Tons	
			Gradation, L.L., P.I., Fracture, Deleterious		
Aggregate Base and Surface Course	Source Quality	150 lbs.	L.A. Wear, Degradation Soundness	1 per source prior to use or as required based on changes in material	Allow minimum 14 days for testing and transport. Number consecutively Q-BC-1 or Q-SC-1
	Acceptance	(5)	Standard Density	1 per source and as required based on change in material	Number consecutively BC-SD-1 or SC-SD-1
			Field Density	1 per 1,000 C.Y. or 1 per 2,000 Tons (3) (4) (6)	Number consecutively BC-D-1, SC-D-1 or BCM-D-1
			Gradation, L.L., P.I., Fracture, Deleterious		Number consecutively BC-G-1, SC-G-1, BCM-G-1
	Independent Assurance	(5)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density	1 per 10,000 C.Y. or 1 per 20,000 Tons	
			Gradation, L.L., P.I., Fracture, Deleterious		

(1) If material is impractical to test for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form. IA density testing is not required when material (as shown by gradation testing) is TCTT.
(2) Required when Standard Density is run in the project laboratory.
(3) Perform Liquid Limit **(L.L.)** and P.I. tests on the first five samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional tests need only be performed on the IA samples. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
(4) Fracture: If the first ten tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
(5) See the specified test method for minimum sample size.
(6) Take one Field Density test per 250 square yards for acceptance of Bed Course Material.

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HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Asphalt Treated Base Course	Source Quality	150 lbs. Aggregate	L.A. Wear, Degradation, Soundness	1 per source prior to use or as required based on changes in material	Allow minimum of 14 days for testing and transport
	Mix Design	300 lbs. (5) Aggregate, 3 one gal. cans of AC, 1 pint of Anti-strip	Mix Design (1) (2)	1 per source and as required by changes in material	Allow 15 days or contract specified time for mix design and testing after receiving proposed gradation from contractor
	Acceptance	(1) (6)	Gradation, Density, Oil Content, P.I., Fracture, and Deleterious (visual)	1 per 1,000 Tons (3) (4)	See the contract requirements
	Independent Assurance	(6)	Gradation, Density, Oil Content, Fracture, P.I., and Deleterious (visual)	1 per 10,000 Tons	Use numbers that correspond to acceptance samples. Include field test results with sample.
Emulsified Asphalt Treated Base Course	Mix Design	300 lbs. Aggregate, 3 gals. Asphalt Emulsion	Mix Design (1)	1 per source and as required by changes in material	Allow 15 days or contract specified time for mix design and testing after receiving proposed gradation from contractor
	Acceptance	(1)	Gradation, Fracture, Density	1 per 5,000 square yards	See the contract requirements
Crushed Asphalt Base Course	Acceptance	(1)	Gradation, Density	1 per 5,000 square yards	See the contract requirements

(1) Refer to project specifications.
(2) Recommendations regarding anti-strip requirements must be determined for each mix design.
(3) Perform P.I. tests on the first five samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional tests need only be performed on the IA samples. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
(4) Fracture: If the first ten tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
(5) For multiple stockpiles, proportion each stockpile sample to the proposed Job Mix Design blend ratio.
(6) See the specified test method for minimum sample size.

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Asphalt Concrete Pavement (Hot or Warm Mix Asphalt)	Source Quality	150 lbs. Aggregate	L.A. Wear, Degradation, Soundness, P.I.	1 per source prior to use or as required based on changes in material	Allow 25 days for testing and transport
	Mix Design	500 lbs. (6) Aggregate, 5 one-gallon cans of AC, 1 pint of Anti-Strip	Mix Design (1) (2), Flat and Elongated, Fracture	1 per source and as required by changes in material	Allow 15 days or contract specified time for mix design and testing after receiving contractor's proposed gradation
	Acceptance	(1) (7)	MSG	1 per lot (1)	From Mix Design on first lot and then from the first sublot of each additional lot
		(1) (7)	Gradation, Oil Content, P.I., Fracture, Flat & Elongated , Mat Density, and Deleterious (visual)	1 per 500 Ton sublot (3) (4) (5) (8)	Ross Count (AASHTO T 195, Coating Test) as required by RQE or RME.
		Joint Density	(1)	Top lift (1)	
	Independent Assurance	(8)	MSG	1 per project minimum	Required when MSG is run in the field
			Gradation, Oil Content, P.I., Fracture, Flat & Elongated, Density, and Deleterious (visual)	1 per 5,000 Tons (8)	Use numbers that correspond to acceptance samples. Include field test results with sample.
	Information	30 lbs.	3-Marshall Biscuits or 2 gyratory samples	1 per Mix Design Minimum	Compare results to Mix Design

(1) Refer to project specifications.
(2) Recommendations regarding anti-strip requirements must be determined for each mix design.
(3) Perform P.I. tests on the first five samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional tests need only be performed when IA samples are taken. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
(4) Fracture: If the first ten tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
(5) Perform Flat and Elongated tests on the first five samples from any source. For known sources, the RQE or RME may waive this requirement.
(6) Proportion each stockpile sample to the proposed Job Mix Design blend ratio.
(7) See the specified test method for minimum sample size.
(8) For sidewalks, medians, and other non-traffic areas acceptance sampling and testing frequency will be 1 per 1,000 Tons or 1 per 10,000 sy; and IA sampling and testing frequency will be 1 per 10,000 Tons or 1 per 100,000 square yards

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Asphalt Cement	Source Quality	See Remarks	(1)	1 per each grade and source prior to use	Manufacturer's certification required
	Acceptance	Three 1-quart cans		1 per 50,000 gals. or 1 per 200 Tons	Sampled on project. Test for anti-strip if required by RQE or RME
Liquid Asphalt for: a. Tack coat b. Prime coat c. Seal coat d. Surface Treatment	Source Quality	See Remarks	Type and Grading	1 per each grade and source prior to use	Manufacturer's certification required
	Acceptance	1 gallon in plastic jug (for emulsified asphalt)	(1)	1 per 50,000 gallons or 1 per 200 Tons	Sample must be tested by Lab that did not test material for Quality. Material sampled prior to dilution
Aggregate for Cover Coat and Surface Treatment	Source Quality	150 lbs. Aggregate	L.A. Wear, Soundness, Degradation	1 per each grade and source prior to use	Allow 25 days for testing and transport Test for anti-strip if required by RQE or RME
	Acceptance	(3)	Gradation, Fracture, Deleterious (visual)	1 per 500 Tons (2)	May be taken from stockpile or production
	Independent Assurance		Gradation, Fracture, Deleterious (visual)	1 per 5,000 Tons	

(1) Refer to project specifications.
(2) Fracture: If the first ten tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
(3) See the specified test method for minimum sample size.

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Portland Cement Concrete	Source Quality				
a. Cement and Cementitious	Quality	a. Two 1-gal. cans, each	See Remarks	1 per shipment (2), (4)	Allow 45 days for testing and transport. Manufacturer's certification required.
b. Water		b. ½ gal. in glass jar	See Remarks	1 per source	Allow 20 days for testing and transport. Potable water may be accepted by the Engineer.
c. Coarse Aggregate		c. 100 lbs	Deleterious Substances, L.A. wear, Soundness	1 per source	Allow 25 days for testing and transport.
d. Fine Aggregate		d. 25 lbs	Deleterious Substances, Soundness	1 per source	Allow 25 days for testing and transport.
Portland Cement Concrete	Mix Design Submittal (1) (3)				
a. Cement and Cementitious	Mix Design	a. 94 lbs., each	Mix Design Verification as required by RQE or RME.	1 per source prior to use	For verification of Contractor-furnished mix design, allow 45 days for testing and transport
b. Water		b. None			
c. Coarse Aggregate		c. 330 lbs			
d. Fine Aggregate		d. 330 lbs			
e. Admixtures		e. 1 qt each			

(1) Refer to project specifications.
(2) Cement stored in silos or bins over six months, or in bags over three months, may require re-testing. See project specifications.
(3) Manufacturer's certifications and aggregate test reports required.
(4) Manufacturer's Certification for cement used on project may be accepted in lieu of sampling as approved by the RQE or RME

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Concrete Continued:					
Coarse Aggregate	Acceptance	As required by test method	Gradation, Deleterious (visual)	1 per 100 C.Y.	Number consecutively CA-G-1
Fine Aggregate			Gradation, Deleterious (visual), Fineness Modulus	1 per 100 C.Y.	Number consecutively FA-G-1
Mix			Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per C.Y.	1 per ½ days pour (2) or 1 per 50 C.Y	(3) (4)
		Cylinders	Compressive strength	1 per ½ days pour (2) or 1 per 50 C.Y.	Mold two (6x12) or three (4x8) cylinders. Test at 28 days. (3) (4)
	Information	Cylinders	Compressive strength	As required (e.g. for 7 and 14 day breaks)	Mold two (6x12) or three (4x8) cylinders "As Required" for Strength Data.
Coarse Aggregate	Independent Assurance	As required by test method	Gradation, Deleterious (visual)	1 per 1,000 C.Y. with minimum of 1 per project if over 100 C.Y. is placed	Use numbers that correspond to acceptance samples. Include field test results with sample.
Fine Aggregate			Gradation, Deleterious (visual), Fineness Modulus		
Mix			Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per C.Y.	1 per 1,000 C.Y.	
		Cylinders	Compressive strength	1 per 1,000 C.Y.	Mold two (6x12) or three (4x8) cylinders
Prestressing Concrete	Quality and Acceptance	Refer to contract specifications for approval of specific components			
Grout	Acceptance	Set of 3 cubes	Compressive Strength	1 per 10 bags with minimum of 1 per day (5)	Test at 28 days or per contract specifications
	Independent Assurance	Set of 3 cubes	Compressive Strength	1 per project	Test at 28 days or in conjunction with acceptance specimens

(1) Refer to project specifications.
(2) Half day's pour considered to be 6 hours or less.
(3) Commercial sources which are periodically inspected do not have to be tested if day's total quantity of concrete placement is less than 5 C.Y. Placement reports summarizing all minor pours will be completed.
(4) For non-structural or minor concrete construction, as determined by the RQE or RME, 1 set minimum per project is recommended.
(5) A reduced frequency may be allowed as approved by RQE or RME.

HIGHWAY CONSTRUCTION Materials Sampling & Testing Frequency

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Misc. Hardware	Source Quality	(1)		1 per pay item or assembly, min.	Manufacturer's certification or sample for testing.
Concrete Reinforcing Steel	Source Quality	(2)		1 for each type, grade and size in a shipment	Manufacturer's certification or sample for testing.
Structural Steel	Source Quality	(2)		1 for each component in a shipment	Manufacturer's certification or sample for testing.
Piling	Source Quality	(2)		1 for each type of pile in shipment	Manufacturer's certification or sample for testing.
Joint Sealer, Joint Filler, and Curing Materials for Concrete	Source Quality	1 quart for each liquid (see remarks)	(1) See remarks	1 per type	Project Engineer documentation if on Qualified Products List **(QPL)**. If not on QPL, manufacturer's certification or sample for testing.
Porous Backfill	Source Quality	Refer to test method	Clay Lumps, Deleterious	1 per source	
	Acceptance		Gradation, Deleterious (visual)	1 per source or as required by change in material	Number consecutively PB-G-1
Riprap	Source Quality	125 lbs.	LA Wear	1 per source prior to use or as required based on changes in material	Allow 25 days for testing and transport
	Acceptance	5 C.Y. min.	Gradation count	1 per source for each class	
Topsoil	Source Quality	15 lbs.	Organic content, Gradation, pH	1 per source prior to use or as required based on changes in material	Allow 15 days for testing and transport
	Acceptance	(3)	Gradation	1 per 15,000 Square Yards or 1 per 2,500 cubic yards	Number consecutively TS-G-1
Signals and Lighting	Quality and Acceptance	Within 30 days following award of the contract, the contractor shall submit to the Project Engineer for approval a complete list of material and equipment that is proposed to be used for this item. The data shall include catalog cuts, diagrams, test reports, manufacturers' certifications, etc. The above data shall be submitted in eight sets. Any proposed deviation from the plans shall also be submitted. Check the QPL.			

(1) Certificates of Compliance per Specifications Section 106.
(2) Mill Test Reports to include heat numbers, fabrication date, physical and chemical properties.
(3) See the specified test method for minimum sample size.

Acceptance of Minor Quantities and Installations

A. Portland Cement Concrete. Concrete for the following items **may** be accepted on the basis of an approved mix design and placement reports documenting batch information and pour location, time, and quantity. Under this system arrangements should be made for the producer to state on the delivery ticket accompanying each load of concrete, the class of concrete being furnished, the weights of cement, aggregates and water used in the batch, and the time of batching. Use only State-tested aggregates and cement, or supplier certified cement, approved by the RQE, RME, or SME. Each pour must be documented on a Concrete Placement Report.

1. Sidewalks—not to exceed approximately 150 Square Yards per day.
2. Curb and gutter not to exceed approximately 250 lineal feet per day.
3. Slope paving and headers.
4. Paved ditch.
5. Catch basins, manhole bases, and inlets
6. Small culvert headwalls.
7. Fence post footings.
8. Sign Post footings
9. Guardrail anchorages.

B. Small Quantities of Miscellaneous Materials. When project quantities are as shown below the primary documentation of delivery and placement may be the Project Materials Report for acceptance.

1. Aggregates—not to exceed 500 Tons per item per project.
2. Asphalt/Aggregate Mixtures—not to exceed 1,500 Tons per approved mix design per project.
3. Bituminous Material—not to exceed 85 Tons of asphalt cement or 15 tons for other liquid asphalt per project.
4. Paint—not to exceed 20 Gallons per project. Acceptance to be based on weights and analysis on the container label.
5. Masonry Items—Subject to checking of nominal size and visual inspection. Not to exceed 100 pieces.
6. Plain concrete or clay pipe—100 lineal feet.
7. Topsoil—not to exceed 600 square yards.

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