

AIRPORT CONSTRUCTION Materials Sampling & Testing Frequency					Page 1 of 8
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	For unsuitable excavation 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 1,500 C.Y. or 1 per 3,000 Tons (6)	Number consecutively BM-D-1 or EX-D-1.
			Gradation, P.I. (4) and Deleterious (visual)	1 per 5,000 C.Y. or 1 per 10,000 Tons (6)	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)	1 per 15,000 C.Y. or 1 per 30,000 Tons	
			Gradation and Deleterious (visual)	1 per 50,000 C.Y. or 1 per 100,000 Tons	
Bedding & Backfill for Structures (Drainage Items, Ducts, Conduits, etc.)	Acceptance	(5)	Standard Density	As required by changes in material	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density	(1) (3)	
			Gradation, P.I., and Deleterious (visual)	1 per source or as required by change in material	
<p><b>General:</b> Independent Assurance (IA) Testing may be waived when Acceptance Testing is performed in DOT&amp;PF Regional Laboratories accredited in the specified test method. When DOT&amp;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.</p> <ol style="list-style-type: none"> <li>1) If material is Too Coarse to Test (TCTT) 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 TCTT. Any material can be rejected based on failure to meet any one of the criteria.</li> <li>2) Required when Standard Density test is run in the project laboratory.</li> <li>3) One density per structure (pipe, conduit, manhole, catch basin, inlet, utility vault, etc.), with a minimum of one density per 100 lineal feet of structure installed same day and same manner. Perform densities within 18 inches of the structure or outside diameter of the pipe. Frequency may be reduced to 1 per 200 lineal feet for electrical conduits when approved by Regional Quality Assurance Engineer (RQE) or Regional Materials Engineer (RME).</li> <li>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 acceptance 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.</li> <li>5) See the specified test method for minimum sample size.</li> <li>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).</li> </ol>					

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Subbase Course	Source Quality	150 lbs.	L.A. Wear, Degradation	1 per source prior to use or as required based on change in material	Allow minimum of 14 days for testing and transport. Number consecutively Q-SB-1 or Q-SC-1
	Acceptance	(6)	Standard Density	1 per source and as required based on change in material	Number consecutively SB-SD-1
			Field Density (1)	1 per 1,000 CY or 1 per 2,000 Tons	Number consecutively SB-D-1
			Gradation, L.L. P.I., Deleterious	1 per 2,500 CY or 1 per 5,000 Ton (3)	Number consecutively SB-G-1
	Independent Assurance	(6)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density (1)	1 per 10,000 CY or 1 per 20,000 Tons	
			Gradation, Deleterious, L.L., P.I.	1 per 25,000 CY or 1 per 50,000 Tons	
Aggregate Surface Course and Crushed Aggregate Base Course	Source Quality	150 lbs.	L.A. Wear, Degradation, Soundness	1 per source prior to use or as required based on change in material	Allow minimum 14 days for testing and transport. Number consecutively Q-SC-1 or Q-BC-1
	Acceptance	(6)	Standard Density	1 per source and as required based on change in material	Number consecutively SC-SD-1 or BC-SD-1
			Field Density	1 per 500 C.Y. or 1 per 1,000 Tons	Number consecutively BC-D-1 or SC-D-1
			Gradation, Fracture, Deleterious, L.L., P.I., SE	1 per 1,000 C.Y. or 1 per 2,000 Tons (3) (4) (5)	Number consecutively BC-G-1 or SC-G-1
	Independent Assurance	(6)	Standard Density	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample
			Field Density (2)	1 per 5,000 C.Y. or 1 per 10,000 Tons	
			Gradation, Fracture, L.L., P.I., SE, Deleterious	1 per 10,000 CY or 1 per 20,000 Tons	
<p>(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.</p> <p>(2) Required when Standard Density is run in project laboratory.</p> <p>(3) Perform Liquid Limit (<b>L.L.</b>) 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 acceptance 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.</p> <p>(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.</p> <p>(5) If the first five tests indicate the material meets specification for Sand Equivalent (<b>SE</b>), additional acceptance tests need only be performed when IA samples are taken. The SE test is not required for Aggregate Surface Course.</p> <p>(6) See the specified test method for minimum sample size.</p>					

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Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Plant Hot Mix Asphalt and Asphalt Treated Base Course	Source Quality	150 lbs. Aggregate	L.A. Wear, Degradation, Sodium Sulfate Loss	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. (7) Aggregate	Mix Design (1) (2) Sand Equivalent (SE), Flat & Elongated (F&E), Fracture, L.L., P.I.	1 per source and as required based on changes in material	Allow 15 days or contract specified time for mix design and testing after receiving contractor's proposed gradation.
		5 one gallon. cans of AC,			
		1 pint of Anti-strip			
	Acceptance	(1) (8)	MSG (Maximum Specific Gravity)	1 per Lot (1) (9)	From Mix Design for the first lot and then from the first subplot of each additional lot
			Mat Density, Gradation, Oil Content, L.L., P.I., Fracture, F&E, SE, Deleterious, Thickness	1 per subplot (3) (4) (5) (6) (9)	Ross Count (AASHTO T 195, Coating Test) as required by RQE or RME.
			Joint Density	(1) (9)	Top Lift (1)
	Independent Assurance	(8)	MSG	1 per project minimum (1)	Required when MSG is run in the field.
			Mat Density, Gradation, Oil Content, L.L., P.I., Fracture, F&E, SE	1 per 10 sublots	Use numbers that correspond to acceptance samples. Include field test results with sample
	Information	30 lb	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 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 acceptance 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) SE: If the first five tests indicate the material meets specification for SE, additional acceptance tests need only be performed when IA samples are taken.
- (6) Perform Flat and Elongated (**F&E**) tests on the first five samples from any source. For known sources, the RQE or RME may waive this requirement.
- (7) For multiple stockpiles, proportion each stockpile sample to the proposed Job Mix Design blend ratio.
- (8) See the specified test method for minimum sample size.
- (9) May not be applicable to Asphalt Treated Base Course. Refer to project specifications.

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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 (1)	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. Prime Coat b. Tack Coat c. Seal Coats d. Asphalt 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 Seal Coats and Asphalt Surface Treatments	Source Quality	150 lbs. Aggregate	Fracture, F&E, L.A. Wear, Soundness, Degradation	1 per source prior to use or as required by changes in material prior to use	Allow 25 days for testing and transport
	Acceptance	(4)	Gradation, Fracture, F&E, Deleterious (visual)	1 per 500 Tons (2) (3)	May be taken from stockpile or production
	Independent Assurance		Gradation, Fracture, F&E, Deleterious (visual)	1 per 5,000 Tons	May be taken from stockpile or production
<p>(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 taken/tested.                      (3) Perform F&amp;E tests on the first five samples from any source. For known sources, the RQE or RME may waive this requirement.                      (4) See the specified test method for minimum sample size.</p>					

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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 40 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 or potable water accepted by Project 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 40 days for testing and transport
b. Water		b. None			
c. Coarse Aggregate		c. 330 lbs			
d. Fine Aggregate		d. 220 lbs			
e. Admixtures		e. 1 qt each			
<p>(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</p>					

MSTF Table (AIRPORTS)  
Effective 4/15/12

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DOT&PF Design & Engineering Services

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Concrete Continued:						
Coarse Aggregate	Acceptance	(5)	Gradation and; Deleterious (visual)	1 per 200 C.Y.	Number consecutively CA-G-1	
Fine Aggregate			Gradation, Deleterious (visual), Fineness Modulus	1 per 200 C.Y.	Number consecutively FA-G-1	
Mix		As required by test method	Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per C.Y.	1 per ½ days pour (2) or 1 per 200 C.Y.	(3)	
		Cylinders or beams	Compressive strength or Flexural strength (1)	1 per ½ days pour (2) or 1 per 200 C.Y.	Mold two (6x12) or three (4x8) cylinders or 2 (6x6x20) beams. Test at 28 days. (1) (4)	
	Information	Cylinders or beams	Compressive strength or Flexural strength	As required (e.g. for 7 day break)	Mold two (6x12) or three (4x8) cylinders or 2 (6x6x20) beams "As Required" for Strength Data.	
Coarse Aggregate	Independent Assurance	(5)	Gradation and; Deleterious (visual)	1 per 2,000 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			As required by test method	Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per C.Y.	1 per 2,000 C.Y.	Mold two (6x12) or three (4x8) cylinders or 2 (6x6x20) beams
	Cylinders or beams	Compressive strength or Flexural strength	1 per 2,000 C.Y.			
<p>(1) Refer to project specifications.</p> <p>(2) Half day's pour considered to be 6 hours or less.</p> <p>(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. as determined by the Project Engineer. Placement reports summarizing all minor pours will be completed.</p> <p>(4) For non-structural or minor concrete construction, as determined by the RQE or RME, 1 set minimum per project is recommended.</p> <p>(5) See the specified test method for minimum sample size.</p>						

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Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks	
Misc. Hardware	Source Quality	(1)		1 per pay item or assembly, min.	Approved by designated authority; reference MCL	
Concrete Reinforcing Steel	Source Quality	(2)		1 for each type, grade and size in a shipment	Approved by designated authority; reference MCL	
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 QPL. If not on QPL, manufacturer's certification or sample for testing.	
Porous Backfill	Acceptance	(3)	Gradation, Deleterious (visual)	1 per source or as required by change in material	Number consecutively PB-G-1	
Topsoil	Source Quality	15 lbs.	Organic content, Gradation, pH	1 per source prior to use or as required by 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.				
<p>(1) Certificates of Compliance per Specifications GCP- 60.</p> <p>(2) Mill Test Reports to include heat numbers, fabrication date, physical and chemical properties.</p> <p>(3) See the specified test method for minimum sample size.</p>						

**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 Statewide Materials Engineer (SME). Each pour must be documented on a Concrete Placement Report.
1. Sidewalks - not to exceed 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 Ditches and flumes.
  5. Manhole bases, Catch Basins, Inlets and Inspection Holes.
  6. Small culvert headwalls and Miscellaneous Drainage Structures.
  7. Fence Post Footings.
  8. Sign Post footings.
  9. Cable Markers
- B. Small Quantities of Miscellaneous Materials.** The primary documentation of delivery and placement may be the Project Materials Report.
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. Asphalt Cement—not to exceed 85 Tons 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— not to exceed 100 lineal feet.
  7. Topsoil—not to exceed 600 square yards.