

FREQUENCY SCHEDULE for INDEPENDENT ASSURANCE EVALUATION

ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	FORM #	REMARKS
203	EMBANKMENT	% Compaction	1 per 100 000 cu yds (75 000 m ³), or a fraction thereof greater than 25 000 cu yds. None required if plan quantity is less than 25 000 cu yds (20 000 m ³).	212	Use the same location for % Compaction. Verify curve selection.
206	STRUCTURE BACKFILL (Class I)	Gradation % Compaction	1 per 10 000 cu yds (7500 m ³), or a fraction thereof greater than 1 000 cu yds. None required if plan quantity is less than 1 000 cu yds (750 m ³).	6	Split the gradation sample. Use the same location for % Compaction. Verify curve selection.
206	STRUCTURE BACKFILL (Class II)	% Compaction	1 per 10 000 cu yds (7500 m ³), or a fraction thereof greater than 1 000 cu yds. None required if plan quantity is less than 1 000 cu yds (750 m ³).	212	Use the same location for % Compaction. Verify curve selection.
206	FILTER MATERIAL	Gradation	1 per 2 000 cu yds. (1500 m ³), or a fraction thereof greater than 200 cu yds. None required if plan quantity is less than 1 000 cu yds (750 m ³).	6	Split the gradation sample.
304	AGGREGATE BASE COURSE	Gradation % Compaction	1 per 20 000 tons (20 000 t), (10 000 cu. yds.) or a fraction thereof greater than 2 000 tons (2 000 t), (1 000 cu. yds.). None required if plan quantity is less than 10 000 tons (10 000 t), (5 000 cu. yds.).	6	Split the gradation sample. Use the same location for % Compaction. Verify curve selection.
306	RECONDITIONING	% Compaction	1 per 50 000 sq yds. (40 000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 000 m ²). None required if plan quantity is less than 25 000 sq yds. (20 000 m ²).	212	Use the same location for % Compaction. Verify curve selection.

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ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	FORM #	REMARKS
307	LIME TREATED SUB-GRADE	% Compaction	1 per 50 000 sq yds. (42 000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 200 m ²). None required if plan quantity is less than 25 000 sq yds. (20 000 m ²).	212	Use the same location for % Compaction. Verify curve selection.
308	PORTLAND CEMENT TREATED BASE [Project Special]	Gradation % Compaction	1 per 50 000 tons (50 000 t) or a fraction thereof greater than 5 000 tons (5 000 t). None required if plan quantity is less than 5 000 tons (5000 t).	6	Split the gradation sample. Use the same location for % Compaction. Verify curve selection.
310	PROCESS ASPHALT MAT [Project Special]	% Compaction	1 per Project or as determined by the RME.	69	Use the same location for % Compaction. Verify curve selection.
403	HOT MIX ASPHALT - GRADATION ACCEPTANCE PROJECT Basis	% Asphalt Maximum Specific Gravity Gradation	1 per 10 000 tons (10 000 t), or a fraction thereof greater than 2 500 tons (2 500 t). None required if plan quantity is less than 2 500 tons (2 500 t).	360 &/or 58 and 6	Split the sample.
		% Compaction Joint Density		69	Use the same location for % Compaction. Take an adjacent core for joint density.
403	HOT MIX ASPHALT - GRADATION ACCEPTANCE SYSTEM Basis	% Asphalt Maximum Specific Gravity Gradation	1 per 25 000 tons (25 000 t), or a fraction thereof greater than 2 500 tons (2 500 t), and perform at a minimum one IA every two months on each HMA project tester and their equipment. None required if plan quantity is less than 2 500 tons (2 500 t).	360 &/or 58 and 6	Split the sample.
		% Compaction Joint Density		69	Use the same location for % Compaction. Take an adjacent core for joint density.

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ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	FORM #	REMARKS
403	HOT MIX ASPHALT - VOIDS ACCEPTANCE PROJECT Basis	% Asphalt Maximum Specific Gravity Hveem Stability Air Voids Voids in Mineral Aggregate % Compaction Joint Density	1 per 10 000 tons (10 000 t), or a fraction thereof greater than 2 500 tons (2 500 t). None required if plan quantity is less than 2 500 tons (2 500 t).	360 &/or 58	Split the sample.
				69	Use the same location for % Compaction. Take an adjacent core for joint density.
403	HOT MIX ASPHALT - VOIDS ACCEPTANCE SYSTEM Basis	% Asphalt Maximum Specific Gravity Hveem Stability Air Voids Voids in Mineral Aggregate % Compaction Joint Density	1 per 25 000 tons (25 000 t), or a fraction thereof greater than 2 500 tons (2 500 t), and perform at a minimum one IA every two months on each HMA project tester and their equipment. None required if plan quantity is less than 2 500 tons (2 500 t).	360 &/or 58	Split the sample.
				69	Use the same location for % Compaction. Take an adjacent core for joint density.
405	HOT-IN-PLACE RECYCLE	% Compaction Maximum Specific Gravity	1 per 50 000 sq yds. (40 000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 000 m ²). None required if plan quantity is less than 25 000 sq yds. (20 000 m ²)	69	Use the same location for % Compaction. Split the HMA sample.
406	COLD ASPHALT PAVEMENT (RECYCLE)	% Compaction	1 per 50 000 sq yds. (40 000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 000 m ²). None required if plan quantity is less than 25 000 sq yds. (20 000 m ²).	69	Use the same location for % Compaction.

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ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	FORM #	REMARKS
403/ 411	ASPHALT CEMENT & BITUMINOUS MATERIAL	Determined by Central Laboratory	<p>Asphalt Cement / Performance Graded Binder & Emulsion for Chip Seal Coats and Cold-In-Place Recycling: Project acceptance sampling will be witnessed by the Region IA Tester, and documented on CDOT Form #411.</p> <p>Project Basis: 1 per 20 000 tons (20 000 t), or a fraction thereof greater than 2 500 tons (2 500 t) per binder type. None required if plan quantity is less than 2 500 tons (2 500 t).</p> <p>System Basis: A minimum of one per two months per tester or one per binder grade. None required if plan quantity is less than 2 500 tons (2 500 t).</p>	67 &/or 411	
409	SEAL COAT MATERIAL - AGGREGATE	Gradation	1 per 5 000 tons (5 000 t), or a fraction thereof greater than 500 tons (500 t). None required if plan quantity is less than 1 200 tons (1 200 t). 1 per 285 000 sq yds (230 000 m ²). None required if plan quantity is less than 62 500 sq yds (50 000 m ²).	6	Split the gradation sample.

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ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	FORM #	REMARKS
412	PORTLAND CEMENT CONCRETE PAVEMENT (Compressive Strength Alternative)	Compressive Strength Slump Air Content Sand Equivalent	1 set of cylinders per 50 000 sq yds. (40,000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 000 m ²) for all thicknesses. None required if total plan quantity for all thicknesses is less than 5 000 sq yds. (4 000 m ²).	82 &/or 192	May use the same sampling container or a split sample. Split the sand equivalent sample.
	(Flexural Strength Alternative)	Flexural Strength	1 set of beams per 50 000 sq yds. (40,000 m ²), or a fraction thereof greater than 5 000 sq yds. (4 000 m ²) for all thicknesses. None required if total plan quantity for all thicknesses is less than 5 000 sq yds. (4 000 m ²).	157, 82 &/or 192	May use the same sampling container or a split sample.
503	DRILLED CAISSONS	Compressive Strength Slump	1 set of cylinders per 2 000 cu yds. (1 500 m ³), or a fraction thereof greater than 200 cu yds (150 m ³). None required if plan quantity is less than 500 cu yds. (380 m ³).	82 &/or 192	May use the same sampling container or a split sample.
601	STRUCTURAL CONCRETE	Compressive Strength Slump Air Content	1 per 2 000 cu yds. (1 500 m ³), or fraction thereof greater than 500 cu yds for each Class. No tests required if the quantity is less than 500 cu yds for each class. <u>Exception</u> : 1 test minimum if the total quantity of all classes is greater than 500 cu yds (380m ³).	82 &/or 192	May use the same sampling container or a split sample.

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ITEM	DESCRIPTION	TYPE OF TEST REQUIRED	MINIMUM SAMPLING FREQUENCY	REMARKS
606	GUARDRAIL (Cast In-Place)	Compressive Strength Slump Air Content	1 per 10 000 linear feet (3000 m) or a fraction thereof greater than 1 000 linear feet (300 m). None required if plan quantity for all classes is less than 3 000 linear feet (900 m).	May use the same sampling container or a split sample.
608	SIDEWALKS (Concrete)	Compressive Strength Slump Air Content	1 per 10 000 sq yds. (8 000 m ²), or a fraction thereof greater than 1 000 sq yds. (800 m ²). None required if total plan quantity for all classes and for all thicknesses is less than 3 000 sq yds. (2 500 m ²)	May use the same sampling container or a split sample.
	(HMA)	AC Content Gradation	1 per project. None required if total plan quantity is less than 2 500 tons (2 500 t).	Split the HMA sample.
609	CURB AND GUTTER (Concrete)	Compressive Strength Slump Air Content	1 per project. None required if plan quantity is less than 10 000 linear ft. (3 000 m).	May use the same sampling container or a split sample.
	(HMA)	AC Content Gradation	1 per project. None required if total plan quantity is less than 2 500 tons (2 500 t).	Split the HMA sample.
618	PRESTRESSED CONCRETE UNITS (Cast In-Place)	Compressive Strength Slump Air Content	1 per 2 000 cu yds. (1 500 m ³), or a fraction thereof greater than 200 cu yds. (150 m ³). None required if plan quantity is less than 500 cu yds. (380 m ³).	May use the same sampling container or a split sample.

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- NOTE 1** - When all Items subject to Independent Assurance Sampling on a particular project have quantities less than the minimums set forth in the (QA) Frequency Guide Schedule for Minimum Materials Sampling, Testing, and Inspection, no IA Samples are required. However, on such projects the Region Materials Engineer will fill in the heading on a CDOT Form #379 and write across the face of this form a statement to the effect that "*No independent assurance samples were taken because of the small quantities involved.*" This will fulfill Independent Assurance requirements on this project.
- NOTE 2** - Independent Assurance testing should be accomplished by the same method used for Quality Acceptance (QA) at the Point of Verification or Acceptance listed for each Item in the (QA) Frequency Guide Schedule for Minimum Materials Sampling, Testing, and Inspection in the Field Materials Manual. Sampling shall be accomplished using CDOT approved sampling methods outlined in the FMM. All samples shall be split with the field tester (QA) and run independently by personnel who have no direct responsibility for Quality Assurance or Verification sampling and testing for the project.
- NOTE 3** - Refer to the CDOT Independent Assurance Manual for specific item testing information and techniques.

TABLE IA – 1, Comparison Precision Guide

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Element	Type of Test	Minor Difference	Significant Difference
Gradation	Sieve Analysis per CP 31 Nominal Maximum 1-1/2" to # 8	$\leq 1\%$	$> 1\%$
	#16 to #50	$\leq 5\%$	$> 5\%$
	#100	$\leq 4\%$	$> 4\%$
	Sieve Analysis per CP 31 #200	$\leq 3\%$	$> 3\%$
	NOTE: # 200 (Item 409 per CP 31B)	$\leq 3\%$	$> 3\%$
Asphalt Content	Asphalt Content Gauge per CP 85	$\leq 0.20\%$	$> 0.20\%$
	Ignition Method per CP-L 5120	$\leq 0.35\%$	$> 0.35\%$
	Asphalt Content Gauge vs. Ignition Method	$\leq 0.35\%$	$\leq 0.35\%$
Maximum Specific Gravity	Flask per CP 51	≤ 0.019	> 0.019
Asphalt Compaction	M/D Gauge per CP 81	$\leq 2.0\%$	$> 2.0\%$
	Cores per CP 44	$\leq 2.0\%$	$> 2.0\%$
Asphalt Compaction at Longitudinal Joints	M/D Gauge per CP 81 Cores per CP 44	$\leq 2.0\%$ $\leq 2.0\%$	$> 2.0\%$ $> 2.0\%$
Air Voids	Per CP-L 5115	$\leq 1.2\%$	$> 1.2\%$
Voids in Mineral Aggregate	Per CP 48	$\leq 1.2\%$	$> 1.2\%$
Hveem Stability	Per CP-L 5106	≤ 7	> 7

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TABLE IA – 1, Comparison Precision Guide (continued)

Element	Type of Test	Minor Difference	Significant Difference
Sand Equivalent	Sand Equivalent per CP 37	≤ 5 points	> 5 points
Slump	Cone per AASHTO T 119	$\leq 1/2$ "	$> 1/2$ "
Air Content	Air Meter per AASHTO T 152	$\leq 0.5\%$	$> 0.5\%$
Compressive Strength	Compressive Strength per ASTM C 39	Average QA within $\pm 10\%$ of average IA	Average QA test result $> 10\%$ of average IA test result
Flexural Strength	Flexural Strength per AASHTO T 97	Average QA within $\pm 10\%$ of average IA	Average QA test result $> 10\%$ of average IA test result
Soil Compaction	M/D Gauge per CP 80	$\leq 2.0\%$	$> 2.0\%$
Aggregate Base Compaction	M/D Gauge per CP 80	$\leq 2.0\%$	$> 2.0\%$

NOTE: Data based on Empirical Bayesian Statistics and is subject to change as the database increases. Table 1 was revised for the 2007 FMM based on data from the 2003, 2004, and 2005 construction season.

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