Mn/DOT SD-15 (Rev. 2-2002)

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS ENGINEERING

Federal Aid, State Funds, County, Municipal Federal Aid Projects and State Aid Projects

This schedule outlines the minimum sampling and testing required for most materials used in highway construction. Some items that are rarely used or materials of recent development are often covered by special provisions and may not be shown on the schedule. For more information regarding contract requirements for testing, please reference the "Standard Specifications for Construction"; Specification 1603 Materials: Specifications, Samples, Tests, and Acceptance. When sample sizes required for testing exceed 35 pounds, please submit multiple containers of the material with no individual container weighing more than 35 pounds.

Small quantities of materials may be accepted without sampling and testing. A small quantity is defined as any total quantity, for the whole project, of one material which is smaller than the minimum quantity required for testing unless modified by the individual material items. These materials shall be from known, reliable sources, perform satisfactorily and meet the requirements for purpose intended. The inspection report (Form 2415) should include a statement to this effect and show the source. Form 2403 may be used to report small quantities of diverse materials from different sources. Form 2415 and Form 2403 (or approved revisions) are referenced in the Schedule of Materials Control for project record documentation and are required to be maintained in the project file.

Where items of small quantity are used in a critical location or significantly influence the safety, performance, strength or durability of major construction items, prior approval for their use without testing must be obtained.

Previously approved materials transferred from another project should be reported on Form 2415. The report should include: type of material, quantities involved, source, and supplier of materials. Whenever possible, include the project number for which the material was originally approved.

A TELEPHONE INDEX is included with the Schedule giving the numbers of contact persons if further information is required regarding the various materials.

A website (www.mrr.dot.state.mn.us) has been established for the Office of Materials and Road Research. The contributing units to the Materials Control Schedule from the Pavement Engineering Section are the Bituminous Engineering Unit, the Concrete Engineering Unit, and the Grading & Base Unit. The Materials Engineering Unit contains the Approved Products and the Certified Products and Services List, as well as, the Materials Control Schedule.

PLEASE CONTACT THE Mn/DOT DISTRICT INDEPENDENT ASSURANCE INSPECTOR WHEN PROJECT STARTS TO PROVIDE THE PROPER SERVICING OF YOUR PROJECT.

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Materials Control Schedule

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SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (www.mrr.dot.state.mn.us/pavement/GradingandBase/gradingandbase.asp)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
1. GRADATION(5-692.210) (a) Aggregate Surfacing (2118) (b) Aggregate Base (2211) (c) Aggregate Shoulders (2221) (d) Bituminous Treated Base (2204)	3138 & Special Provisions	Random Sampling Gradation Acceptance Method (See Spec. 2211.3F) & (5-692.700)	02115-03, 02154-02 & 24346-02	None except (See Note 1)	10-15 kg (25 lb.)
(e) Stabilizing Aggregate (2105)	3149 & Special Provisions				
(f) Permeable Aggregate Open Graded Aggregate Base (OGAB)	Special Provisions	1/1,000 t, or 1/600 m^3 (LV), or 1/460 m^3 (CV) *or* 1/1,000 ton, or 1/714 CuYd (LV), or 1/550 CuYd (CV)	02115-03, 21760-03a & 24346-02	1 per source	10-15 kg (25 lb.)
(g) Binder Soil (3138.2B)	3146	2 per source (See Note 1)		1 per source	5 kg (10 lb.)
(h) Granular Borrow Select Granular Borrow (2105)	3149 & Special Provisions	0-65,000 m^3 (LV) - minimum of 1/5,000 m^3 (LV) or 7, whichever is less 66,000-130,000 m^3 (LV) - minimum 10 required 131,000-260,000 m^3 (LV) - minimum 15 required 261,000 m^3 (LV) or more - minimum 1/20,000 m^3 (LV) 0-50,000 m^3 (CV) - minimum of 1/4,000 m^3 or 7, whichever is less 51,000-100,000 m^3 (CV) - minimum 10 required 101,000-200,000 m^3 (CV) - minimum 15 required 201,000 m^3 (CV) or more - minimum 1/15,000 m^3 (CV) 1 m^3 (LV) =1.31 CuYd (LV) 1 m^3 (CV)=1.31 CuYd (CV) (See Note 1)		1 per source	10-15 kg (25 lb.)
(i) Granular Filter	3601 & Special Provisions	1 per source (See Note 1)			

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
(j) Granular Backfill (2451) (k) Aggregate Backfill (2451) (l) Granular Bedding (2451) (m) Aggregate Bedding (2451) (n) Coarse Filter (2451) (o) Fine Filter (2502) (p) Sand Cover (2206)	3149	1 per source (See note 1)	02115-03, 21760-03a & 24346-02	1 per source	10-15 kg (25lb)
(q) Embankment Soil (Excavation and Borrow)	2105	None	02115-03 & 21760-03a	1 per major soil for Identification (Specified Density Only)	5 kg (10 lb.)

NOTE 1: No laboratory samples for 1,000 metric ton [1,000ton] or 600m³ (LV) [714 CuYd (LV)] or 460m³ (CV) [550 CuYd (CV)] or less. First laboratory samples shall be taken within the first 3,000 metric ton [3,000 ton] and shall have a field companion sample.

LV = Loose Volume

CV = Compacted Volume

If salvaged bituminous is used, submit a companion to the first Random Sampled gradation for a bituminous extraction and extracted gradation.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1	Sample Size
2. "ONE POINT DENSITY" (5-692.583) (a) Bituminous Stabilized Subgrade	2207	1/ 1,500 m^3 (LV) or 1/1,200 m^3 (CV) *or* [1/2,000 CuYd (LV) or 1/1,500 CuYd (CV)]	24587-01 Retain in Field	None	
3. MOISTURE-DENSITY TEST* (5-592.222) (a) Aggregate Base	2211	1/40,000 t/source *or* [1/40,000 ton/source]	24587-01 Retain in Field	One sample minimum and additional samples as required	25-30 kg (50 lb.)
(b) Aggregate Shoulder	2221				
(c) Soil - Cement Base	2206	1/350 m^3 (LV) or 1/1,270 m^3 (CV) *or* [1/450 CuYd (LV) or 1/350 CuYd (CV)]		None	
(d) Embankment Soil	2105	1 per major soil.		Two samples per project and additional samples as required	

**When Specified Density is Required.*

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
4. RELATIVE DENSITY TEST* (5-692.251) (a) Aggregate Base (b) Aggregate Shoulder (c) Bituminous Stabilized Subgrade *When Specific Density is Required.	2211 2221 2207	1/1,800 t, 1/1,000 m^3 (LV), or 1/800 m^3 (CV) *or* [1/1,800 ton, 1/1,300 CuYd (LV), or 1/1,000 CuYd (CV)]	02115-03 & 21760-03b	None	
(d) Soil - Cement Base	2206	1/350 m^3 (LV) or 1/270 m^3 (CV) or [1 per 450 CuYd (LV) or 1/350 CuYd (CV)]			
(e) Embankment Soil (Excavation and Borrow)	2105 & Special Provisions	1/3,000m^3 (LV) or 1/2,300 m^3 (CV) or [1/4,000 CuYd (LV) or 1/3,000 CuYd (CV)]			
4a. PENETRATION INDEX METHOD (Procedures**) Aggregate Base/Shouldering Classes 5, 6, and 7	2211	2 DCP*** tests/1,800 t, or 800 m^3 (CV) *or* [2DCP tests/1,800 ton, or 1,000 CuYd (CV)]	02115-03 & 2170-02	None	
**Dynamic Cone Penetrometer – Procedure @ www.mrr.dot.state.mn.us/pavement/ GradingandBase/gradingandbase.asp					
5. RELATIVE MOISTURE TEST BEFORE PRIMING (5-692.253) (a) Aggregate (2211) (b) Aggregate Shoulder (2221)	2321 & 2358 Special Provisions	Upper 75mm (3 in) 1/350m^3 (LV) or 1/270 m^3 (CV) *or* [1/450 CuYd (LV) or 1/350 CuYd (CV)]	21760-03b	None	

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
6. RELATIVE MOISTURE TEST * AT TIME OF COMPACTION (5-692.253)			02115-03 & 21760-03b		
(a) Aggregate Base	2211	1/1,800 t, 1/1,000 m^3 (LV) or 1/800 m^3 (CV) *or* [1/1,800 ton, 1/1,300 CuYd (LV), or 1/1,000 CuYd (CV)]		None	
(b) Aggregate Shoulder	2221				
*When Specific Density or Penetration Index Method is Required					
(c) Bituminous Stabilized Subgrade (5-692.582) SS-1 Mixture	2207	1/1,000 m^3 (LV) or 1/800 m^3 (CV) *or* [1/1,300 CuYd (LV) or 1/1,000 CuYd (CV)]	21760-03b	None	
(d) Soil - Cement Base	2206	1/350 m^3 (LV) or 1/270 m^3 (CV) *or* [1/450 CuYd (LV) or 1/350 CuYd (CV)]	21760-03b	None	
(e) Embankment Soil (Excavation and Borrow) (5-692.253)	2105	1/2,000 m^3 (LV) or 1/1,500 m^3 (CV) *or* [1/2,600 CuYd (LV) or 1/2,000 CuYd (CV)]	21760-03b	None	
7. PULVERIZATION TEST (5-692.260)					
(a) Binder Soil (3138)	3146	1 per day	21760-03b	None	
(b) Soil - Cement Base	2206	1/350m^3 (LV) or 1/270 m^3 (CV) *or* [1/450 CuYd (LV) or 1/350 CuYd (CV)] 1/hour if plant mixed			
8. PERCENT CRUSHING			24346-02		
(a) Belt Samples (5-692.203)	3138 & 3149 & Special Provisions	Once each day	02463 Retain in Field	None	
(b) Particle Count (5-692.204)		One per Project			

SCHEDULE OF MATERIALS CONTROL

I. GRADING AND BASE CONSTRUCTION ITEMS (Cont'd)

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Laboratory Testing (See Note 1)	Sample Size
9. AGGREGATE (Quality Tests)	3138 & Special Provisions	None	24346-02	Submit sample of aggregate retained on the 4.75mm (#4) sieve from each source	25 kg (50 lb.)
				1 per source (Total Sample)	10-15 kg (25 lb.)

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1)

(www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Agency
Verification	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results can be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Contractor or Agency	Contractor or Agency	Contractor or Agency

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2340

SAMPLE SIZE: **35 kg (75 lb.) for each aggregate type retained on 4.75mm (#4) sieve; for quality testing and Percent Crushing.**

2 kg (4 lb.) for each aggregate type passing the 4.75mm (#4) sieve; for quality testing.

1kg (2 lb.) for mineral filler.

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1. Bituminous Mix Design (QC/QA)

QC Testing

1 per mix [3-point Asphalt Cement (AC) content]
15 kg (35 lb.) of mixture at optimum asphalt content, plus 3 Marshall specimens.
REMARKS: Mix Design for Spec. 2340 is Contractor's responsibility with verification by Mn/DOT.

QA Testing

Test Contractor's samples at optimum Asphalt Content, plus 3 Marshall specimens submitted along with Trial Mix data for Approval.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part A, Cont'd)

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2. Aggregate Quality Testing (QA Only)

QA Testing

Agency representative selects one (1) sample of each non-asphaltic aggregate type or class per source per year. When aggregate qualities approach specification limits or when material variation is observed, take additional field tests.

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3. Mineral Filler (QA Only)

QA Testing

One (1) per shipment of 45 metric tons (50 tons) or less, unless previously inspected.

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4. Additives (QA Only)

QA Testing

1 L (1 qt.) of blended asphalt binder and additive. Sample first shipment of each type of material, then submit one sample per 1,000,000 L (250,000 gal.) (approx. 1,000 ton)

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Cont'd)

B. BITUMINOUS PRODUCTION for Specification 2340

SAMPLE SIZE: **15 kg (35 lb.) for Aggregate for Gradation;**
11 kg (25 lb.) for Mixture Properties - 1 full 6" by 12" cylinder mold for QA
1 L (1 qt) for Asphalt Binder
2 L (½ gal) for Asphalt Emulsion

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1. Plant Mix Aggregate Gradation Testing (QC/QA)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend including non-asphaltic aggregate fraction from recycled mix with a minimum of 1 test per day. Companion samples taken for agency for mixtures not containing salvaged asphaltic aggregate.

REMARKS: See Note #2 & Note #3

QA Testing

1 per day per mixture blend. (None from mixtures containing asphaltic aggregate.)
For Certified Plant: Agency representative will select one per day to be run as deemed necessary.

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2. Aggregate Percent Crushing (QC/QA)(Type 41, Type 42, Type 47, Type 48)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend minimum.
For Certified Plant: See Specification/Special Provisions for modifications.

REMARKS: See Note #3
None required when tonnage/course is less than 1,360 metric tons (1,500 tons).
Type 42 Tests run on non-asphaltic aggregate only.
Additional QA samples taken at discretion of the Engineer.

QA Testing

Agency representative is required to observe 1 per day per mixture blend.

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3. Spot Check (QC/QA)

QC Testing

1 per 1,360 metric tons (1,500 tons) per mix blend minimum; with a minimum of 1 test per day.

REMARKS: See Note #3
If a member of a monitoring team observes the Contractor test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking, sampling and testing procedures.
3.) Discussing QC problem with Contractor.
4.) Obtaining verification samples.

QA Testing

1 per day per mixture blend conducted by plant monitor.
For Certified Plant: One per day minimum.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part B, Cont'd)

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4. Extraction and Gradation (QC/QA)

QC Testing

1 per 900 metric tons (1,000 tons) per mix blend for first 3,600 metric tons (4,000 tons) of mixture produced to verify mix design. Additional tests, at the same testing rate, required only when mixture property test results between Contractor and Agency are beyond the allowable differences as defined in Section .400 of the Mn/DOT Bituminous Manual or when either Contractor or Agency results fail specification criteria.

e.g.: Individual air voids less than 2.0% or greater than 6.0%.
Moving average air voids less than 3.0% or greater than 5.0%.
Total extracted asphalt content below mixture type minimum or below recommendation target minimum.
Asphalt spot-check below mixture type minimum or below recommendation target minimum.
Extracted gradation beyond broad-band requirements.

REMARKS: See Note #2 & Note #3.
Extractions on Type 32, Type 42 and Type 48 mixtures only.
Testing at plant site is not required if approved by the Engineer.

QA Testing

1 per day per mixture blend.
For Certified Plant: Agency representative will select one per day.

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5. Mixture Properties (QC/QA, Verification) (Maximum Gravity, Marshall Density-3 Specimen Average, Air Voids)

QC Testing

1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced; then 1 per 900 metric tons (1,000 tons) with a minimum of 2 tests per day.
Verification Companion testing from Agency split sample is required to be performed and may be used as a QC sample.

REMARKS: See Note #2 & Note #3
Calibration factors shall be established regarding reheated samples.

QA Testing

An Agency representative is required to observe at least one QC test per day.

Verification Testing: An Agency representative will take 1 verification sample per mixture blend per day for Mn/DOT laboratory testing. A verification companion sample will be given to contractor for QC testing.

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6. Core Density (Option 1)/Nuclear Density(Option 2) For Modified Specified Density Only

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QC Testing

1 lot per day
5 sublots per lot
2 density determinations per sublot

REMARKS: Sawing of cores into separate lifts is required (Option 1). Contractor is required to have a saw capable of separating the core lifts without damaging the material at the field testing lab.

QA Testing

Option 1:

3 companion cores per lot per day for verification. Companion cores tested on Agency equipment. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported to the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat.

For Certified Plant:
Agency representative observes weighing of cores in water and saturated surface dry weights.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

II. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2340 (Note #1) (Part B, Cont'd)

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6. Core Density (Option 1)/Nuclear Density(Option 2) For Modified Specified Density Only (Cont'd)

Option 2:

For nuclear gauge calibration an Agency representative shall observe all Contractor testing and select 3 companion cores to verify Contractor's results for each mix design or change in mix design. Companion cores tested on Agency equipment. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported to the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat.

Agency representative observes all nuclear density readings per lot per day.

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7. Nuclear Density Control Strip

QC Testing

Each Control Strip: 10 Random Tests
Each lot for Quality Level: 5 Random Tests

QA Testing

Agency representative observes all Contractor Testing

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8. Bituminous Materials including Asphalt Emulsion <u>ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html</u>

QC Testing <u>ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED</u>

QC Testing is the responsibility of the bituminous material supplier. Random sampling is arranged the Chemical Laboratory.

QA Testing <u>ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html</u>

Asphalt Binder: **Sample first shipment of each grade of material at the start of a plant's production each year or after set-up of a portable plant. Thereafter, submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton).**

Asphalt Emulsion: **Tack material only when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 (50,000 gal.) (approx. 200 ton).**

REMARKS: State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

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9. Moisture Content in Mixture

QA Testing

When conditions are such (rainy weather and/or saturated stockpiles) that the Engineer suspects the mixture as sampled from behind the paver may have a moisture content exceeding 0.5%, a sample should be taken for each individual course and, at the discretion of the Engineer, tested according to the procedures in the Bituminous Manual (5-693.950). Moisture content above 0.5% are not allowed.

Note #1: Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 2415 or Form 2403 in the Project File.

Note #2. All QA test samples shall be from split samples.
If a member of the monitoring team observes the Contractor Test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking sampling and testing procedures.
3.) Discussing QC problems with the Contractor.
4.) Obtaining Verification Samples.
5.) When additional testing is necessary, collect QA samples which have been acquired and retained by the Contractor.

Note #3. For process control testing, acceptance will be based on Contractor's test results as verified by Mn/DOT test results.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1)

(All bituminous mixtures are from Certified Plants) **(www.mrr.dot.state.mn.us/pavement/bituminous/bituminous.asp)**

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Agency
Verification	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results shall be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Contractor or Agency	Contractor or Agency	Contractor or Agency

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2350/2360

SAMPLE SIZE:
35 kg (75 lb.) - plus #4 aggregate sample for quality testing and Percent Crushing
15 kg (35 lb.) - minus #4 aggregate for quality testing
15 kg (35 lb.) - bituminous mixture plus 3 Marshall specimens for volumetric testing (2350)
35 kg (75 lb.) - bituminous mixture plus 2 Gyratory specimens for volumetric testing (2360)
25 kg (55 lb.) - bituminous mixture for TSR testing (option A)
8.2 kg (18 lb.) - bituminous mixture for TSR testing plus 9 Marshall specimens (option B) (2350)
8.2 kg (18 lb.) - bituminous mixture for TSR testing plus 6 Gyratory specimens (option B) (2360)
1 kg (2 lb.) - for mineral filler.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part A, Cont'd) (All bituminous mixtures are from Certified Plants)

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1. Bituminous Mix Design (QC/QA)

QC Testing

REMARKS: Mix Design for Spec. 2350/2360 is Contractor's responsibility with review by Mn/DOT.

QA Testing

Test Contractor's samples at optimum Asphalt Content, TSR, plus 3 Marshall specimens submitted along with Trial Mix data for review. (2350)

Test Contractor's samples at optimum Asphalt Content, TSR, plus 2 Gyratory specimens submitted along with Trial Mix data for review. (2360)

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2. Aggregate Quality Testing (QA Only)

QA Testing

Contractor shall provide 24 hour notice of intent to sample aggregates for quality testing. Agency has the option to monitor sampling.

Contractor submits to the Bituminous Engineer or the District Materials Engineer one (1) sample of each non-asphaltic aggregate type or class per source per year. When aggregate qualities approach specification limits or when material variation is observed, take additional field tests.

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3. Mineral Filler (QA Only)

QA Testing

One (1) per shipment of 45 metric tons (50 tons) or less, unless previously inspected.

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4. Additives (QA Only)

QA Testing

1 L (1 qt.) of blended asphalt binder and additive. Sample first shipment of each type of material, then submit one sample per 1,000 m^3 (250,000 gal.) (approx. 1,000 ton)

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Cont'd)
(All bituminous mixtures are from Certified Plants)

B. BITUMINOUS PRODUCTION for Specification 2350/2360

SAMPLE SIZE: **15 kg (35 lb.) for Aggregate for Gradation (QC/QA)**
11 kg (25 lb.) for 2350 Mixture Properties (QC/QA) 1 full 6" by 12" cylinder mold for QA
23 kg (50 lb.) for 2360 Mixture Properties (QC/QA) 2 full 6" by 12" cylinder molds for QA
50 kg (110 lb.) for TSR (QC/QA)
40 kg (90 lb.) for Aggregate Specific Gravity (QC/QA)
1 L (1 qt) for Asphalt Binder (QA)
2 L (½ gal) for Asphalt Emulsion (QA)

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1. Plant Mix Aggregate Gradation Testing (QC/QA, Verification*)

QC Testing
1 per 900 metric tons (1000 tons) at start of production
1 per 1,800 metric tons (2,000 tons) or portion thereof per mix blend as required by 2350.5C3a(6)(a)(b) or 2360.4E6a
1 per 450 metric tons (500 tons) when operating under corrective action.
Companion samples taken for agency.
REMARKS: See Note #2 & Note #3

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

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2. Aggregate Percent Crushing (QC/QA, Verification*)

QC Testing
Testing rates as required by 2350.5C3B, 2360.4E9 CAA, 2360.4E10 FAA. Two tests per day (CAA, FAA) for first two days. If CAA results exceed the specification minimum by 8% of the requirement; sample daily, test minimum one per week. If FAA results exceed the specification minimum by 5% of the requirement; sample daily, test minimum one per week.
REMARKS: See Note #3

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

****

3. Asphalt Content, % (QC/QA)

QC Testing
1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced
Divide planned production by 1,000; round up to determine testing rate.

(a) Meter Method (Virgin only) ..... Mn/DOT Bituminous Manual
(b) Incinerator Oven ..... Mn/DOT Lab Manual Method 1853
(c) Extraction ..... Mn/DOT Lab Manual Method 1851 or 1852
(d) Spot Check (Virgin only) ..... Mn/DOT Bituminous Manual 5-693.848

REMARKS: The verification companion sample must use Method (b) or (c) only.
When more than one Mn/DOT approved test procedure is available, the Contractor shall select one method at the beginning of the project (when material is submitted for Trial Mix Review) and use that method for the entire project. The Contractor and Engineer may agree to change test procedures during the construction of the Project.
REMARKS: See Note #3
If a member of a monitoring team observes the Contractor test, note and sign under remarks.
The Project Engineer is responsible for:

1.) Reviewing control charts for accuracy and completeness.
2.) Checking, sampling and testing procedures.
3.) Discussing QC problem with Contractor.
4.) Obtaining verification samples.

QA Testing
Companion samples to QC samples set aside for 7 working days and tested as needed.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part B, Cont'd) (All bituminous mixtures are from Certified Plants)

****

4. Mixture Properties (QC/QA, Verification*)
(Maximum Gravity, Marshall Bulk Gravity - 3 Specimen Average, Gyratory Bulk Gravity - 2 Specimen Average)

QC Testing

1 per 450 metric tons (500 tons) per mix blend for first 1,800 metric tons (2,000 tons) of mixture produced.
Divide planned production by 1,000; round up to determine testing rate.
Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day.

REMARKS: See Note #2 & Note #3
Calibration factors shall be established regarding reheated samples.

QA Testing

Companion samples to QC samples set aside for 7 working days and tested as needed.
The agency representative is required to observe at least one QC test per day.

***Verification Testing**

Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day. Verification testing to include the following Mixture Properties; Maximum Gravity, Marshall Bulk Gravity - 3 Specimen Average or Gyratory Bulk Gravity - 2 Specimen Average, air voids, VMA, % crushing, AC content, and gradation. The verification companion shall also be tested for CAA and FAA at a rate of 1 test per week if the CAA and FAA exceed the requirements by 8% and 5% respectively otherwise test daily.

An Agency representative will take 1 verification sample per mixture blend per day for Mn/DOT laboratory testing. A verification companion sample will be given to contractor for QC testing.

****

5. Core Density and Thickness

QC Testing Production/lot testing rate requirements.

Daily Production		Lots
Metric Ton	English (ton)	
0 – 545	(0 – 600)	1
546 – 910	(601 – 1000)	2
911 – 1455	(1001 – 1600)	3
1456 – 3275	(1601 – 3600)	4
3276 – 4545	(3601 – 5000)	5
4546 +	(5001 +)	6

Core locations determined and marked by Agency. The Contractor shall schedule the approximate time of testing during normal project work hours so that the Agency may observe and record the saturated surface dry and immersed weight of the cores.

REMARKS: Sawing of cores into separate lifts is required. Contractor is required to have a saw capable of separating the core lifts without damaging the material.

QA Testing

1 companion core per lot. Core locations determined and marked by Agency. Agency representative observes all Contractor coring, sawing and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported and tested at the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat. A completed coring log shall be submitted to the Laboratory (Agency field or District/Division).

****

6. Aggregate Specific Gravity (QC/QA)

QC Sampling
1 per 10,000 metric tons (11,000 tons). Tested by Contractor, if requested by Project Engineer.

QA Testing
Companion sample to QC sample shall be submitted to the District/Division Materials Lab and tested as needed.

****

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

III. BITUMINOUS CONSTRUCTION ITEMS FOR SPECIFICATION 2350/2360 (Note #1) (Part B, Cont'd) (All bituminous mixtures are from Certified Plants)

****

7. Tensile Strength Ratio (T.S.R.) (QC/QA)

QC Sampling

1 in the first 5,000 tons or by the second day of production, whichever comes first, then 1 per 20,000 metric tons (22,000 tons). Tested by Contractor, if requested by Materials Engineer

---

QA Testing

Companion sample to QC sample shall be submitted to the District/Division Materials Lab and tested as needed.

****

8. Bituminous Materials including Asphalt Emulsion: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

---

QC Testing ONLY BITUMINOUS MATERIAL FROM CERTIFIED SOURCES ARE ALLOWED FOR USE.

QC testing is the responsibility of the bituminous material supplier. The Chemical Laboratory arranges random sampling.

QA Testing: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html

Asphalt Binder: Sample first shipment of each grade of material at the start of a plant's production each year or after set-up of a portable plant. Thereafter, submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton)

Asphalt Emulsion: Tack material only sample when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 ((50,000 gal.) (approx. 200 ton)

REMARKS: State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

****

9. Moisture Content in Mixture (QC only)

QC Testing

Sampling and testing shall be conducted by the Contractor on a daily basis unless exempted by the Engineer and tested according to the procedures in the Bituminous Manual (5-693.950). Moisture content above 0.3% are not allowed.

Note #1. Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 2415 or Form 2403 in Project File.

Note #2. All QA test samples shall be from split samples.
If a member of the monitoring team observes the Contractor Test, note and sign under remarks.
The Project Engineer is responsible for:
1.) Reviewing control charts for accuracy and completeness.
2.) Checking sampling and testing procedures.
3.) Discussing QC problems with the Contractor.
4.) Obtaining Verification Samples.
5.) When additional testing is necessary, collect QA samples which have been acquired and retained by the Contractor and/or additional verification samples.

Note #3.
For process control testing, acceptance will be based on Contractor's test results as verified by Mn/DOT test results.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1)

A. PRE-PRODUCTION SAMPLING AND TESTING for Specification 2331

Contractor Trial Mix Design and Verification — 35 kg (75 lb.) for each aggregate type retained on 4.75mm (#4) sieve; for quality testing, and percent crushing. 2 kg (4 lb.) for each aggregate type passing the 4.75 mm (#4) sieve; for quality testing.

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
1. Trial Mix for Bituminous Content Recommendations	2331 3139	None	None	The Contractor will submit a representative sample from each source	135kg (300 lb.) of total blend with a minimum 45kg (100 lb.) of each component
				or-	
				Contractor's Mix Design	15 kg (35 lb.) of mix
					Defined for Aggregate Preproduction (listed above)

REMARKS: Contractor's mix design sample at optimum asphalt content plus 3 Marshall specimens with Trial Mix data for approval

B. BITUMINOUS PRODUCTION for Specification 2331

1. Aggregate (Gradation) A. Plant Mix Aggregate	2331 Type 31 Type 41 Type 47 Type 61 3139	1 per 900 metric tons (1,000 tons) per mix blend No field tests required for quantity less than 272 metric tons (300 tons) per mix type when from previously accepted source. Use form 2415 or 2403.	TP 24449	1 per 9,000 metric tons (10,000 tons) If Field samples are tested in District Laboratory, separate laboratory testing at 1 per 9,000 metric tons (10,000 tons) is not required.	10 kg (25 lb.)

REMARKS:

No routine laboratory samples required for quantities less than 900 metric tons (1,000 tons) mix.
Quantities shown for laboratory samples refer to total tons of bituminous mixtures on project.
All laboratory samples shall have field companions.
If test results do not comply with Job Mix Formula gradation values, two samples shall be taken and tested on the succeeding day.

B. Mineral Filler	3145	None	None	1 per shipment of 45 metric tons (50 tons) or less unless previously inspected.	1 kg (2 lb.)
C. Seal Coat	3127	1 per 400 m³ (500 CuYd)	TP 2429	1 per 1,500 m³ (2,000 CuYd)	10 kg (25 lb.)

REMARKS:

First sample within first 800 m³ (1,000 CuYd) production. No routine laboratory samples required for quantity less than 800 m³ (1000 CuYd)

2. Aggregate (% Crushing)	2331 Type 41 Type 42 Type 47 Type 48 3139	1 per 1,350 metric tons (1,500 ton) per mix blend with a minimum of 1 per day	TP 7119-02

REMARKS:

None required when tonnage/course is less than 1,350 metric tons (1,500 tons).
If test results do not comply with Specifications; 2 samples shall be taken and tested on the succeeding day.
For Type 42, tests will be run on non-asphaltic aggregate only.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1) (Part B, Cont'd)

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
3. Aggregate (Quality Tests)	2331 3139	When spall content is near upper limits, take additional field tests.		TP 2429 1 sample of each non-asphaltic aggregate type or class per source per year. When aggregate qualities approach specification limits or when material variation is observed take additional field tests.	35 kg (Note A.) (75 lb.) 2 kg (Note B.) (4 lb.)
4. Bituminous Materials (Including Asphalt Emulsion)	2331 2357 2358 3151	None	None	CERTIFIED SOURCE: Asphalt Cement Only. Sample first shipment of each type of material, then submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton) CERTIFIED SOURCE: Asphalt Emulsion Only. TACK MATERIALS: Sample only when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 (50,000 gal) (Approx. 200 ton)	1 L (1 quart) 2 L (½ gal)

Note A.- Sample of aggregate retained on 4.75mm (#4) sieve
Note B. - Sample of aggregate passing the 4.75mm (#4) sieve

REMARKS: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html. State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Cutback Asphalt should only be used in cold temperature applications. Contact Bituminous Office for cold temperature application guidelines.

5. Bituminous mixtures (Plant Mixed)

A. Asphalt Content by Spot Check method	2331	As often as required to control 1 per day minimum	TP 24448-01	None
B. Density (Specified Density)	2331	Marshall Density: Daily, Minimum 1 per 900 metric tons (1,000 tons) per course. Core Density: Daily, Minimum 1 per 900 metric tons (1,000 tons) per course	TP 24447-02	None

REMARKS: Samples shall be taken from each day's production at the direction of the Engineer, prior to placement of the next course thereon and not later than the next working day following the date of placement.

C. Density (Control Strip)	2331	(1) Each Control Strip: 10 Random Tests. (2) Each Lot for Quality Control 5 Random Tests.	TP 24342 TP 24446-01	None
D. Extraction and Gradation *Recycled Mixtures Only Under Spec 2331*	Type 32 Type 42 Type 48 and all mixes measured by square yard inch	None		2 per mixture blend on first day of production. 1 per mixture blend per day thereafter.

REMARKS: Sample shall be taken from mixture property test(s). If test results do not comply with Job Mix Formula gradation values, a minimum of 2 samples each succeeding day until test results comply with Job Mix Formula gradation values.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

IV. BITUMINOUS CONSTRUCTION ITEMS FOR PROJECTS CONSTRUCTED UNDER SPECIFICATION 2331 (See Note #1) (Part B, Cont'd)

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
5. Bituminous Mixtures (Cont'd) (Plant Mixed)					
E. Mixture Properties	**2331**	**None**		**1 per 450 metric tons (500 tons) per mix blend for first 1800 metric tons (2,000 tons) of mix produced then 1 test per mix per day.** **FOR SQUARE YARD INCH PROJECTS 2 per mixture blend on first day 1 per mixture blend per day thereafter.**	**10 kg (25 lb.)**
6. Additives	**3161**	**None**		**1 L (1 qt) sample of blended bituminous material and additive. Sample first shipment of each type of material, then submit one sample per 1,000,000 L (250,000 gal.) (approx. 1,000 ton)**	
7. Moisture content in Mixture	**2331**	**When conditions are such (rainy weather and/or saturated stockpiles) that the Engineer suspects that the mixture as sampled from behind the paver may have a moisture content exceeding 0.5%, a sample should be taken for each individual course and, at the discretion of the Engineer, tested according to the procedures in the Bituminous Manual (5-693.950)** **Moisture contents above 0.5% are not allowed.**			

REMARKS:

If testing rate for first 1,800 metric tons (2,000 tons) of production has been satisfied on previous project and continuous production of the mix type has been established, then 1 test per mix per day.

Samples should be taken from behind paver.

If test results do not comply with mix design air voids criteria, additional samples shall be taken and tested at the rate of 1 per 450 metric tons (500 tons) each succeeding day until test results comply with mix design criteria. The samples shall weigh approximately 10 kg (25 lb.) (Small sample bag or concrete cylinder mold).

If the appearance of the mixture changes, additional samples should be taken.

Note #1: Projects with bituminous tonnage less than or equal to 272 metric tons (300 tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Document on Form 2403 or Form 2415 and retain in project file.

SCHEDULE OF MATERIALS CONTROL

V. SEALCOAT CONSTRUCTION ITEMS SPECIFICATION 2356

Material	Spec. Mix	Rate of Field Testing	Form No.	Sampling Rate for Laboratory Testing	Sample Size
1. Aggregate	3127	1 per 400 m^3 (500 Cu Yd)	TP 2429	1 per 1,500 m^3 (2000 Cu Yd)	10 kg (25 lb.)

REMARKS: First sample within first 800 m^3 (1000 Cu Yd) production. No routine laboratory samples required for quantity less that 800 m^3 (1000 Cu Yd). Check Special Provisions for any additional specifications.

2. Bituminous Materials (Including Asphalt Emulsion)	2355 2356	None	None	CERTIFIED SOURCE: Asphalt Cement Only Sample first shipment of each type of material, then submit one sample per 1,000 m^3 (250,000 gal) (approx. 1,000 ton) CERTIFIED SOURCE: Asphalt Emulsion Only TACK MATERIALS: Sample only when material appears suspect. Other applications: Sample first shipment, then submit one sample per 200 m^3 (50,000 gal) (Approx. 200 ton)	1 L (1 quart) 2 L (½ gal)

REMARKS: ONLY BITUMINOUS MATERIALS FROM CERTIFIED SOURCES ARE ALLOWED. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND IN THE TECHNICAL MEMORANDUM ENTITLED *INSPECTION, SAMPLING AND ACCEPTANCE OF BITUMINOUS MATERIALS* AT http://www.dot.state.mn.us/tecsup/tmemo/index.html. State inspector observes contractor personnel taking sample. Plastic jar with wide screw top for asphalt emulsion. Pressure fit cans for cutback asphalt. Check Special Provisions for any additional specifications.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (www.mrr.dot.state.mn.us/pavement/concrete/concrete.asp)
(All Ready Mix is from Certified Plants)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing Performed by Contractor Also known as Process Control testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample. If QA only, sampling and testing by Agency only.	Contractor	Contractor	Agency
Verification (Audit)	A sample which is sampled and tested by the Agency to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification (Audit) Companion	A companion sample to the Agency's verification sample provided to the Contractor. The Contractor is required to test this sample. The results are required to be used as part of the QC program	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

PAVING PLANT - Central Batching Plant dedicated to a concrete paving project delivering concrete other than by Ready-Mix trucks.

****

A. CONCRETE AGGREGATE TESTING (All Concrete) Specification 3126, 3128 and 3137.

SAMPLE SIZE: 10 - 15 kg (25 lb.) for +19 mm (3/4" Plus) Coarse Aggregate
5 - 7 kg (10-15 lb.) for -19 mm (3/4" Minus) Coarse Aggregate
5 kg (10 lb.) for CA-70 and Sand

****

1. Certified Ready Mix Concrete

****

a. Gradation Testing (QC/QA): **Form No.**

(1) QC Testing — 2449
When over 20 m³ (CuYd) of agency concrete produced per day — Weekly Concrete
Coarse: 1 per 100 m³ (CuYd) of concrete* — Aggregate Report
Fine: 1 per 200 m³ (CuYd) of concrete*

(2) QA Testing — 24143
Based on Verification (Audit) Sample testing only unless altered by the Project Engineer*
Weekly Certified
Coarse and Fine: For plants producing over 500 m³ (500 CuYd) of Certified production each day, take verification (audit) samples at a rate of 1 per day with a maximum of 3 verification (audit) samples — Ready-Mix Report

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Part A, Cont'd)
(All Ready Mix is from Certified Plants)

1. Certified Ready Mix Concrete (1a(2). Cont'd): **Form No.**

per week. For plants producing 20 m³ to 500 m³ (20 CuYd to 500 CuYd) of Certified production each day, take verification (audit) samples at a rate of 1 per 500 m³ (500 CuYd) based on a cumulative (day-to-day) total with a minimum of 1 verification (audit) sample per week. Take more verification (audit) samples when production problems exist. QA Coarse Aggregate testing on -75□m (#200) material as directed by the District/Division Materials Engineer.

*Split samples are tested by the agency as needed at the direction of the Project Engineer. These results shall be included in the QA program.

NOTE: As a check on field testing equipment when QA testing is performed in the field, send one split gradation sample per month to District Lab for comparison testing.

****

b. Moisture Testing (QC/QA): **Form No.**

(1) QC Testing
When over 20 m³ (CuYd) of agency concrete produced per day
Coarse and Fine: 1 per 200 m³ (CuYd) of concrete

(2) QA Testing
None Required. Testing rate at the discretion of the Engineer

****

c. Quality Testing (QC/QA): **Form No.**

(1) QC Testing
At Contractor's discretion

(2) QA Testing
Sampled for acceptance (QA) at the rate of 1 per month. Testing rate may be adjusted by contacting the Concrete Engineering Unit.
2410 Sample ID Card

****

2. Paving Concrete

See Special Provisions for QC/QA testing schedule on projects with a dedicated Contractor paving plant; otherwise, the testing rate for Certified Ready Mix Concrete applies.

NOTE: When work requires that a Certified Ready Mix Concrete Plant be dedicated to a paving project, a full-time plant monitor and daily audit samples are recommended. The Contractor sampling and testing rate may be reduced with the approval of the Concrete Engineering Unit.

****

3. Low Slump Concrete for Bridge Deck Overlay and Concrete Pavement Repair

****

a. Gradation Testing (QA): **Form No.**

(1) QA Testing
1 per fraction prior to commencing operations and each time aggregate is delivered to site.
Quality testing as directed by the Engineer
21412 Weekly Report of "Low Slump Concrete"

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Part B)
(All Ready Mix is from Certified Plants)
B. STRUCTURAL CONCRETE CONTROL TESTS

****

1. Certified Ready Mix Concrete – (Other than concrete from a Paving Plant)

NOTE: For Concrete Paving from Certified Ready Mix Plants, the sampling and testing rate as listed below shall apply unless reduced with approval of the Concrete Engineering Unit.

****

a. Air Content and Slump (QA Only)	**Form No.**
(1) QA Testing Only Test first load each day per mix. 1 test per 100 m³ (CuYd)	2448 Weekly Concrete Report

****

b. Strength (QA Only)	**Form No.**
(1) QA Testing Only Strength (See NOTES #1 and #2) 1 per 100 m³ (CuYd) **1 per day minimum if production is more than 20 m³ (CuYd)**	2409 ID Card Concrete Test **Cylinder**

NOTE #1: For concrete mixtures containing aggregate with a maximum size of 31.5 mm (1 1/4 in), 100 mm x 200 mm (4 in x 8 in) cylinders may be substituted for 150 mm x 300 mm (6 in x 12 in) cylinders.
NOTE #2: Additional Control Cylinders as necessary.

****

2. Paving Concrete from Paving Plants

NOTE: For Paving Concrete from Ready Mix Plants, the sampling and testing rate for Certified Ready Mix Concrete shall apply unless reduced with the approval of the Concrete Engineering Unit. See Special Provisions for sampling and testing rates for dedicated paving plants.

****

a. Air Content and Slump (QA Only)	**Form No.**
NOTE: Only one slump test per day is required on slipform paving. See Certified Ready Mix Concrete testing rates when paving concrete is supplied by Ready Mix. (1) QA Testing Only Test first load each day per mix. 1 test per 300 m³ (CuYd)	2448 Weekly Concrete Report

****

b. Strength (QA Only)	**Form No.**
(1) QA Testing Only 1 set of two beams per 2,000 m³ (2,500 Cu Yd). See NOTE.	2162 Concrete Test Beam Data

REMARKS: If less than 2,000 m³ (2,500 Cu Yd) of paving, a set of 2 cylinders per day may be substituted for the beam requirements.
NOTE: Additional Control Beams as necessary.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

(All Ready Mix is from Certified Plants)

c. Thickness — **Form No.**

CORES FOR VERIFICATION: (See specification 2301.3P2 for procedure.) — 24327 Field Core Report

The cores are taken at locations determined by the Project Staff using Random Numbers. The Contractor takes one random core per 1,000 ft/traffic lane/5,000 ft (300 m/traffic lane/1,500 m). The Agency initials pavement at core locations and re-initials the sides of specimens after coring to clearly verify their authenticity.

d. Surface Smoothness and Ride Quality (QC/QA Testing) — **Form No.**

(1) QC Testing

CONTRACTOR PROVIDES CALIFORNIA'S PROFILOGRAPH RESULTS

Refer to Mn/DOT Specification 2301.3P1b for surface smoothness and Specification 2301.3P1c for ride quality requirements.

(2) QA Testing

If the Contractor's test results are in question, the Engineer may request that the entire project be retested by an Independent Source.

3. Low Slump Concrete for Bridge Deck Overlay and Concrete Pavement Repair

a. Air Content and Slump (QA Only) — **Form No.**

(1) QA Testing Only

Test at beginning of pour each day. 1 per 15 m³ (Cu Yd) — 21412 Weekly Report of "Low Slump Concrete"

REMARKS: For low-slump concrete from concrete mobile, allow mix to hydrate 4 to 5 minutes before slump test to assure all cement is saturated.

b. Strength (QA Only) — **Form No.**

(1) QA Testing Only

1 per 30 m³ (Cu Yd). 1 minimum per project. — 2409 ID Card Concrete Test Card

C. CEMENTITIOUS MATERIALS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
1. Standard Portland High Early Portland Air Entraining Portland Air Entraining High Early Portland	3101		Certified Source* See REMARKS	2 kg (5 lb.)	24300 ID Card Cement Samples

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
2. Portland Pozzolan Blended Cement Ground Granulated Blast Furnace Slag (GGBFS)	3102, 3103		Certified Source* See REMARKS	2 kg (5 lb.)	24300 ID Card Cement Samples
3. Fly Ash	3115		Certified Source* See REMARKS	2 kg (5 lb.)	24308 ID Card Fly Ash Samples

REMARKS: All certified products must so state on the Bill of Lading. Certified source list at http://www.mrr.dot.state.mn.us/pavement/concrete/products.asp

1. **All Cement, Fly Ash and GGBFS must be approved by the Lab before use.**
2. **Spot Check sampling as District Materials Engineer directs.**
   Suggested Spot Check sampling rates for
   a. **CONCRETE PAVING PROJECTS**
      1 Sample per 7,500 m^3 (10,000 CuYd) of Concrete (Minimum of 1 per project)
   b. **OTHER CONCRETE**
      1 Sample every 2 to 4 weeks per plant as production warrants.

D. CURING MATERIALS

					Form No.
1. Burlap	3751	Visual Inspection	1 per shipment	1 m^2 (1 yd^2)	2410 Sample ID Card
2. Membrane Compound	3754 3754 AMS 3755		See NOTE	1 L (1 qt.)	2410 Sample ID Card

NOTE: Sampling rates for

a. **CONCRETE PAVING PROJECTS**
   1 sample for each shipment or if shipment contains more than 1 lot, sample each lot. See REMARKS
b. **OTHER CONCRETE**
   Call (651) 779-5556 before sampling.

REMARKS: Only Curing Materials from APPROVED sources are allowed for use. The most current approved list can be found at http://mrr.dot.state.mn.us/pavement/concrete/products/Approvedcuringcompounds.pdf . Material must be thoroughly stirred or agitated immediately prior to taking sample. Cover sample immediately.

3. Paper or Plastic	3752 3756	Visual Inspection	1 per shipment	0.25 m^2 (2 Sq Ft)	2410 Sample ID Card

NOTE: Must be white opaque.

E. JOINT MATERIALS

					Form No.
1. Hot Poured Elastic Type	3723 **3725**		1 per lot	5 kg **(10 lb.)**	2410 **Sample** ID Card

REMARKS: Only joint materials from CERTIFIED sources are allowed for use. The most current list of certified can be found at http://www.mrr.dot.state.mn.us/materials/AppProddisclaimer.asp Samples shall be taken from application wand.

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Form No.
2. Silicone Joint Sealer	3722		1 per lot	0.5 L (1 pt.) in Steel Container	2410 Sample ID Card
REMARKS: Only joint materials from APPROVED sources are allowed for use. The most current list of approved Sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products/jointsealants.pdf					
3. Preformed Elastomeric Type	3721	Visual Inspection	1 per 1,000 m (3,000 LF) for each lot or sub-lot or fraction	2 m (6 ft)	2415* or 2403
***Field Inspection Report (Lot Numbers Only)**					
4. Preformed	3702	Visual Inspection	1 per shipment of each type and thickness	0.25 m² (2 Sq Ft)	2410 Sample ID Card
REMARKS: Will carry "Inspected" tag if approved prior to shipment.					

F. ADMIXTURES FOR CONCRETE

					Form No.
1. Accelerating, Retarding, Water Reducing, Air Entraining, etc.	3113		See NOTE	.25 L (½ pt.) in Plastic Container	2410 Sample ID Card

NOTE: Suggested Spot Check sampling rates for

a. CONCRETE PAVING PROJECTS

1 Sample per shipment for each type, brand and concentration. (Minimum of 1 per project)

b. OTHER CONCRETE

1 Sample once per month per plant or as production warrants.

REMARKS: Only admixtures from APPROVED sources are allowed for use. The most current list of approved sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products.asp Samples shall be taken from the dispensing tubes.

G. CONCRETE TREATING OIL

					Form No.
	3917	Visual Inspection	1 per shipment	.5 L (1pt.) in Steel Container	2410 Sample ID Card

H. WATER

					Form No.
	3906	Visual Inspection	1 sample from any questionable source. Use clean glass or plastic containers.	3.5 L (1 gal)	2410 Sample ID Card

I. EPOXIES

					Form No.
		Visual Inspection	1 sample of each component from each lot in each shipment for quantities over 1 gallon	.25 L (½ pt.) of each component in Steel Container	

REMARKS: Must be approved prior to use. Only epoxies from APPROVED sources are allowed for use. The most current list of approved sources can be found at http://www.mrr.dot.state.mn.us/pavement/concrete/products/approvedepoxies.pdf

SCHEDULE OF MATERIALS CONTROL

Please contact the Mn/DOT District Independent Assurance Inspector when Project starts to provide servicing of your project.

VI. CONCRETE CONSTRUCTION ITEMS (Cont'd)

****

There are certain items of concrete which are acceptable under a modified small quantity acceptance plan from a known and reliable source. These small quantities should be documented by the Engineer but no inspection reports are necessary.

FIELD TESTING (No Plant Inspection):

1 air (if required), 1 slump and 1 cylinder test per day:

1 - 20 m³ (CuYd) of general concrete work (pavement, curb and gutter, bridge footings, bridge concrete constructed above footings, median barrier, etc.)

1 - 100 m³ (CuYd) of concrete of a non-critical nature (all Grade C concrete, C. I. P. pile filling, fence post footings, etc.)

PLANT TESTING (No Field Inspection):

1 Delivery truckload for all types of work may be accepted without field tests if all plant tests are performed, including batching and mixing inspection.

Should unique circumstances arise on a project which makes the above quantities or rates of testing for concrete shown elsewhere impractical, they may be revised prior to performing the work by contacting the Concrete Engineering Unit and obtaining their approval.

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Plant Stock and Landscape Materials	3861 and 2571.2A1	Field Inspection at Job Site. submit itemized report for each shipment.*	2415 or 2403		

*Utilize "Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects" to determine and measure minimum and maximum criteria thresholds. The following documentation must be provided as a condition for delivery and approval:

1. A Mn/DOT Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment
2. A valid copy of a nursery stock (dealer or grower) certificate registered with the MN. Dept. of Agriculture and/or a current nursery certificate/license from a state or provincial Dept. of Agriculture for each plant stock supplier.
3. A copy of the most recent Certificate of Nursery Inspection for each plant stock supplier.
4. Plant material shipped from out-of-state nursery vendors subject to quarantines (Gypsy Moth and Japanese Beetle) must be accompanied by documentation certifying all plants shipped are free of regulated pests.
5. Bills of lading (shipping documents) for all materials delivered.
6. Invoices (billing statements) for all materials to be used.
7. Each bundle, bale, or individual plant must be legibly and securely labeled with the name and size of each species or variety.

REMARKS: Preliminary inspection will not be done at the source. Material must be in accordance with the Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects.

2. Wildflower and Wetland Seedlings	3861	Field inspection at Job Site. Submit itemized report for each shipment. Include Mn/DOT Certificate of Compliance for seedlings, labels, and invoices	2415 or 2403	None	

REMARKS: Certified sources only. A certificate of Compliance must be furnished by the supplier to the Engineer.

3. Fertilizer	3881	Visual Inspection		None	

REMARKS:

BAGGED: Inspected on the basis of guaranteed analysis.

BULK: Inspector to obtain copy of invoice of blended material stating analysis. Check if Slow Release Fertilizer is specified.

4. Agricultural Lime	3879	One gradation test for each 180 Metric Ton (200 ton)	2415 or 2403	One sample per source for quantities of 90 metric ton (100 ton) or less	4.5 kg (10 lb.)

REMARKS: Submit form 2415 or 2403. Small Quantity is 90 metric ton (100 ton) or less.

5. Topsoil Borrow and Select Topsoil Borrow Premium Topsoil Borrow	3877.2	None.		From each source: One composite sample for the first 765 m^3 (1,000 CuYd) or less. One composite sample for each additional 2,300 m^3 (3,000 CuYd) or fraction thereof.	10 kg (20 lb.)

REMARKS: Testing takes about three weeks after delivery of the sample to the Department Laboratory. Sampling shall be done prior to the time the topsoil is delivered to the project.

Small Quantity - 230 m^3 (300 CuYd)

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS (Cont'd)

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
7. Seeds	**3876**				
A. Certified Vendors only		**Check for guaranteed analysis labels. Check for variety and county of origin for native seeds.**	**2415 or 2403**	**Sampling need only be done for seed that is not planted within nine months after germination test, or if quantity used is more than 450 kg (1,000 lb.)**	**.5 L (1 pint)**
REMARKS: Seed guaranteed as meeting the requirements is identified by official guaranteed analysis labels affixed to each container of seed in addition to the customary seed tag. Submit copy of seed tag per shipment to Office of Environmental Services. Indicate quantity used and contractor. Any moldy or insect contaminated seed must be rejected.					
B. Non-Certified Vendors	**3876**		**2415 or 2403**	**MUST BE SAMPLED. For 25 bags or less, combine from five bags into one sample. For larger quantities; sample each 5th bag combine samples into groups of 5 and select a test sample from each composite.**	**.5 L (1 pint)**
REMARKS: Submit samples six weeks before seeding to allow for testing. May be sampled at source by Office of Environmental Services upon proper notification. Seed may be sampled by Office of Environmental Services at the project site upon proper notification.					
Small Quantity - 90 kg (100 lb.)					
C. Wildflower Seed	**3876**	**Check if from Certified Vendor or Approved Source**	**None**		**.25L 1 cup (8 oz)**
REMARKS: Send sample and copy of seed tag to Office of Environmental Services.					
8. Erosion Control Blanket	**3885**	**Visual Inspection**	**None.**	**Random - See Remarks**	**1 m² (1 Sq Yd)**
REMARKS: Periodic tests from approved sources to verify quality.					
9. Erosion Control Netting	**3883**	**Visual Inspection**	**None.**	**Random - See Remarks**	**1 m² (1 Sq Yd)**
REMARKS: Periodic tests from approved sources to verify quality.					
10. Peat Moss	**3880**	**Final Inspection at Job Site**	**None.**	**For material furnished in bulk; one sample for 100 m³ (100 CuYd) or less. An additional sample for each 200 m³ or less, thereafter.**	**2-1/4 kg (5 lb.)**
REMARKS: SUBMIT SAMPLES IN MOISTURE PROOF BAGS. Materials furnished in packaged form may be accepted on the basis of guaranteed analysis.					
11. Sod	**3878**	**Final Visual Inspection at site. No form 2415 required.**	**2415 or 2403**	**To accept Mineral Sod, furnish sample of soil from sod prior to installation.**	
REMARKS: A Certificate of Compliance must be furnished by the producer to the Engineer for the type of sod supplied showing correct grass varieties.					
12. Silt Fence	**3886**	**Visual Inspection Check Product Label**	**2415 or 2403**	**For amounts (61m)200 ft or greater.**	**1 m (1Yd)**
REMARKS: Samples sent 21 days prior to use. Check Special Provision for Approved Products List of accepted geotextiles.					

SCHEDULE OF MATERIALS CONTROL

VII. AGRICULTURAL ITEMS (Cont'd)

Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate Laboratory Testing	Sample Size
13. Flotation Silt Curtain	3887	Visual Inspection	None.	Random - See Remarks	1 m (1 Yd)
REMARKS: Accepted, based on manufacturers' guaranteed results, with periodic sampling to verify quality.					
14. Compost	3890	Visual Inspection Form 2415 or Form 2403 is required	2415 or 2403		12 kg (25 lb.)
A. Certified Source				Random - See Remarks	
REMARKS: Accepted on the basis of certified test reports furnished to the Engineer by the supplier. Periodic sampling to verify quality.					
B. Non-Certified Source				MUST BE SAMPLED - One Sample per 300 m³ (500 CuYd)	
REMARKS: Submit samples six weeks before use. Small quantity 75 m³ (100 CuYd) or less.					
15. Erosion Stabilization Blanket	3888	Visual Inspection	None	Random - See Remarks	1 m² (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality.					
16. Sediment Mat	3894	Visual Inspection	None	Random - See Remarks	1 m² (1 Sq Yd)
REMARKS: Periodic tests from approved sources to verify quality.					
17. Fiber Log	3895	Visual Inspection	None	Random - See Remarks	1 m (1 Yd)
REMARKS: Periodic Tests from approved sources to verify quality.					
18. Inlets	3891	Visual Inspection	None	For assurance of geotextile type	1m (1 Yd)
REMARKS: Visual inspection on inlets using a geotextile, geotextile needs to have monofilament fibers running both directions					
19. Hydraulic Soil Stabilizer	3884	Slump Test forType 8	None	None	
REMARKS: Tests done prior to placement of material by installer.					

SCHEDULE OF MATERIALS CONTROL

VIII. CHEMICAL ITEMS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Sampling Rate for Laboratory Testing	Minimum Required Sample Size
1. Asphalt Plank	3204	Visual Inspection		1 sample per 1,000 plank or less of each thickness in each shipment	3 PCS 1 m long (1 Yd) each from different plank
REMARKS: CALL CHEMICAL LABORATORY (651) 779-5548					
2. Calcium Chloride	3911			Liquid: 1 per 40,000 L (1 per 10,000 gal) Dry: 1 per shipment	0.5 L (1 pint) 0.5 kg (1 lb.) in Plastic Container
3. Water Proofing Materials		Visual Inspection			
A. Asphalt Primer Waterproofing Asphalt	3165 3166			1 sample from each shipment of each material	1 L (1 qt)
REMARKS: Containers will be stamped if approved prior to shipment. CALL CHEMICAL LABORATORY (651) 779-5548					
B. Fabric	3201			1 per shipment	1 m² (1 Sq Yd)
C. Membrane	2481			1 per shipment (Membrane Only)	0.1 m² (1 Sq Ft)
4. Paints A. Non-Striping Paints	3500 Series	Visual Inspection	2415 or 2403	For pre-approved paints submit form 2415 listing batch number.	0.5 L (1 pint)
REMARKS: See Special Provisions For Approved Products List. Call Chemical Laboratory at (651) 779-5550					
B. Traffic Marking Paints	Special Provisions			None unless Suspect material	0.5 L (1 pint)
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Laboratory at (651) 779-5550					
C. Epoxy Paints (Traffic Marking)	Special Provisions			None unless Suspect Material	0.5 L (1 pint) each Component
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Chemical Laboratory at (651) 779-5550.					
5. Glass Beads (Drop On)	Special Provisions			None unless Material suspect	One L (1 qt)
REMARKS: Approved Manufacturers Only. See Special Provisions For Approved Manufacturers List. Usually sampled at source and pretested. Call Chemical Laboratory at (651) 779-5548.					
6. Reflectorized Marking Tape	3353 3354 3355			1 clean sample of each color	1 m (1 yd)
7. Sign and Markers	3352	Visual Inspection	2415 or 2403	None unless material suspect	

REMARKS: ONLY SIGN AND MARKER MATERIAL FROM CERTIFIED SOURCES IS ALLOWED FOR USE. THE MOST CURRENT LIST OF CERTIFIED SOURCES CAN BE FOUND AT http://mrr.dot.state.mn.us/materials/apprprod2.asp

SCHEDULE OF MATERIALS CONTROL

IX. METALLIC MATERIALS AND METAL PRODUCTS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Guard Rail					
A. Fittings - Splicers, Bolts, etc.	3381	Visual Inspection	2415 or 2403 for small quantity	Bolts: 2 Post bolts and 4 splice bolts with nuts for each 1,000 units or less.	
B. Cable	3381	Visual Inspection	Same	1 sample from each spool	1.2 m (4 ft)
C. Structural Plate Beam	3382	Visual Inspection	Same	One .025x.25 m (1inx10in) from one edge of one of each 200 RAIL SECTIONS or One of each 100 TERMINAL SECTIONS	

REMARKS:

To be approved before use.

Pre-tested or Inspected will carry "Inspected" tag.

Not Pre-tested:
Submit laboratory samples at required laboratory rate.

For small quantities, lab samples not required, but document on Form 2415 or 2403 and maintain in project file.

SMALL QUANTITIES:
Rail Sections - 20 or less
Terminals - 10 or less
Post Bolts - 100 or less
Splice Bolts - 100 or less

2. Steel Posts					
A. Sign Posts	3401	Visual Inspection	2415 or 2403 for small quantity	Two posts per shipment of each MASS per UNIT LENGTH	Submit shortest length of each weight
B. Fence Posts, Top Rails and others	3403* 3406* 3379 3408	Visual Inspection	Same	One sample per 500 pieces or less, but not less than two samples per shipment. Cut 0.3 m (1 ft) from each end of pipe. One each of fittings or hardware items.	

REMARKS:

*** For 3403, submit certified mill analysis with sample.**

*** For 3406, submit Certificate of Compliance and certified mill analysis with sample.**

SCHEDULE OF MATERIALS CONTROL

IX. METALLIC MATERIALS AND METAL PRODUCTS (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
3. Fence Wire					
A. Barbed	3376	Visual Inspection	2415 or 2403	One sample per 50 spools or fraction thereof	1 m (3 ft)
B. Woven	3376	Visual Inspection	Same	One full height sample per 50 rolls	1 m (3 ft)
C. Chain Link Fabric	3376	Visual Inspection	Same	One sample for each 1,500 m (5,000 ft) of fencing.	0.3 m (1 ft)
4. Water Pipe and other Piping Materials	3364, 3365, 3366 & Special Provisions		2415 or 2403		
REMARKS: To be identified and tested if necessary prior to use. Retain Form 2415 or 2403 in project files. SEE SPECIAL PROVISIONS.					
5. Reinforcing Steel					
A. Bars					
1. Uncoated	3301	Visual Check for Size and Grade Marking	2415 or 2403	NO FIELD SAMPLE NECESSARY	
2. Epoxy Coated		Visual Check for Size and Grade Marking and "Inspected" tag (See Remarks)	Same	One sample (1 bar) of each size bar for each day's coating production	1 m (3 ft)

REMARKS: For Uncoated bars - Retain Certificate of Compliance and Certified Mill Analysis in Project File.
For Epoxy Coated bars - Shipping paperwork will include Mn/DOT Lab #'s or steel will be tagged "Inspected" when it has been sampled and tested prior to shipment. Will be tagged "Sampled" when testing has not been completed prior to shipment. Submit samples and Certificate of Compliance if not tagged "Sampled" or "Inspected".

B. Steel Fabric	**3303**	**Visual Inspection**		**NO FIELD SAMPLE NECESSARY**	
REMARKS: Retain Certificate of Compliance in project file.					
C. Dowel Bars	**3302**			**One Dowel Bar from each shipment**	**Full Size Dowel Bars**
REMARKS: Same as Epoxy Coated Reinforcing Steel					
D. Prestressing Strand	**3348**			**One sample (2 strands) from each heat**	**1.5 m (5 ft)**
REMARKS: Submit one copy of mill certificate and one copy of the stress-strain curve representative of the lot with the samples.					
E. Spirals	**3305**			**One per shipment**	**0.6 m (2 ft)**
REMARKS: Will be tagged with "Inspected" tag when tested prior to shipment.					
6. Drainage Castings	**3321 2471**	**Visual Inspection***	**2415 or 2403**	**ALL CASTINGS Two tensile bars to be cast with each heat at Foundry and submitted to the Laboratory BY AN APPROVED FOUNDRY***	

**** Call Maplewood Laboratory at 651-779-5540 for list of approved foundries***
REMARKS: Inspect in the field and retain Form 2415 or 2403 in project file, showing NAME OF FOUNDRY AND QUANTITY

SCHEDULE OF MATERIALS CONTROL

X. MISCELLANEOUS MATERIALS

Material	Spec. No.	Minimum Required Acceptance Testing Field Testing Rate	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Timber, Lumber Piling and Posts	3412 to 3471 and 3491	Visual Inspection	2415 or 2403		

REMARKS:

Untreated materials shall be inspected in the field and the results reported on Form 2415 or 2403.

Treated materials shall be Certified on the Invoice or Shipping Ticket.

Material is inspected and stamped by an Independent Agency as per Specification 3491. Contact Laboratory for additional information.

2. Miscellaneous pieces and Hardware (Galvanized)	3392 3394		2515 or 2403	One sample of each item per shipment. Sample critical items only. (CRITICAL ITEMS ARE LOAD LOAD BEARING, STRUCTURALLY NECESSARY ITEMS.)	

REMARKS:

Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected".

3. Insulation Board	3760	Visual Inspection	2415 or 2403	None	
4. Elastomeric Bearing Pads	3741 and Special Provisions	Check dimensions Check repair of tested pad		One sample of each size pad if not previously tested.	Full size pad

REMARKS:

Submit copy of Certificate of Compliance with pad.

<u>DO NOT</u> USE ANY PADS THAT ARE NOT CERTIFIED

SCHEDULE OF MATERIALS CONTROL

XI. GEOSYNTHETICS, PIPE, TILE, AND PRECAST/PRESTRESSED CONCRETE

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Corrugated Metal Products					
A. Culvert Pipe Underdrains Erosion control Structures	**3225 thru 3229, 3351, and 3399**	**Visual Inspection: Check for good construction, workmanship, finish requirements and shipping**	**2415 or 2403**		
REMARKS: **Make certain pipe is Certified on Invoice**					
B. Structural Plate	**3231**	**Visual Inspection: Invoice shall include notation that material described is in accordance with fabricator's Certificate and Guarantee**	**2415 or 2403**		
C. Aluminum Structural Plate	**3233**				
REMARKS: **The Fabricator's Certificate and Guarantee shall be on file in the Mn/DOT Central Laboratory.**					
2. Clay Pipe	**3251**	**No samples required for less than 100 pieces**	**2415 or 2403**	**1 sample per 200 pieces of each size.**	**Full Size Pipe**
REMARKS: **To be sampled and inspected in the field.**					
3. Concrete Pipe	**3236**	**Field Inspection: Check for damage and defects Check dimensions as required.**	**2415 or 2403**		
A. Reinforced Pipe and Arches Precast Cattle Pass Units Sectional Manhole Units					
B. Non-Reinforced Concrete Pipe	**3253**			**2 samples of each size from each source <u>unless inspected and stamped at source.</u>**	**Full Size <u>Pipe</u>**
REMARKS: **Pipe will be certified or inspected, tested and stamped at source. Only spot checks for dimensions are performed. Make certain pipe with certified mark is certified on invoice.**					
4. Precast/Prestressed Concrete Structures					
A. Reinforced Precast Box Culvert	**3238**	**<u>Tests by Producers</u> 1 Air test per day (1st load) 2 cylinders per pour for positive slump concrete. (1 for records, 1 for shipping)**	**2415 or 2403**	**<u>Tests by Mn/DOT</u>**	
B. Precast/Prestressed Concrete Structures (beams, posts, etc.).	**2405**				
	3126 (Fine Aggregate)	**Gradation: 1 per 150 m³ (200 CuYd) or fraction thereof. 1 per day of production or 3 per week, whichever is less.**	**2449 2153**	**Gradation: 1 per month per plant 10 kg (25 lb.) Quality (Litho): 1 per month per plant**	
	3137 (Coarse Aggregate)	**Gradation: 1 per 75 m³ (100 CuYd) or 115 metric Ton (125 Ton) or fraction thereof. 1 per day of production or 3 per week, whichever is less.**		**Gradation: 1 per month per plant 10 kg (25 lb.) Quality (Litho): 1 per month per plant**	

REMARKS: Precast/prestressed structures including boxes will be inspected and stamped at source. Only spot checks for dimensions are performed.

SCHEDULE OF MATERIALS CONTROL

XI. GEOSYNTHETICS, PIPE, TILE, AND PRECAST/PRESTRESSED CONCRETE (Cont'd)

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
5. Manholes and Catch Basins (Construction)	2506 3622	Field Inspection: Check for damage and defects. Check dimensions as required.	2415 or 2403		

REMARKS:
Maintain Form 2415 or 2403 in project records, showing source of materials and type and quantity of materials used. (Bricks, blocks precast or combination)

6. Drain Tile (Clay or Concrete)	3276	Visual Inspection		2 samples of each size from each source	
7. Thermoplastic (TP) Pipe ABS and PVC	3245	Obtain Certificate of Compliance. Check for approved marking printed on pipe. Field Inspect for damage or defects.	2415 or 2403		

REMARKS:
See Spec. 2345 for specific AASHTO or ASTM Pipe types are approved under this specification. If perforated, holes should be 5mm - 10 mm (3/16 - 3/8 inch) diameter, two rows for 4", and four rows for 6" diameter; approximately 75 mm (3 inches) on center.

8. Corrugated Polyethylene Pipe - PVC and ABS	3278	Check for markings (AASHTO M 252) Certificate of Compliance Field Inspect for damage or defects..	2415 or 2403	No Laboratory tests required	
9. Sewer Joint Sealing Compound	3724			One per shipment	0.5 L (l pt.)
10. Preformed Plastic Sealer for Pipe	3726 Type b			One from each source	0.3 m (1 ft)
11. Bituminous Mastic Joint Sealer for Pipe	3728	Visual Inspection		Sample, if questionable	
12. Geotextile Fabric	3733 and Special Provisions	Visual Inspection for damage and uniformity of texture. Rolls of both geotextile and geotextile wrapped PE Tubing must be wrapped in UV protective plastic. (Usually Black)		(a) 1/15,000 m (50,000 LF) or fraction thereof for pipe wrap or trench lining for Permeable base designs. (b) 1/10 rolls or fraction thereof of each type fabric for all other uses. (c) Sewn seam, if required, 1/project minimum, additional as appropriate	(a) 3m (10 LF) (b) 3m² (4SqYd)* (c) 3m (10 LF)

REMARKS:
Submit Certificate of Compliance with fabric identification (Typar 3341, Supac 8NP, Mirafi 500X, etc.) and roll number.
Contact Geology Unit for small quantity testing and questions.

* Do not sample first 1 m (3 ft) of rolled Geotextile. Cut 1 m (3ft) wide strip across width of roll [Usually 3 - 4 m (12 - 14 ft)]

13. Silt Fence	3886	Visual Inspection Check Product Label	2415 or 2403	For amounts (61m)200 ft or greater.	1 m (1Yd)

REMARKS: Samples sent 21 days prior to use. Check Special Provision for Approved Products List of accepted geotextiles.

SCHEDULE OF MATERIALS CONTROL

XII. BRICK, STONE, AND MASONRY UNITS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Brick					
A. Sewer and Masonry	3612 to 3615	Visual Inspection		One sample per 50,000 brick or fraction thereof	5 whole brick
B. Concrete Sewer*	3616	Visual Inspection		One sample per 50,000 brick or fraction thereof	5 whole brick
Air entrainment required. Obtain air content statement from supplier.					
2. Concrete Masonry Units					
A. For Sewer Construction	3621	Visual Inspection		One sample per shipment	5 whole units
Air entrainment required. Obtain air content statement from supplier.					
B. For Modular Block Retaining Walls	Special Provisions	Visual Inspection		One sample per 10,000 units or fraction thereof, with a minimum of one sample per product (block) type per contract.*	8 whole units
* Wall units and cap units are considered separate block types.					
3. Reinforced Concrete Cribbing	3661	Concrete control tests Air Tests Visual Inspection if previously tested	2415 or 2403	One cylinder per 100 units, but not less than 5 cylinders for a given contract. Other materials as required herein.	150x300 mm (6 x 12 in) Cylinders
REMARKS: Will be stamped when inspected prior to shipment.					
4. Stone for Masonry or Rip-Rap	3601 and Special Provisions	Visual Inspection Submit Form 2415 unless special testing is specified	2415 or 2403		
REMARKS: Each source shall be approved by Project Engineer or Supervisor for quality prior to use. For questions on quality, contact District Materials or Geology Unit					

SCHEDULE OF MATERIALS CONTROL

XIII. ELECTRICAL AND SIGNAL EQUIPMENT ITEMS

Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
1. Lighting Standards (Aluminum or Steel)	3811	Visual Inspection			
REMARKS: The Fabricator will submit "Certificate of Compliance", on a per project basis, to the Structural Metals Engineer.					
2. Hand Holes and Pull Boxes (Precast) (PVC)	2545 2550 2565		2415 or 2403		
REMARKS: Will be inspected at source by laboratory upon notification. For cast iron frame and cover: see VIII.6, Drainage Castings					
3. Foundation	2545	Slump as needed		1 cylinder per 20 m³ (25 CuYd)	
4. Conduit and Fittings					
A. Metallic	3801 3802 3803	Visual Inspection	2415 or 2403	None	
REMARKS: Conduit will bear UL labels. Retain Form 2415 or 2403 in Project File					
B. Non-Metallic		Visual Inspection	2415 or 2403	Submit samples if not approved by brand	
REMARKS: Conduit will bear UL labels. Retain Form 2415 or 2403 in Project File					
5. Anchor bolts	3811.2B(5)	Visual Inspection		1 per 100 Units (per Type per Lot Number per Project)	
REMARKS: The Fabricator will submit test specimens (in quantities sufficient to meet the noted test frequency) to the Maplewood Lab. A copy of the test report will be forwarded to the Structural Metals Engineer.					
6. Miscellaneous Hardware		Visual Inspection		Sample critical items only. One of each item per shipment. (Critical Items are load bearing, structurally necessary items.)	
REMARKS: Will carry "Inspected tag if sampled and tested prior to shipment. No sample necessary if "Inspected". Do Not use if not tested. Field sample at sampling rate for laboratory testing.					
7. Cable and Conductors					
A. Single Electrical Conductors (No Jacket)	3815.2B1 3815.2B2(a)	Visual Inspection	2415 or 2403	None	
REMARKS: Make certain the conductors are the type specified. Submit Field Inspection report showing type and quantities used. Shall bear UL label and type where applicable.					
B. Electrical Cables and Single Conductors with Jacket	3815.2B2(b) 3815.2B3 3815.2B4 3815.2C1 3815.2C3 3815.2C4 3815.2C5 3815.2C6 3815.2C7 3815.2C8	Visual Inspection	2415 or 2403	1 sample per size per lot	1 m (1 Yd)
C. Fiber Optic Cables	3815.2C13	Visual Inspection	2415 or 2403	1 sample per size per lot	1 m (1 Yd)
REMARKS: Usually inspected (B&C) at source and spools stamped. If spools are not stamped, submit sample and material certification from manufacturer.					

SCHEDULE OF MATERIALS CONTROL

XIII. ELECTRICAL AND SIGNAL EQUIPMENT ITEMS (Cont'd)

Materials	Spec. No.	Minimum Required Acceptance Tasting (Field Testing Rate)	Form No.	Minimum Required Sampling Rate for Laboratory Testing	Sample Size
8. Ground Rods	**2545**	**Visual Inspection**	**2415 or 2403**	**None.**	

REMARKS:

Retain Form 2415 or 2403 in project file.

9. Luminaires and Lamps	**2545**		**2415 or 2403**		

REMARKS:

Approved by Brand Name.

The conductors shall bear UL label and type, where applicable.

10. Electrical Systems.

To be reported as a "System" using the LIGHTING, SIGNAL AND TRAFFIC RECORDER INSPECTION REPORT

To be certified by the Project Engineer

11. Traffic Signal Systems.

To be reported as a "System" using the LIGHTING, SIGNAL AND TRAFFIC RECORDER INSPECTION REPORT

To be certified by the Project Engineer