Schedule of Materials Control

2023 Version

Contents

Introduction Page

Minnesota Department of Transportation Schedule of Materials Control (SMC)

(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. For more information regarding contract requirements for testing, please reference the "Standard Specifications for Construction", Specification 1603 Materials: Specifications, Samples, Tests, and Acceptance. Items that are not listed in the Standard Specifications for Construction are covered by Special Provisions and are not listed herein.

Laboratories performing acceptance tests for payment shall be accredited by AASHTO resource (formerly AMRL) or a comparable accreditation program approved by MnDOT and the FHWA for all test procedures performed.

Contact the MnDOT District Independent Assurance Inspector when the project starts to provide the proper servicing of your project.

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 02415) 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 02415 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.

Previously approved materials transferred from another project should be reported on Form 02415. The report should include type of material, quantities involved, source, and supplier of materials. Whenever possible, certification of "Approval documents" shall be included with the Project documents.

If Forms 02415 and 2403 are referenced by form number within the Schedule of Materials Control for materials or products received from pre-approved sources, where the field responsibility for acceptance is visual inspection and all information required to complete these forms is contained in other documents in the project file, the use of these forms becomes optional. If these forms are completed and sent to the Project Engineer by off-site inspection personnel from the District or the Office of Materials, they must be retained in the project file.

A Telephone Index is included with the Schedule giving contact information for the specialty areas if further information is required regarding the various materials. A Form Index is also included.

The Department maintains the Approved/Qualified Products List (APL/QPL) and the Certified Products and Services List, as well as the Schedule of Materials Control. All are available electronically on the Office of Materials and Road Research website.

Products manufactured offsite may be pre-approved; however, final acceptance will be made at the point of incorporation, based upon review of documentation and inspection for shipping or other damage.

The Department may perform ride quality verification testing (Bituminous and/or Concrete) within 30 calendar days of the Contractor's profiling for the project or major stage of construction. The Department will randomly test at least 10 percent of the calendar year's projects that are subject to Smoothness evaluation. If the Department's weighted mean Smoothness value differs by less than or equal to 10 percent or 3 inches/mile of the Contractor's weighted mean Smoothness value, the Engineer will accept the Contractor's segment Smoothness and ALR values as the basis for acceptance, incentive/disincentive, and Corrective Work's monetary deductions. If the Department's weighted mean Smoothness value is greater than 10 percent and 3 inches/mile of the Contractor's weighted mean Smoothness value, the Engineer will use the retested segment Smoothness and ALR values as the basis for acceptance, incentive/disincentive, and Corrective Work monetary deductions.

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Material Spec. No.	Minimum Contractor Testing Rate	Minimum Department Testing, Rate and Size	Minimum Companion (Split Lab) Sample, Rate and Size	Form No. *(See Note 4)*
(a) 2118 (b) 2211 (c) 2212 (d) 2221 (e) 2106	**1. Gradation** (a) Aggregate Surfacing (b) Aggregate Base (c) Drainable Aggregate Base (d) Shoulder Base Aggregate (e) Stabilizing Aggregate	3136 3138	Production: 1/1000 yd^3 (CV) Only required for 1906.2, "Material on Hand"	**Random Sampling** *(See Notes 1, 2, 10, & 11)* < 250 yd^3 (CV) or 500 tons: No tests required ≥ 250 yd^3 (CV) to ≤ 2,000 yd^3 (CV) or ≥ 500 tons to ≤ 4,000 tons: 2 random samples from each lot and average. > 2,000 yd^3 (CV) or 4,000 tons: Divide into lots with lot size no greater than 2,000 yd^3 (CV) or 4,000 tons 2 random samples from each lot and average 30 lb.	1 per project 30 lb. .	G&B-001 G&B-002b G&B-101 G&B-104
(f) 2106	(f) Granular and Select Granular Materials	3149.2B	1/10,000 yd^3 (CV) Only required for 1906.2, "Material on Hand"	1 per 40,000 yd^3 (CV) or 1 per 80,000 tons *(See Notes 1, 2, 10, & 11)* 30 lb.	1 per project 30 lb.	G&B-001 G&B-101 G&B-104
(g) 2215	(g) Full Depth Reclamation (FDR)	2215	None	Test at Engineer's discretion. Inspect for oversize chunks (+3"), after the motor grader has overturned the material. 30 lb.	None	G&B-001 G&B-101
Multiple	(h) Granular Backfill (i) Aggregate Backfill (j) Granular Bedding (k) Aggregate Bedding (l) Coarse Filter Aggregate (m) Fine Filter Aggregate (n) Structural Backfill	3149	1 per source. Only required for 1906.2, "Material on Hand"	1 per source 30 lb. .	None	G&B-001 G&B-101 G&B-104
Multiple	**2. Proctor Test** (Used to determine optimum moisture & maximum density)	2106	None	1 per major soil type. Additionally, 1 for each granular material (3138, 3149, etc.), if using specified density. *(See Notes 6 & 8)* *50 lb.*	1 per project. *(Notes 1 & 2)* *25 lb.*	G&B-001 G&B-303

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Material Spec. No.	Minimum Department Testing	Form No. *(See Note 4)*
Multiple	**3a. Compaction Compliance-Non-Granular Material** Non-granular material has greater than 20% passing the number 200 sieve. Specified Density or Light Weight Deflectometer (LWD)	2106	**Roadway Embankment** **Within road core:** 1 per 10,000 yd^3 **Material outside road core:** Test at Engineer's discretion **Trenches for Transverse Culverts and Abutments**: 1 per every 2 feet of fill height **Trenches for longitudinal water-main, storm-sewer, sanitary, gas, and retaining walls. Also, sidewalks and trails:** 1 per 500 feet **Subgrade Preparation** 1 per 25 Road Stations *(See Notes 11 & 12)*	G&B-001 G&B-304
Multiple	**3b. Compaction Compliance -Granular Material** Dynamic Cone Penetration (DCP) Index Method, LWD, or specified density (a) Aggregate Base (b) Shoulder Base Aggregate (c) Walks and Trails Granular material has 20% or less passing the number 200 sieve.	3138	**For aggregate base and shoulder base:** 1 per 2,000 yd^3 (CV) or 1 per 4,000 ton 1 per 500 feet for sidewalks and trails *(See Note 10, 11, & 12)*	G&B-001 G&B-204 G&B-601 G&B-603
(d) 2215	**3b. Compaction Compliance -Granular Material (Continued)** (d) Full Depth Reclamation (FDR)	2215	1 per 10,000 yd^2 *(See Note 11)*	G&B-001 G&B-205 G&B-601 G&B-603
Multiple	(e) Granular Embankment and Subgrade Preparation, if Subgrade has less than 20% passing the number 200 sieve.	3149	**Roadway Embankment:** 1 per 5,000 yd^3 **Trenches for Transverse Culverts and Abutments except spread footings**: 1 per every 2 feet of fill height per structure. **Trenches for longitudinal water-main, Storm-sewer, sanitary, gas. retaining walls. Also, sidewalks and trails:** 1 per 500 feet **Spread Footings:** Four per footing **Subgrade Preparation:** 1 per 25 Road Stations. *(See Notes 11 & 12)*	G&B-001 G&B-203 G&B-601 G&B-603

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Minimum Contractor Testing Rate
Multiple	**3c. Compaction Compliance-Test Rolling** *(See Note 9)*	Contractor to perform test rolling at top of: • Non-granular subgrade (2106) • Granular subgrade that does not meet 3149.2.B.2 (2106), • Base (2211) and shoulder base (2221), • Unstabilized Full Depth Reclamation (2215). Minimum 12' width and 300' length. Department to observe test rolling.

Pay Item Number	Test Type / Material	Material Spec. No.	Minimum Department Testing	Form No. *(See Note 4)*
Multiple	**4. Moisture Content Test During Compaction** (a) Aggregate Surfacing *(See Notes 1 & 7)* (b) Aggregate Base *(See Note 1)* (c) Shoulder Base Aggregate *(See Note 1)* (d) Structure Excavations and Backfills (e) Walks and Trails	3138 3149	**For 2118, 2211, 2221, and 2521:** 1 per 1,000 yd^3 up to 10 maximum **For 2451:** 1 per structure., however, for multiple adjacent structures, may test once, use judgement **For Quality Compaction:** Test at Engineer's discretion.	G&B-001 G&B-105 G&B-106
(f) 2215	(f) Full Depth Reclamation *(See Note 1)*	2215	1 per 20,000 yd^2	G&B-001 G&B-105 G&B-106
Multiple	(g) All embankment materials *(See Note 1)* (h) Subgrade Preparation *(See Note 1)*	2106 3149	**Embankment Materials:** 1 per 10,000 yd^3 up to 10 maximum **Subgrade Preparation:** 1 per 25 Road Stations **For Quality Compaction:** Test at Engineer's discretion.	

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Material Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Department Testing, Rate and Size	Form No. *(See Note 4)*
Multiple	**5. Aggregate Quality** (a) LAR, Insoluble Residue (IR), and Lithological Exam (b) Bitumen content; % crushing; clay content; plasticity index; percentage of Concrete, Masonry Concrete, Glass, Brick and other Objectionable Material in a Recycled Aggregate Sample.	3136 3138 3149	1 per source. Only required for 1906.2, "Material on Hand" *(See Note 5)*	(a) 2 per source For larger quantities from carbonate quarries, LAR and IR are required. Always required for structures regardless of quantity. *(See Notes 1, 2, & 3)* (b) 2 per source Test at the discretion of the Engineer, however crushing is required for drainable bases regardless of quantity (2212 & 3136). *(See Notes 1, 2, 3, & 5)* 30 lb.	G&B-103 G&B-104 G&B-107

Pay Item Number	Test Type / Material	Minimum Contractor Quality Control Testing Rate	Minimum Department Testing	Form No. *(See Note 4*
2215	**6. Depth Check** Full Depth Reclamation (FDR)	1 per mile	1 per day	**G&B-401**

General Notes: Sampling and Testing Procedures are found in the Grading and Base Manual in Section 5-692.2XX. Obtain all gradation and quality samples at time of delivery and before compaction.

Modify testing and sampling protocol for increases in Plan quantities as follows:

Time Plan Quantity Increased	Testing and Sampling
Before Collection of first sample.	Reorder sampling to account for additional quantity.
After Collection of first sample, but before sampling is complete.	Complete testing of current lot, and then reorder the sampling using the remaining quantity.
After collection of all original Plan quantity samples.	Order sampling for additional quantity.

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Note 1: Except for backfilling structures (where tests are always required), samples, companion gradations, proctor, moistures during compaction, and aggregate quality samples are not required for 500 tons or 250 yd^3 (CV) or less. Report small quantities on Form 02415 or Form 2403. Form G&B-104 is always required regardless of quantity.

Note 2: Laboratories with AASHTO accreditation that perform Department testing is not required to submit companion samples. When Department testing is not performed in an AASHTO accredited facility, obtain the Companion/Lab sample as a split sample from the first Department sample, and include the gradation results on the sample card.

Note 3:

- Carbonate aggregates require 50 lb. samples for lab testing.
- Submit the initial aggregate quality and crushing sample from the first day's placement; the Engineer may elect to sample from the stockpile.
- A second test is required, when the first test fails. Average both tests to determined compliance, when two tests are performed.
- Use the table on the following page as a guideline.

Note 4: Forms are available on the Grading & Base website at: http://www.dot.state.mn.us/materials/gradingandbase.html. Form G&B-104 is always required regardless of quantity.

Note 5: Use the Centrifuge Method (MnDOT Lab. Manual Method 1852) to determine bitumen content.

Note 6: Major soil types are defined in the Triaxial Chart located in the Grading and Base Manual.

Note 7: For Quality Compaction of Base and Shoulder Aggregate (2118, 2211, or 2221), the Engineer may replace the moisture testing requirement with time stamped photo documentation of water being applied.

Note 8: For estimated optimum moisture content only, may use one point proctor, full proctor, or Form G&B - 305 (granular only), to determine the optimum moisture.

Note 9: The Engineer may elect, with the concurrence of the Contractor, to have the Contractor test roll per 2111, "Test Rolling", material meeting the requirements of 3149.2.B, "Select Granular Material", in lieu of spot compaction testing. If this method is adapted, the Contractor would be required to first place 3" of base on top of the Select Granular prior to test rolling. For areas failing test rolling the Contractor is required to remove the base and recompact the material, then place the base back, and retest roll. There is no additional compensation to the Contractor, if this method is adapted. Additionally, the Select Granular is not accepted until passing test rolling has occurred.

Note 10: Test rates are determined by the method of measurement, cubic yards (CV) or tons.

Note 11: For gradations or compaction compliance, the Engineer can choose to divide lots sizes into smaller volumes, weights, or areas of non-equal sizes. For example, the Engineer may designate one or more turn or passing lanes or farm entrances as individual lots or may designate a lot as one or more day(s) production.

Note 12: For quantities less than 500 tons or 250 yd^3, one may use Quality Compaction as the only test method, except when backfilling structures**.**

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Table: Guidelines for Required Crushing and Aggregate Quality Tests					
Material	**Crushing**	**Bitumen Content, Percent Concrete, PI, and clay content**	**LAR**	**Insoluble Residue**	**Lithological Exam & Shale Float Test**
3136 Drainable Bases	Yes. Not required for quarried sources.	Not applicable	Yes, if source from a carbonate quarry.	Yes, if source from a carbonate quarry.	Yes, when not from quarried source.
3138 Aggregate for Surface and Base	Test at the discretion of the Engineer. Not required for quarried sources.	At the discretion of the Engineer.	Yes, if source is carbonate quarry and does not contain any recycled material.	Yes, if source from a carbonate quarry, and does not contain any recycled material.	Yes, for Class 3, 4, 5, and 6, when not from quarried rock, and does not contain bitumen.
3149 Granular Material *	Test at the discretion of the Engineer.	**Bit. Content** At the discretion of the Engineer. **PI/Clay content** Not applicable	Yes, for carbonate quarried Fine Aggregate Bedding (3149.2G.1), and Coarse Filter Aggregate (3149.2H) .	Yes, if source from a carbonate quarry, and does not contain recycled material.	Yes, for virgin glacial gravel: Stabilizing Aggregate (3149.2C), Fine Aggregate bedding (3149.2G.1), and Medium Filter Aggregate (3149.2I.1)
* Note for Structural Backfill (3149.2D.2), perform all tests required of 3137.2B.3, and tests as required in plan and special provisions.					

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Contractor QC Tests Requirements for Cold in Place Recycled Bituminous (CIR) & Cold Central Plant Recycling Bituminous (CCPR) Spec 2390 & Stabilized Full Depth Reclamation (SFDR) Spec 2215		
Test Name	**Rate**	**Method/Location**
SFDR: Simple gradation for unstabilized material	1 per mile	G&B Manual .215 & Form G&B-101 Report sieves 3" & 2"
CIR, CCPR, & SFDR: Entire Gradation for material to be stabilized	1 per day	G&B Manual .215 & Form G&B-101 Report sieves 2", 1", 3/4", 3/8", #4, #10 & #30.
SFDR: Test Roll unstabilized portion		Test Roll and recompact failing areas. Repairs may be subject to 1402.5, "Extra Work".
CIR, CCPR, & SFDR: Simple gradation for material to be stabilized	1 per mile for SFDR and CIR 1 per 2,000 ton for CCPR	G&B Manual .215 & .293, Form G&B-101 Report sieves 2" & 1.5" for SFDR 1.5" and 1.25" for CIR
CIR & SFDR only: Depth Check for unstabilized and stabilized material	1 per mile for initial pulverization and stabilization	G&B Manual .284 and Form G&B- 401
SFDR*:* Penetration Index (DCP) for unstabilized material	2 per mile	G&B Manual .255 & Form G&B-205
CIR & SFDR: Calibrate mineral stabilizing agent application rate	Once using design rate per vane feeder	G&B Manual .286
CCPR & SFDR: Moisture determination before injecting liquid bituminous material	1 per mile of anticipated daily production and after rain & one for SFDR after mechanical drying (disking, etc.).	G&B Manual .281 & Form G&B-105
Yield check: ***CIR & SFDR:*** Cement ***CIR, CCPR, &/SFDR:*** Liquid Bit. Material	 1 per transport (if using cement, lime, etc.) 1 per transport	G&B Manual .286 & Forms G&B 402 & 403
CIR, CCPR, & SFDR stabilized: Compaction (Nuclear Density)	10 per lane mile, engineer can require more for suspect areas Correlate the nuclear gauge's dry measurement density by direct moisture measurement (microwave oven or equivalent).	Grading & Base manual .282 and Form G&B-405
CIR, CCPR, & SFDR stabilized: Control strip	Minimum 1 per project	
CIR, CCPR, & SFDR: Foaming asphalt checks expansion ratio & half-life	1 per load (if using foamed asphalt)	Grading & Base Manual .285 and Form G&B-404
CIR, CCPR, & SFDR: Moisture testing of stabilized layer during curing before placement of HMA	2 per day until placement of HMA. For 1st day get samples before compaction. For subsequent days, get 1 before compaction of new production, and 1 in 1st day's production until moisture stabilizes, then get the 2nd in new area until moisture stabilizes.	Grading & Base Manual

I. Grading, Base, and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Department Tests Requirements for Cold in Place Recycled Bituminous (CIR) & Cold Central Plant Recycling Bituminous (CCPR) Spec 2390 & Stabilized Full Depth Reclamation (SFDR) Spec 2215		
Test Name	**Rate**	**Method/Location**
SFDR: Penetration Index (DCP) for unstabilized material	1 per mile	Grading & Base Manual .255 & Form G&B-205
SFDR: Test Rolling unstabilized portion		Observe Test Rolling, and recompact failing areas. Repair underlying material. Repairs may be subject to 1402.5, "Extra Work", if due to weak underlying materials.
CIR & SFDR*:* Calibration of the mineral stabilizing agent application rate	Observe the Contractor	
Yield check: ***CIR & SFDR:*** Mineral Stabilizing Agent ***CIR, CCPR, & SFDR:*** Liquid Bit. Material	1 per day each	G&B Manual .286 & Forms G&B-402 & 403
CIR, CCPR, & SFDR stabilized: Compaction (Nuclear Density)	Observe the Contractor	Grading & Base Manual .282 & Form G&B-405
CIR, CCPR, & SFDR stabilized: Control Strip	Observe the Contractor	
CIR, CCPR, & SFDR stabilized: Bituminous Material Samples	1 per 250,000 gallons	1 quart from first load, then take samples randomly
CIR, CCPR, & SFDR stabilized: Foaming asphalt checks expansion ratio & half life	Observe the Contractor	G&B Manual .285 and Form G&B-404

II. Bituminous Construction Items for Specification 2360

Note: Projects with bituminous tonnage less than or equal to 300 tons per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 02415 or Form 2403 in Project File.

(All plant mixed asphalt 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 Department. This test is performed on a companion sample to the Contractor's QC sample.	Contractor (mixture) Department (density cores)	Contractor	Department
Verification	A sample to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Department	Department	Department
Verification Companion	A companion sample to the Department'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.	Department	Department	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Department	Contractor or Department	Contractor or Department

II. Bituminous Construction Items for Specification 2360 (cont.)

A. Pre-Production Sampling and Testing for Specification 2360 Plant Mixed Asphalt

Minimum Sample Sizes:

Quality Sample Size for Lab Submittal:

Plus #4 aggregate sample for quality testing and Percent Crushing	80 lb.
Minus #4 aggregate for quality testing	35 lb.
Bituminous mixture plus 2 Gyratory specimens for volumetric testing	80 lb.
Bituminous mixture for TSR testing (option A)	80 lb.
Bituminous mixture for TSR testing plus 6 Gyratory specimens (option B)	20 lb.
Mineral filler.	2 lb.
RAP for Quality Testing	80 lb.
RAS (shingles) for Gradation and Quality Testing	10 lb.
Asphalt Binder	1 quart

All aggregates and mixtures will be split according to G&B Manual 5-692.141, "Quartering Method of Sample Size Reduction"

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Bituminous Mix Design (QC/QA)	2360	**Contractor submits Mix Design Option 1 or Option 2**	**Option 1**- Laboratory Mix Design: In addition to reviewing the Trial Mix data (JMF), test Contractor's mixture (at optimum asphalt content). Also, evaluate TSR per 2360.2G.7.i. **Option 2**- Laboratory Mix Design: Review submitted Mix data only.	Approved Mix Design Report
2360	Aggregate Quality Testing (QA only)	2360	Provide 24 hour notice of intent to sample aggregates for quality testing. Department has the option to monitor sampling. Submits to the Bituminous Engineer or the District Materials Engineer: 1 sample of each non-asphaltic aggregate type or class per source per year. Also submit the asphaltic aggregate material when the mixture contains RAP or RAS. Provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.	Test as directed by the Bituminous Engineer or the District Materials Engineer.	Test Report
2360	Mineral Filler (QA only)	3145	1 per shipment of 50 tons or less, unless previously inspected.	Testing as directed by the Engineer or the District Materials Engineer.	Test Report
2360	Additives (QA Only)	2360	Sample blended asphalt binder and additive, 1 quart Sample first shipment of each type of material. Then submit 1 per 250,000 gal. (approximately 1,000 ton).	Testing as directed by the Engineer or the Chemical Laboratory Director.	Test report

II. Bituminous Construction Items for Specification 2360 (cont.)

B. BITUMINOUS PRODUCTION for Specification 2360

*Verification Testing

Verification Companion testing from Department split sample is required to be performed and used as the next QC sample that day.

SAMPLE SIZE:		
	Aggregate for Gradation (QC/QA)	35 lb.
	Plus #4 Aggregate Type for Quality Testing	80 lb. for each source
	Minus #4 Aggregate Type for Quality Testing	35 lb. for each source
	RAP material for Quality Testing	80 lb. for each source
	RAS (Shingles) for Processed Gradation and Quality Testing	10 lb.
	Mixture Properties (QC/QA) 3 full 6" by 12" cylinder molds for QA	65 lb.
	TSR (QC/QA) 4 full 6” by 12” cylinder molds for QA	90 lb.
	Aggregate Specific Gravity (QC/QA)	90 lb.
	Asphalt Binder (QA)	1 quart
	Emulsified Asphalt (QA)	½ gallon

All aggregates and mixtures will be split according to G&B Manual 5-692.141, “Quartering Method of Sample Size Reduction”

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Aggregate Quality Testing Including aggregate specific gravity (QA Only)	2360	None	Take additional samples when aggregate qualities approach specification limits or when material variation is observed, take additional field samples as requested by Project Engineer. Take additional samples when material variation is observed in RAP or RAS. Take additional field samples as requested by Project Engineer. Conduct random belt samples and test for aggregate quality as directed by the Engineer.	Lab report
2360	Moisture Content in Mixture (QC/QA) Lab Manual 1855	2360	Sample and test as directed by the Engineer.	None	Test Summary Sheet (TSS)

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Asphalt Binder Content, % AC, ADD AC, AC/Total AC ratio (QC/QA, Verification*) Lab Manual 1851, 1852, 1853	2360	(a) Incinerator Oven MnDOT Lab Manual 1853 (b) Chemical Extraction MnDOT Lab Manual 1851 or 1852 REMARKS: Contractor selects 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. When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: *(See Notes #1, #2 & #4)* A computer file of the plant's control settings is required every 20 minutes of production.	The inspector will witness all QC/QA mixture sampling and take possession of the Department's QA-Verification split of this sample immediately after the sample is split. At least once per day per mix type the Inspector will randomly determine when the QC/QA mixture sample will be sampled from either behind the paver or from the truck box. The Inspector will observe the Contractor sampling and splitting this QA-Verification sample and take immediate possession of the sample after it is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. The Department reviews the computer files of the plant's control settings. REMARKS: (*See Notes #3 & #7)*	TSS
2360	Mixture Properties (QC/QA, Verification*) Maximum Specific Gravity Lab Manual 1807	2360	Contractor performs test 1807 When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: (*See Notes #1, #2, & #4)*	The inspector will witness all QC/QA mixture sampling and take possession of the Department's QA-Verification split of this sample immediately after the sample is split. At least once per day per mix type the Inspector will randomly determine when the QC/QA mixture sample will be sampled from either behind the paver or from the truck box. The Inspector will observe the Contractor sampling and splitting this QA-Verification sample and take immediate possession of the sample after it is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. REMARKS: *(See Notes # 3 & #7)*	TSS

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Mixture Properties (QC/QA, Verification*) Gyratory Bulk Specific Gravity - 2 Specimen Average, Lab Manual 1806, 1820	2360	Contractor performs test 1806 When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: (*See Notes #1, #2, & #6)*	The inspector will witness all QC/QA mixture sampling and take possession of the Department's QA-Verification split of this sample immediately after the sample is split. At least once per day per mix type the Inspector will randomly determine when the QC/QA mixture sample will be sampled from either behind the paver or from the truck box. The Inspector will observe the Contractor sampling and splitting this QA-Verification sample and take immediate possession of the sample after it is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. REMARKS: *(See Notes #3 & #7)*	TSS
2360	Mixture Properties (QC/QA, Verification*) Adjusted Asphalt Film Thickness (AFT), Air Voids, Fines to effective, CAA, FAA and Gradation. Lab Manual 1203, 1206, 1214, 1808, 1854	2360	Verification Companion testing from Department split sample is required and used as a QC sample once per day. Bituminous mixes composed entirely of Class A and/or Class B aggregates are not required to be tested for CAA (Coarse Aggregate Angularity). When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: (*See Notes #1, #2, #4, #5, & #6)* The production start-up testing rates for the CAA and FAA are 1 per 1000 tons for the first 2000 tons. After 2000 tons, 2 test per day for at least two days. Then 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.	The inspector will witness all QC/QA mixture sampling and take possession of the Department's QA split of this sample immediately after the sample is split. At least 1 per day per mix type the Inspector will randomly determine when mix will be sampled from behind the paver or from the truck box. The Inspector will observe the Contractor sampling and splitting this Verification Sample and take immediate possession of the sample after it is split. This Department sample is then submitted to the District Lab for testing. The contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). The verification sample replaces the next scheduled QC sample. Additional verification samples can be taken at any time or location. REMARKS: *(See Notes # 3 & #7)*	TSS

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Core Density and Thickness Lab manual 1810	2360	Contractor cuts 2 cores at each location. In the laboratory, measure, and saw cores into separate lifts. Sawing of cores into separate lifts is required. Schedule the approximate time of testing during normal project work hours so the Department may observe and record the saturated surface dry and immersed weight of the cores. A completed Core Density Incentive/Disincentive worksheet is to be submitted to the Laboratory (Department field or District/Division).	Complete core stationing spreadsheet to determine core locations and then mark all coring locations on the pavement. Once the Contractor has measured and sawed the Department companion cores the Department will transport their cores to the Department field lab or District Lab for testing. Transport the cores as soon as possible to the testing lab taking care to prevent damage due to improper handling or exposure to heat. Selects at least one of the two companion cores per lot to test for verification. REMARKS: *(See Notes #3 & #6)*	Core Density Worksheet Core Density Incentive/ Disincentive worksheet.
2360	Tensile Strength Ratio (T.S.R.) (QC/QA) Lab Manual 1813813	2360	Sample as directed by the Engineer. When testing is required, complete testing within 72 hours after the sample is taken.	Test as directed by the Engineer. When testing is required, complete testing within 72 hours after the sample is taken.	TSR Worksheet
2360	Mixture Moisture Content	2360	Sample as directed by the Engineer.	Test as directed by the Engineer.	Lab Report

II. Bituminous Construction Items for Specification 2360 (cont.)

C. BITUMINOUS MATERIALS for Specification 2360

Only Bituminous Materials from Certified Sources are allowed for use. The most current list of Certified Sources: http://www.dot.state.mn.us/products/index.html

Minimum Sample Sizes:

Quality Sample Size for Lab Submittal:

Asphalt Binder (QA)/Cutback Asphalt (QA)	1quart metal can with pressure fit lid
Emulsified Asphalt (QA)	1/2 gallon plastic

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2360	Asphalt Binder (QA only)	3151.2	Asphalt Supplier QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program at the rate specified in https://engineering.purdue.edu/~csbg/method.html. During Asphalt Mixture Production (Field Verification Sample) Obtain asphalt binder samples from a sampling valve located between the pump and the drum. Contractor personnel will obtain samples, under the observation of a Department representative, by random selection from shipments of material at the project site. The samples shall be taken from the first load and subsequently 1 per 1000 tons of liquid asphalt binder for each supplier and grade of asphalt binder per contract. For contracts with less than approximately 25 tons (one truck transport) of asphalt binder, sampling may be waived. A minimum of 1 gallon of binder must be drawn and wasted from the sampling valve before the actual sample is drawn. For batch plants, obtain the asphalt binder sample from the weigh pod. Provide asphalt binder sample in clean 1-quart steel container. The Inspector will monitor the sampling the Contractor performs.	During Asphalt Mixture Production (Field Verification Sample) Observe contractor personnel taking sample from sampling valve and submit to MnDOT Chemical Lab.	2413 Asphalt Sample Identification Card
2357	Emulsified Asphalt (QA only)	3151.2	Tack Coat Obtain emulsion samples from the spigot or sampling valve of the distributor for the first load placed on the project then sample 1 per 50,000 gallons. Contractor personnel will obtain samples under the observation of a Department representative. Sample emulsified asphalt in clean 1/2 gallon plastic container with wide screw top. Sample all emulsified asphalt from the distributor.	Tack Coat Observe Contractor personnel taking sample from the spigot or sampling valve of the distributor and submit to MnDOT Chemical Lab within 7 calendar days of sampling.	2413 Asphalt Sample Identification Card

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2357 2358	Cutback Asphalt (QA only)	3151.2	Tack Coat Obtain emulsion samples from the spigot or sampling valve of the distributor for the first load placed on the project then sample 1 per 50,000 gallons. Contractor personnel will obtain samples under the observation of a Department representative. Sample emulsified asphalt in clean 1/2 gallon plastic container with wide screw top. Sample all emulsified asphalt from the distributor.	Tack Coat Observe Contractor personnel taking sample from the spigot or sampling valve of the distributor and submit to MnDOT Chemical Lab within 7 calendar days of sampling.	2413 Asphalt Sample Identification Card

Note #1: 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 & Test summary sheets for accuracy and completeness,
2.) Checking sampling and testing procedures,
3.) Discussing QC problems with the Contractor,
4.) Obtaining Verification Samples

Note #2: For Mixture Quality Management, acceptance will be based on Contractor's test results as verified by Department test results.

Note #3: When a member of a monitoring team observes the Contractor test, note and sign under remarks.

Note #4:

How to calculate the number of tests per day	Production Start-up testing rates (first 2000 tons of production)	Production testing rates (after 2,000 tons of mixture produced)
Divide daily tonnage by 500 and round up to next whole number	1 per 500 tons	
Divide daily tonnage by 1000 and round up to next whole number		1 per 1000 tons

Note #5: MnDOT projects will require the calculated Adjusted Asphalt Film Thickness (AFT). VMA will still be calculated for informational purposes but will not be used for acceptance criteria. The adjusted AFT will be calculated each time a gradation test is required.

Note #6: Random number generation and determination of random sample location shall be consistent with Section 5 of ASTM D3665. The Engineer may approve alternate methods of random number generation.

Note #7: QA samples retained for 10 calendar days and tested, if needed.

III. Construction Items for Bituminous Specialty Items include the following:

- **2353 Ultra-Thin Bonded Wearing Course (UTBWC)**
- **2354 Micro-Surfacing**
- **2355 Bituminous Fog Seal**
- **2356 Otta Seal Special Provision**
- **2356 Bituminous Seal Coat and Bituminous Underseal Special Provision**
- **2363 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB)**
- **2365 Stone Matrix Asphalt (SMA)**

All aggregates and mixtures will be split according to G&B Manual 5-692.141, "Quartering Method of Sample Size Reduction"

Only Bituminous Materials from Certified Sources are allowed for use. The most current list of Certified Sources:
http://www.dot.state.mn.us/products/index.html

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 Department. This test is performed on a companion sample to the Contractor's QC sample.	Contractor (mixture) Department (density cores)	Contractor	Department
Verification	A sample to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Department	Department	Department
Verification Companion	A companion sample to the Department'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.	Department	Department	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Department	Contractor or Department	Contractor or Department

III. Construction Items for Bituminous Specialty Items (cont.)

2353 Ultra-Thin Bonded Wearing Course

Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form No.
Mix Design (Pre-Production)	2353 3139.4	Complete and submit 1 design per mix	Review submitted Mix Design	Reviewed Mix Design Report
Bituminous Mixture Tests Lab Manual 1203, 1807, 1852, 1853, 1854	2353 3139.4	Tests: % AC, Gradation, Max Gravity, Adjusted AFT Rate: 1 per 750 tons (min. 1 per day) *(See Note 1)* Submit to Department: 20 lbs. (1 cylinder from truck box)	1 per day, minimum	Test Summary Sheet
Bituminous Material	2353 3151	QC testing is the responsibility of the bituminous material supplier	The Department will observe Contractor personnel taking sample from sampling valve and MnDOT will submit to Chemical Lab Asphalt Binder: First load, then 1 per 250,000 gallons Sample Size: 1 quart Emulsified Asphalt: First load, then 1 per 50,000 gallons Sample Size: 1/2 gallon*	Test Report

*Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 calendar days of sampling.

Note 1: TSR testing on production mixture is at the discretion of the Engineer.

III. Construction Items for Bituminous Specialty Items (cont.)

2354 Micro Surfacing

Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form No.
Mix Design (Pre-Production)	2354 3139.5	Complete 1 mix design per aggregate source. See specification. Submit to Department: 150 lbs. aggregate	Review submitted Mix Design. Perform gradation and sand equivalence test from submitted sample.	
Gradation Lab Manual 1202, 1203	3139.5	Machine Hopper: 1 per 500 tons (min. 1 per day)	Machine Hopper: 1 per 1,500 tons (min. 1 per project) Sample Size: 30 lbs.	Test Report
Moisture (In Aggregate) Grading & Base Manual, 5-692.245.B	2354	Machine Hopper: 1 per 300 tons (min .1 per day) Sample Size: 1 lb.	1 per day Sample Size: 1 lb. split sample	Test Report
Sand Equivalence AASHTO T 176	3139.5	1 per day		Test Report
Bituminous Material	2354 3151	QC testing is the responsibility of the bituminous material supplier	First load, then 1 per 50,000 gallons, Sample Size: 1/2 gallon*	Test Report
Bituminous Material Application Rate	2354	Verify Application rate 3 per day	Verify Application rate 1 per day	

*Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 calendar days of sampling.

III. Construction Items for Bituminous Specialty Items (cont.)

2355 Bituminous Fog Seal and 2357 Bituminous Tack Coat

Test type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form
Bituminous Material	3151	QC testing is the responsibility of the bituminous material supplier.	First load, then 1 per 50,000 gallons Sample Size: 1/2 gallon*	Test Report
Bituminous Material Application Rate	2355 2357	Verify Application rate As needed for tack coat, 1 per project for fog seal	Verify Application rate As needed for tack coat 1 per project for fog seal	Bituminous Manual Form 21841 or ASTM D2995 Method A

*Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 calendar days of sampling.

2356 Otta Seal Special Provision

Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form No.
Gradation Lab Manual 1202, 1203	2356	Stockpile: 1 per 1,500 tons (min. 1 per day) Placement: Chip Spreader Hopper: As needed Submit to Department: 30 lbs. from Hopper	As needed	Test Report
Bituminous Material	2356 3151	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory.	First load, then 1 per 50,000 gallons Sample Size: 1/2 gallon*	Test Report
Bituminous Material Application Rate	2356	Verify Application rate As needed	Verify Application rate As needed	Bituminous Manual Form 21841 or ASTM D2995 Method A

*Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 calendar days of sampling.

III. Construction Items for Bituminous Specialty Items (cont.)

2356 Bituminous Seal Coat and Bituminous Underseal Special Provisions

Test type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form
Mix Design (Pre-Production)	2354	At least two weeks before beginning construction complete 1 design per mix and provide information to Engineer. Submit to Department: 150 lbs. aggregate	Review and verify submitted Mix Design.	
Gradation Lab Manual 1203	3127	Placement: Chip Spreader Hopper: As needed	Placement: 1 per material source obtained from Chip Spreader Hopper, Sample Size: 30 lbs.	Test Report
Quality Tests Lab Manual 1223	2356	None	Perform daily quality tests per Table 3127.2-2, as needed, Sample Size: 30 lbs.	Test Report
Bituminous Material	2356 3151	QC testing is the responsibility of the bituminous material supplier	First load, then 1 per 50,000 gallons Sample Size: 1/2 gallon*	Test Report
Bituminous Material Application Rate	2356	Verify Application rate As needed	Verify Application rate As needed	Bituminous Manual Form 21841 or ASTM D2995 Method A

*Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 calendar days of sampling.

III. Construction Items for Bituminous Specialty Items (cont.)

2363 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB)

Test type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form
Mix Design (Pre-Production)	2363 3139.3	Complete 1 Job Mix Formula (gradation blend only) per mix Submit to Department: 100 lbs. each coarse aggregate, 35 lbs. each fine aggregate & 4-quart asphalt binder	Department performs Mix Design	Mix Design Report
Production Gradation Lab manual 1202, 1203	2363 3139.3	1 per 1,000 ton with a minimum of one per day Submit to Department: 35 lbs. *(See Note 1)*	1 per day	Test Report
Production % Crushing (CAA) Lab manual 1214	2363 3139.3	One per 1,000 ton with a minimum of one per day Submit to Department: 35 lbs. from Belt	1 per day	Test Report
Bituminous Mixture Tests Bit Manual	2363 3151	Test: Asphalt spot check Rate: minimum 1 per day	None	Test Report
Bituminous Material	3151	QC testing is the responsibility of the bituminous material supplier.	Observe contractor personnel taking sample and submit to MnDOT Chemical Lab. First load, then 1 per 250,000 gallons Sample Size: 1 quart	Test Report

Note 1: Perform test on gradation sample taken from aggregate belt

III. Construction Items for Bituminous Specialty Items (cont.)

2365 Stone Matrix Asphalt (SMA)

Test type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Department QA/Verification (Acceptance)	Form
Mix Design (Pre-Production)	2365	Complete 1 design per mix Submit to Department: 80 lb. - bituminous mixture plus 6 Gyratory specimens for TSR testing. 150 lbs. + 4 aggregate from JMF blend for VCA 80 lbs. each coarse aggregate & 30 lbs. each fine aggregate for quality testing	Review and verify submitted Mix Design Test as directed by the Engineer	Approved Mix Design Report
Bituminous Mixture Tests Lab Manual 1203, 1204, 1205, 1211, 1214, 1806, 1807, 1808, 1813, 1853, 1854, 1855, AI SP-2 AASHTO T 305	2365	**Tests:** % AC, Gradation, Max Gravity, Bulk Gravity, Voids, VMA, CAA, Draindown, voids in coarse aggregate (VCA) fines/effective asphalt. **Rate:** 1 per 1000 tons (min. 1 per day) Aggregate sp. Gravity, mix moisture content to be tested as directed by the Engineer *(See Note 1)* Submit companion 1 per day to Department: Sample Size: 65 lbs. 3 full 6" by 12" cylinder molds	**Tests:** %AC, Gradation, Max Gravity, Bulk Gravity, Voids, VMA, CAA, voids in coarse aggregate (VCA) fines/effective asphalt. *(See Notes 1 & 2)*	Test Summary Sheet
Bituminous Material	2365 3151	QC testing is the responsibility of the bituminous material supplier.	Observe contractor personnel taking sample and submit to MnDOT Chemical Lab. First load, then 1 per 250,000 gallons Sample Size: 1 quart	Test Report

Note 1: TSR testing on production mixture is at the discretion of the Engineer.
Note 2: Department is not required to perform draindown testing on QA/Verification samples.

IV. Concrete Construction Items (www.dot.state.mn.us/materials/concrete.html)

General Notes:

1. The testing rates shown in this Schedule of Materials Control are **minimums**. Take as many tests as necessary to ensure quality concrete. Should circumstances arise on a project which makes the testing rate impractical, contact the Concrete Engineering Unit.

2. **All samples shall be taken in a random manner.**

3. The first load of concrete each day per mix – Take sample after discharging approximately ¼ yd^3, stop further discharge until both slump and air content test are completed with passing results.
4. If batching or field adjustments are made, test the adjusted load for air content and if suspect, slump, before it gets into the work. The Engineer will determine if additional testing is required after each water adjustment made during slipform placement. Continue to test for air content and slump, if suspect, when test results are inconsistent or marginal.

5. If any field test fails, reject the concrete or if the Producer adjusts the load to meet requirements, record the adjustments on the Certificate of Compliance. Retest the air content of the load, slump if required, and record the adjusted test results. Test the next load for air content and slump, if required, before it gets into the work.

6. Material not meeting requirements shall not knowingly be placed in the work. If failing concrete inadvertently gets placed in the work, review either the MnDOT Standard Specifications for Construction or contact the Concrete Engineering Unit for monetary deduction recommendations.

7. Perform quality testing as directed by the Concrete Engineer. Conduct additional random samples for aggregate quality as directed by the Engineer.

Best Practices:

1. It is recommended the Department Plant Monitor be present during critical pours, such as superstructure or paving concrete (i.e. S mixes, HPC, JMF mixes).

2. It is recommended that the Department representative continually monitor the progress of all concrete pours in the field and review Certificate of Compliances. It is not a recommended practice to only perform minimum testing requirements and leave the pour.

DEFINITIONS				
	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 Department. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Department
Verification	A sample to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Department	Department	Department
Verification Companion	A companion sample to the Department's Verification sample provided to the Contractor. The Contractor is required to test this sample.	Department	Department	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Department	Contractor or Department	Contractor or Department

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Plant Batching Materials

Remarks:

(1) All materials must come from certified or qualified sources. All certified sources must state so on the delivery invoice.
(2) The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.
(3) The Sample Log sheets are found in the Aggregate Gradation Control Charts Workbook.
(4) Take additional random samples as directed by the Concrete Engineer.

Pay Item No.	Material	Spec. No.	Sample Size	Minimum Required Sampling Rate for Department Testing	Form No.
2301 2302 2401 2405 2406 2411 2412 2452 2461 2462 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Portland Cement Slag Cement Blended Cement Fly Ash	3101 3102 3103 3115	5 lb.	Certified ready-mix and concrete paving: 1 per certified source when the plant is certified. Take an additional sample: 1) If the plant changes sources, or 2) As the Contract requires. For precast concrete: 1 per 3 months during Department production. The Producer obtains and stores the sample in a sealed container provided by the Department and includes the supplier's delivery invoice from which the sample is obtained.	24300 ID Card Cement Samples 24308 ID Card Fly Ash Samples Sample Log
	Admixtures (Accelerating, Retarding, Water-Reducing, Air-Entraining, etc.)	3113	1/2 pt	Certified ready-mix and concrete paving: Air Entrainment: 1 when the plant is certified Type A water reducer: 1 when plant is certified All other admixtures: 1 when plant is certified, or first time used Take an additional sample of any admixtures used: 1) If the plant changes sources, or 2) As the Contract requires. For precast concrete: 1 per 3 months during Department production. The Producer obtains samples from dispensing tubes and store the samples in a sealed plastic containers provided by the Department. Agitate admixtures prior to sampling.	2410 Sample ID Card Sample Log
	Water (Non-Potable or Clarified)	3906	1 gal	Non-Potable Water: 1 per any questionable source. Clarified Water: 1 per month during Department production. Store sample in a clean glass or plastic container	2410 Sample ID Card

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Minimum Concrete Aggregate Sample Sizes

Remarks:

(1) All gradation and aggregate quality tests require companion samples, double sample sizes. Samples taken at location identified on Contact Report located at plant.

Gradation: Coarse Aggregate:		**Gradation:** Intermediate Aggregate:		**Gradation:** Fine Aggregate:		**Moisture:**		**Aggregate Quality:**		**-#200 Coarse Aggregate:**	
3/4" Plus:	30 lb.	CIA to meet #67	6 lb.	Sand:	500 g	Coarse Aggregate:	2000 g	3/4" Plus:	50 lb.	3/4" Plus:	5000 g
3/4" Minus, #67:	10 lb.	CIA to meet JMF:	500 g			Intermediate Aggregate:	500 g	3/4" Minus, #67:	30 lb.	3/4" Minus, #67:	2500 g
#7, CA-70:	6 lb.	FIA, CS, FS:	500 g			Fine Aggregate:	500 g	#7, CA-70:	20 lb.	#7, CA-70:	2500 g
#89, CA-80:	500 g							#89, CA-80:	20 lb.	#89, CA-80:	500 g
								CIA, FIA, CS, FS:	20 lb.	CIA:	500 g
								Fine Aggregate:	20 lb.		

Certified Ready-Mix - Concrete Plant Production

Remarks:

(1) When <20 **yd³** of Department concrete is produced in a **week**, plant monitoring is not required except for monthly aggregate quality testing.

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2301 2302 2401 2405 2406 2411 2452 2461 2462 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Gradation (QC/QA)	2461 3126 3131 3137	**JMFs and Bridge Deck Mix Designs:** **Daily Concrete Quantity:** **20 – 400 yd³**: 1 per fraction per source **>400 yd³**: 1 additional per fraction per source Take the additional gradation after daily total exceeds 400 yd³. Passing aggregate gradations are required prior to the start of any bridge deck concrete pours. If using the same source and fraction, Producer may use daily QC gradation results to satisfy weekly QC gradation requirements. Record test results in both sections of QC Workbook. **All other mix designs:** **Weekly Concrete Quantity:** **20 – 400 yd³**: 1 per fraction per source **>400 yd³**: 1 additional per fraction per source Take the additional gradation after weekly total exceeds 400 yd³. **Notes:** Washing the fine aggregate gradation (QC) sample is not required when the result on the -#200 sieve of the unwashed sample is less than 1.0%. Hold QA (QC companion) samples until they are picked up by the Department monitor. Discard after 14 calendar days. Performing testing on representative material at the end of the most recent day of production is allowed.	None	Concrete Ready-Mix Plant QC Workbook Aggregate Gradation Control Charts and Sample Log

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Certified Ready-Mix - Concrete Plant Production (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2301 2302 2401 2405 2406 2411 2452 2461 2462 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Gradation (Verification/ Verification Companion)	2461 3126 3131 3137	Test the Verification Companion sample. Complete on the day the sample was taken. Wash all fine aggregate Verification Companion samples.	**Weekly Concrete Quantity:** **20 – 400 yd^3**: 1 per fraction per source **>400 yd^3**: 1 additional per fraction per source **Take the additional gradation after <u>weekly</u> total exceeds 400 yd^3.** Include JMF Number and Verification Companion results on Sample ID Card. Wash all fine aggregate Verification samples.	Concrete Ready-Mix Plant QC Workbook Concrete Ready-Mix Plant QA Workbook Aggregate Gradation Control Charts and Sample Log
	Aggregate Quality <u>including</u> Coarse Aggregate Percent Passing - #200	3126 3131 3137	Test at Producer/Contractor Discretion	**<u>When Department concrete is produced:</u>** 1 per fraction per source per 30 calendar days. **<u>When bridge deck concrete is produced:</u>** 1 per fraction per source per 30 calendar days tested for 3137.2.D.2 Identify quality samples with a “Q” on the Sample ID Card and the Quality companion sample. Write 3137.2.D.2 on bridge deck concrete Sample ID Cards.	2410 Sample ID Card
	Aggregate Moisture (QC)	2461	**Daily Concrete Quantity ≥ 20 yd^3:** 1 per fraction per source completed every 4 hours and enter results into batching system in real time. Complete the initial moisture content prior to the start of concrete production each day. Performing moisture testing on representative material at the end of plant production the prior day is allowed. In the event of overnight precipitation, new moisture tests are required prior to the start of concrete production. In this event, the four-hour rate will commence with the first pour of the day, regardless if it is placed in Department or private work.	None	Concrete Ready-Mix Plant QC Workbook

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production

Remarks:

(1) Use ***Certified Ready-Mix - Concrete Plant Production*** **testing rates when:**

a) The entire concrete paving project is < 3,500 cu. yd, or

b) Minor work or fill-ins are not provided by the primary plant.

(2) When w/c incentives apply, Contractor QC Technician and Department Plant Monitor are required to be present during the entire pour or at the Engineer's discretion.

(3) If w/c incentives do not apply, the Department Plant Monitor shall monitor as necessary to ensure compliance with the requirements of the Contract.

(4) All samples shall be taken off the belt leading to the weigh hopper unless otherwise approved by the Engineer.

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2301	Gradation (QC)	3126 3131 3137	**Concrete paving batch plant:** **Daily Concrete Quantity ≥ 250 yd³:** 1 per 2500 yd³ per fraction per source Take initial samples for aggregate gradation testing within the first 500 yd³. **Certified ready-mix plant using JMF:** **Daily Concrete Quantity:** **20 – 400 yd³**: 1 per fraction per source **>400 yd³**: 1 additional per fraction per source Take the additional gradation after daily total exceeds 400 yd³. **Notes:** Washing the fine aggregate gradation (QC) sample is not required when the result on the -#200 sieve of the unwashed sample is less than 1.0%.	None	JMF Concrete Aggregate Workbook 2410 Sample ID Card when samples are submitted to MnDOT Laboratory
2301	Gradation (Verification/ Verification Companion)	3126 3131 3137	**Concrete paving batch plant:** Test the Verification Companion sample. Complete on the day the sample was taken. **Certified ready-mix plant using JMF:** Test the Verification Companion sample. Complete on the day the sample was taken. Wash all fine aggregate Verification Companion samples.	**Concrete paving batch plant:** **Daily Concrete Quantity ≥ 500 yd³:** 1 per fraction per source **Certified ready-mix plant using JMF:** **Daily concrete quantity ≥ 100 yd³**: 1 per fraction per source Wash all fine aggregate Verification samples. Include the JMF Number and the QC Verification Companion results on Sample ID Card. **Note:** The Department may use the Verification sample for the Coarse Aggregate Quality incentive/disincentive testing, if applies.	JMF Concrete Aggregate Workbook 2410 Sample ID Card when samples are submitted to MnDOT Laboratory

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor or Testing	Department Testing	Form No.
2301	Coarse Aggregate Percent Passing - #200 (QC/QA)	3131 3137	Test the Verification Companion sample **Test these samples at the plant**.	**For a concrete paving batch plant:** Test Verification sample on the first day of production and each time the Contractor mobilizes the plant, changes aggregate sources, or the cleanliness of the coarse aggregate is in question. Test 1 Verification sample per week thereafter **Test these samples at the plant.** **For a certified ready-mix plant using JMF:** Test Verification sample on the first day of production and each time the Contractor mobilizes the plant, changes aggregate sources, or the cleanliness of the coarse aggregate is in question. Test 1 Verification sample per week thereafter **Test these samples at the plant or the Department lab.**	JMF Concrete Aggregate Workbook
2301	Aggregate Quality Testing including Coarse Aggregate Percent Passing - #200	3126 3131 3137	Test at Producer/Contractor Discretion	**Pre-Production Testing for concrete paving batch plants:** **If entire project < 3,500 yd^3:** Pre-production sampling is not required **If entire project ≥ 3,500 yd^3:** Obtain pre-production samples for quality testing at least 16 hours prior to concrete production. Samples may be taken from the stockpile and the -#200 test may be performed at the lab instead of at the plant at the discretion of the Engineer. **During concrete production for concrete paving batch plants and certified ready-mix using JMF:** 1 randomly selected test each fraction every 20,000 yd^3 of production. Split the Quality sample 4 ways: 1) Provide 2 quarters of the sample to the Producer/Contractor. 2) Submit 1 quarter of the sample to the lab for quality testing including testing on the -#200 sieve. 3) Retain the remaining quarter of the sample until the project is complete. Identify quality samples with a “Q” on the Sample ID Card. **See additional requirements for first sand quality sample under ASR Testing.**	2410 Sample ID Card

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)					
Pay Item No.	**Test Type**	**Spec. No.**	**Producer/Contractor Testing**	**Department Testing**	**Form No.**
2301	Aggregate Moisture Testing (QC/Verification)	2301	Complete the initial moisture content prior to the start of concrete production each day. Performing moisture testing on representative material at the end of plant production the prior day is allowed. In the event of overnight precipitation, new moisture tests are required prior to the start of concrete production. ***If w/c incentives do not apply:*** **For a concrete paving batch plant:** 1 per 1000 yd^3 per fraction per source or completed every 4 hours, whichever results in the higher sampling rate. **For a certified ready-mix plant using JMF:** 1 per fraction per source completed every 4 hours. Enter results into batching system in real time.	***If w/c incentives apply:*** **For a concrete paving batch plant:** 1 per 1000 yd^3 or completed every 4 hours, whichever results in the higher sampling rate. Take initial samples for aggregate moisture testing within the first 250 yd^3. **For a certified ready-mix plant using JMF:** 1 per 200 yd^3 or completed every 4 hours, whichever results in the higher sampling rate. Take initial samples for aggregate moisture testing within the first 100 yd^3. Use aggregate moisture results for determining the water content to calculate the w/c ratio incentive/disincentive. **Do not leave samples unattended.** Enter results into batching system in real time.	W/C Ratio Calculation Workbook
	Water Content Verification Testing **(Microwave or Phoenix Oven Verification)**	2301	Obtain the plastic concrete sample at the plant.	***If w/c incentives apply:*** Microwave or Phoenix oven verification testing to verify the w/c ratio is completed in conjunction with Department aggregate moisture testing. **For a concrete paving batch plant:** Take initial verification test within the first 250 yd^3. At least one additional verification test should be taken if more than 1,000 yd^3 is produced in a day. **For a certified ready-mix plant:** Take initial verification test within the first 100 yd^3. At least one additional verification test should be taken if more than 400 yd^3 is produced in a day.	
	Unit Weight (QC)		Test 1 load of concrete per day at the plant.	None	
	Air Content for Type 3 Concrete (QC)	2301 2461	Test the first load of concrete at the plant.	None	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)

<table>
<tr><th>Pay Item No.</th><th>Test Type</th><th>Spec. No.</th><th>Producer/Contractor Testing</th><th>Department Testing</th><th>Form No.</th></tr>
<tr><td>2301</td><td>Coarse Aggregate Quality Testing for Incentive/ Disincentive</td><td>3137</td><td>Test at Contractor’s discretion</td><td>If coarse aggregate quality incentives apply:
Test the Class B aggregates for % absorption and Class C aggregates for % carbonate including any other tests necessary to make those determinations.

Sample the 2 largest fractions in accordance with the following table and 2301:

Coarse Aggregate Quality Incentive/Disincentive Sampling Rates
<table><tr><th>Plan Concrete yd^3</th><th>Samples per fraction (n)</th></tr><tr><td>3,500 – 7,500</td><td>3</td></tr><tr><td>7,501 – 10,000</td><td>5</td></tr><tr><td>10,001 – 25,000</td><td>10</td></tr><tr><td>25,001 – 50,000</td><td>15</td></tr><tr><td>> 50,000</td><td>20</td></tr></table>Identify incentive samples on the Sample ID Card with “I/D”

<u>Note:</u> The Verification Gradation sample may be used for the Coarse Aggregate Quality incentive/disincentive testing.</td><td>2410 Sample ID Card

Coarse Aggregate Quality Incentive/ Disincentive Workbook</td></tr>
<tr><td>2301</td><td>Alkali Silica Reactivity (ASR)</td><td>2301</td><td>None</td><td><u>ASR</u> Testing is not required if the entire project is <3,500 cu. yd.

1 per paving project per sand source

Provide the following samples:
1) 5 lb. of cement
2) 5 lb. of supplementary cementitious material (fly ash or slag), and
3) 10 lb. of sand.

Write “Project Specific ASR Testing” on all 3 Sample ID cards.

Write “Verification” on the Sample ID cards if the cement and supplementary cementitious samples are also used for verification testing.</td><td>2410 Sample ID Card

24300 ID Card Cement Samples

24308 ID Card Fly Ash Samples</td></tr>
</table>

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Plant Production - Bagged Portland Cement Concrete Patching Mix (3U18 and 3U58M)

Remarks:

(1) Mix design is provided by MnDOT unless otherwise specified in the Contract.

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Department Testing	Form No.
2302 2401	Cement	3101 3103	None	1 per certified source when the plant is certified. Take an additional sample: 1) If the plant changes sources, or 2) As the Contract requires. The Producer obtains and stores the sample in a sealed container provided by the Department and includes the supplier's delivery invoice from which the sample is obtained.	
2302 2401	Gradation (QC/QA)	2461 3105 3126 3131 3137	**Prior to production:** 1 per day per fraction per source Washing the fine aggregate gradation (QC) sample is not required when the result on the -#200 sieve of the unwashed sample is less than 1.0%, Hold QA (QC companion) samples until they are picked up by the Department monitor. Discard after 14 calendar days.	None	3U18 and 3U58M Quality Control Worksheet
	Gradation Testing (Verification/ Verification Companion)	2461 3105 3126 3131 3137	Test the Verification Companion sample. Complete on the day the sample was taken. Wash all fine aggregate Verification Companion samples.	1 per fraction per source per month Include verification companion results on Sample ID Card.	2410 Sample ID Card
	Aggregate Moisture Testing (QC)	2461	Complete the initial moisture content prior to the start of concrete bagging each day.	None	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Materials (Refer to Metallic Materials and Metal Products for sampling requirements for concrete reinforcement.)					
Pay Item No.	**Material**	**Spec. No.**	**Sample Size**	**Minimum Required Field Sampling Rate**	**Form No.**
2301 2302 2401 2406 2411 2514 2521 2531	Preformed Joint Filler	3702	2 ft^2	Visual Inspection Use only preformed joint filler materials from approved sources are allowed. The most current lists can be found at www.dot.state.mn.us/products.	2410 Sample ID Card
2301 2302 2401 2406	Preformed Elastomeric Type	3721	6 ft.	**1 per lot source per project**	
	Silicone Joint Sealer	3722	1 pt.	1 per source per project Only joint materials from qualified sources are allowed. The most current lists can be found at www.dot.state.mn.us/products. Take samples from application wand. Store sample in one gallon steel container or silicone lined sample box.	
	Hot Poured Elastomeric Type	3725	1/2 gal.		
2301 2302 2401 2406 2411 2514 2519 2520 2521 2531 2533 2545 2550 2554 2557 2564 2565	Burlap	3751	1 yd^2	Visual Inspection Must be free from holes.	
	Colored Concrete Membrane Curing Compound	3752		Visual Inspection Only curing compound for colored concrete from approved sources is allowed. Refer to the approved products list of curing compounds for approved manufacturers **www.dot.state.mn.us/products**.	
	Membrane Curing Compound	3753 3754 3755	1 qt.	Visual Inspection Use only Pre-Approved Curing Compounds. Refer to the approved products list of curing compounds for **pre-approved** lots at http://www.dot.state.mn.us/products/concrete/curingcompounds.html If sampling is required, materials must be thoroughly stirred or agitated immediately prior to taking sample. Store sample in steel container and cover immediately.	
	Plastic	3756		Visual Inspection Must be white opaque and free from holes.	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing –Ready-mix Concrete Grades F, G, M, P, R, Grout, and Lean Mix Backfill

Remarks for Air, Slump, Temperature and Cylinder Testing:

(1) Take all field samples at the point of placement unless otherwise allowed by the Engineer.
(2) First load each day per mix - Take sample after discharging approximately 1/4 yd^3, stop further discharge until both slump and air content test are completed.
(3) Subsequent tests - Sample from the middle portion of the load.
(4) If batching or field adjustments are made, test the adjusted load for air content and if suspect, slump, before it gets into the work.
(5) It is recommended to make standard strength cylinders **after** the first load of concrete unless that is the only load of concrete for that mix that day.
(6) MnDOT standard cylinder mold size is 4 x 8 inch. If aggregate has a maximum size greater than 1-1/4 inch, use 6 x 12 inch molds.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2302 2452 2461 2506 2511 2514 2515 2520 2521 2531 2533 2545 2550 2554 2557 2564 2565	Air Content for Type 3 Concrete (Verification)	2461	None	1 per 100 yd^3 Test first load each day per mix	2409 ID Card Concrete Test Cylinder When submitting samples, record all field test results and Batch Ticket Number on the Cylinder ID Card.
	Slump (Verification)	2461	None	Test slump if concrete is suspected to be outside of required slump range	
	Ambient air and Concrete Temperature	2461	Record temperatures each time air content, slump, or strength test specimen is performed/fabricated.	Record temperatures each time air content, slump, or strength test specimen is performed/fabricated.	
	Compressive Strength (Verification)	2461	Any additional field control cylinders are the responsibility of the Contractor. Provide moist curing environments for initial and intermediate curing of all cylinders.	1 set of 3 (28-day) cylinders per 300 yd^3 per mix per day MnDOT will cast up to three (3) field control cylinders.	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Ready-mix Bridge Concrete Grades B, S, X, Y, HPC, SCC, and Mass Concrete (MC)

Remarks for Air, Slump, Temperature and Cylinder Testing:

(1) Take all field samples at the point of placement unless otherwise allowed by the Engineer.
(2) First load each day per mix - Take sample after discharging approximately ¼ yd^3, stop further discharge until both slump and air content test are completed.
(3) Subsequent tests - Sample from the middle portion of the load.
(4) If batching or field adjustments are made, test the adjusted load for air content and if suspect, slump, before it gets into the work.
(5) It is recommended to make standard strength cylinders **after** the first load of concrete unless that is the only load of concrete for that mix that day.
(6) MnDOT standard cylinder mold size is 4 x 8 inch. If aggregate has a maximum size greater than 1-1/4 inch, use 6 x 12-inch molds.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2401 2406 2411 2461 2506	Air Content for Type 3 Concrete (Verification)	2401 2461	None	1 per 100 yd^3 Test first load each day per mix	2409 ID Card Concrete Test Cylinder When submitting samples, record all field test results and Batch Ticket Number on the Cylinder ID Card.
	Slump or Spread (SCC) (Verification)	2401 2461 SCC Special Provision	None	1 per 100 yd^3 Test first load each day per mix Test slump if concrete is suspected to be outside of required slump range	
	Ambient air and Concrete Temperature	2401 2461	Record temperatures each time air content, slump, or strength test specimen is performed/fabricated.	Record temperatures each time air content, slump, or strength test specimen is performed/fabricated.	
	Compressive Strength (Verification)	2401 2461	Any additional field control cylinders are the responsibility of the Contractor. MnDOT standard cylinder mold size is 4 x 8 inch. If aggregate has a maximum size greater than 1-1/4 inch, use 6 x 12 inch molds. Provide moist curing environments for initial and intermediate curing of all cylinders.	1 set of 3 (28-day) cylinders for 100 yd^3, then 1 set of 3 (28-day) cylinders per 300 yd^3 thereafter per mix per day For Grades HPC, SCC, and MC: 1 set of 3 (56-day) cylinders per day MnDOT will cast up to three (3) field control cylinders.	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Cellular Concrete					
Pay Item No.	**Test Type**	**Spec. No.**	**Contractor Testing**	**Department Testing**	**Form No.**
2519	Density (QC)	2519	1 per hour at the point of placement Perform in accordance with ASTM C796	Observe Contractor testing when possible	Cellular Concrete Density Worksheet
2519	Compressive Strength (QC/Verification)	2461 2519	1 set of 4 cylinders at the point of placement per 300 yd^3 per day Cast 3 x 6 cylinders in accordance with ASTM C495. Field cure in accordance with 2461.3G5.b.	Transport cylinders to the MnDOT Office of Materials and Road Research for testing. MnDOT will break 4 cylinders at 28-days in accordance with ASTM C495 (do not oven dry before testing).	2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement

Remarks for Air Content Before Consolidation, Slump, Temperature and Strength Testing:

(1) Take samples prior to spreading
(2) If batching or field adjustments are made, test the adjusted load for air content and if suspect, slump, before it gets into the work.
(3) MnDOT standard beam box size is 6" x 6" x 20" unless other sizes or types are approved by the Concrete Engineer. If cylinders are substituted for beams, MnDOT standard cylinder mold size is 4 x 8 inch. If aggregate has a maximum size greater than 1-1/4 inch, use 6 x 12 inch molds.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2301	Air Content Before Consolidation for Type 3 Concrete (QC/QA)	2301 2461	1 per 300 yd^3 or 1 per hour, whichever results in the lower testing rate Test first load each day per mix	1 correlation air test per day	Air Content Workbook
	Slump (QC/QA)	2461	Test slump if concrete is suspected to be outside of required slump range as directed by the Engineer		
	Ambient air and Concrete Temperature (QC/QA)	2461	Record temperatures each time air content, slump or strength test specimen is performed/fabricated by the Contractor.	Record temperatures each time air content, slump or strength test specimen is performed/fabricated by the Department.	
	Flexural Strength (QC)	2301 2461	For information only: 1 beam (28-day) per week per mix 1 cylinder (28-day) per week per mix may be substituted at the discretion of the Engineer Provide moist curing environments, fabricate beams or cylinders, deliver to curing site, and clean beam boxes.	Supply beam boxes or cylinder molds. Cure and test beams and cylinders.	Concrete Test Beam Data Worksheet
	Opening to Traffic Strength		For opening to traffic: Make field control beams within the last hour of concrete poured each day. Substitute field control cylinders for field control beams at the discretion of the Engineer Maturity testing is allowed in lieu of field control cylinders or beams Fabricate beams or cylinders, deliver to curing site, and clean beam boxes.	Supply beam boxes or cylinder molds for field control testing. Cure and test beams and cylinders.	Concrete Test Beam Data Worksheet

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement (cont.)

Remarks for Lane Definition:

(1) From the pavement edge to the adjacent longitudinal joint
(2) From one longitudinal joint to the next longitudinal joint
(3) In the absence of a longitudinal joint, between pavement edges
(4) Each Ramp and Loop greater than or equal to 18 feet in width
(5) Doweled concrete Shoulder greater than or equal to 10 feet in width
(6) Doweled concrete Shoulders less than 10 feet in paved width and undoweled concrete Shoulders are not included as part of a lane.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2301	Concrete Pavement Texture (QC)	2301	1 texture test per 1,000 lin. lane feet in the outside wheel path Perform a minimum of 3 texture tests per project	Determine texture testing locations using random numbers. Observe Contractor testing.	Thickness, Texture and MIT-SCAN Report
	Thickness (QC/Verification)	2301	Projects ≤ 3,500 cu. yd. and concrete overlay Projects where underlying pavement at any depth is concrete: 1 quality control probe (QCP) per 1,000 lin. lane feet. Measure and record probes to the nearest 1/8". 1 quality assurance core (QAC) per 4,000 lin. lane feet. Projects > 3,500 cu. yd. when concrete is placed directly on grade, or the concrete overlay is placed on existing asphalt pavement with no underlying concrete: 1 quality control scan (QCS) per 1,000 lin. lane feet. Measure scans in millimeters and convert and record to the nearest tenth of an inch. 1 quality assurance core (QAC) per 4,000 lin. lane feet.	Determine probing, scanning and coring locations using random numbers. Observe Contractor probing or scanning. Mark pavement at core locations. Pick up the cores from the pavement and re-mark the sides of the specimens after coring to clearly verify their authenticity. Field measure cores to the nearest 1/8" Transport to the MnDOT Office of Materials and Road Research for final thickness determination.	Thickness, Texture and MIT-SCAN Report Field Probing or Scanning Report Field Coring Report
	Surface Smoothness	2399	Measure smoothness of the final concrete as required by the Contract. Perform all profiling in the presence of the Engineer unless otherwise approved by the Engineer.	Observe Contractor testing when possible	Concrete Profile Summary Worksheet
	Dowel Bar and Tie Bar Steel Location (QC)	2301	For concrete projects > 3,500 cu. yd., scan the following: Test 5 random doweled contraction joints per 1,000 lin. lane feet For mechanically placed L1T joints, randomly test 45 lin. feet per 1,000 lin. feet	Observe Contractor steel location testing when possible	Thickness, Texture and MIT-SCAN Report

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing (Volumetric Batching)- Low Slump Concrete for Bridge Deck Overlays

Remarks:

(1) Mix design is provided by MnDOT on the back of the Form 21412 Weekly Report of "Low Slump Concrete" unless otherwise specified in the Contract.
(2) All materials must come from certified or qualified sources. All certified sources must state so on the delivery invoice.
(3) The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Sample Size	Form No.
2404	Cement	3101	None	Each time cement is delivered to site: Store the sample in a sealed container and include the supplier's delivery invoice from which the sample is obtained.	5 lb.	24300 ID Card Cement Samples
	Admixtures	3113	None	Each time new lot/batch admixture delivered to site: Store the sample in a sealed plastic container.	1/2 pint	2410 Sample ID Card
	Gradation and Aggregate Quality Testing <u>including</u> Coarse Aggregate Percent Passing - #200	3126 3137	<u>Prior to concrete production:</u> Provide the Department with: • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source No quality test results are required.	Prior to production and each time aggregate is delivered to site: 1 gradation and quality per aggregate fraction prior to concrete production and each time aggregate is delivered to the site. Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.		2410 Sample ID Car 21412 Weekly Report of "Low Slump Concrete"

Concrete Field Testing - Low Slump Concrete for Bridge Deck Overlays

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2404	Air Content for Type 3 Concrete	2461	None	1 per 15 yd^3 Test at beginning of pour each day	21412, Weekly Report of "Low Slump Concrete"
	Slump	2461	None	1 per 15 yd^3 Test at beginning of pour each day For concrete from a concrete-mobile, allow mix to hydrate 5 minutes before slump test to assure all cement is saturated.	21412, Weekly Report of "Low Slump Concrete"
	Compressive Strength	2461	None	1 set of 3 cylinders (28-day) per 100 yd^3 MnDOT standard cylinder mold size is 4 x 8 inch.	2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement Repair (CPR) for 3U18

Remarks:

(1) Mix design is provided in accordance with MnDOT Spec 3105 unless otherwise specified in the Contract. 3U18 may be pre-bagged or batched volumetrically. Ready-mix batched 3U18 concrete is not allowed.

(2) Testing rates apply to concrete that is produced on site.

(3) All materials must come from certified or qualified sources. All certified sources must state so on the delivery invoice.

(4) The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2302	Type 1 Cement	3101	None	**For volumetric batching only:** Each time mobile mixer is calibrated: Obtain a 5 lb. sample Store the sample in a sealed container and include the supplier's delivery invoice from which the sample is obtained.	24300 ID Card Cement Samples
	Admixtures	3113	None	Each time mobile mixer is calibrated: Obtain a 1/2 pint sample Store the sample in a sealed plastic container.	2410 Sample ID Card
	Gradation (QC/Verification)	3126 3137	**Prior to concrete production:** Provide the Department with: • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source. Test companion samples at Contractor's discretion.	**For volumetric batching only:** Prior to concrete production and each time aggregate is delivered to the site: 1 per aggregate fraction	2410 Sample ID Card
	Aggregate Quality Testing including Coarse Aggregate Percent Passing - #200	3126 3137	No quality test results are required.	**For volumetric batching only:** Prior to production and each time aggregate is delivered to site: 1 test each aggregate fraction per source The Department may use the gradation results for the Quality Samples as a substitute for 1 required field gradation. Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.	2410 Sample ID Card

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement Repair (CPR) for 3U18 (cont.)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2302	Air Content for Type 3 Concrete (Verification)	2461	None	1 per 15 yd^3 or 1 per 4 hours whichever results in the highest sampling rate Test at beginning of pour each day.	Concrete Pavement Repair (CPR) Workbook
	Slump (Verification)	2461	None	1 per 15 yd^3 or 1 per 4 hours whichever results in the highest sampling rate Test at beginning of pour each day. Allow mix to hydrate 5 minutes before slump test to assure all cement is saturated. Test slump if concrete is suspected to be outside of required slump range	
	Compressive Strength (Verification)	2461	Any additional field control cylinders are the responsibility of the Contractor.	1 set of 3 cylinders (28-day) per 15 yd^3 MnDOT will cast three (3) field control cylinders.	2409 ID Card Concrete Test Cylinder

Concrete Field Testing – Dowel Bar Retrofit (DBR)

Remarks:

(1) Use MnDOT approved packaged, dry, non-shrink, rapid-hardening cementitious material for dowel bar retrofit repairs.

(2) Testing rates apply to concrete that is produced on site. (Not from a certified ready-mix plant.)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Department Testing	Form No.
2302	Gradation Testing (Verification)	3137	None	Prior to production and each time aggregate is delivered to site: 1 per aggregate fraction per source	2410 Sample ID Card
	Quality Testing including Coarse Aggregate Percent Passing	3131 3137	None	Prior to production and each time aggregate is delivered to site: 1 per aggregate fraction per source Identify quality samples with a "Q" on the Sample ID Card and	2410 Sample ID Card
	Dowel Bar Retrofit Material Compressive Strength (Verification)	2302	Any additional field control cylinders are the responsibility of the Contractor.	1 set of 3 cylinders (28-day) per day MnDOT will cast three (3) field control cylinders per day.	2409 ID Card Concrete Test Cylinder

V. Landscaping and Erosion Control Items

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2571 2574 2575	1. Topsoil borrow [a]	3877.2	None	Type A: 1 per 1000 cy. Type B: 1 per 500 cy - up to 5 samples from each source. Type C: 1 per 500 cy - up to 5 samples from each source, (min. 1 per project) Type E – G: Topsoil blends have certificate of compliance Type H is same as Compost	1 lb. (2-3 cups)	[a] Contractor to test topsoil for soil texture, organic matter, pH, fertility and, if requested, soluble salts at a Certified Soils Lab. Soils Lab should also provide fertilizer recommendations for the proposed vegetation. Soils for infiltration/filtration must meet specification. Topsoil used for infiltration or filtration must be tested after installation by the contractor to assure flow rate. Where topsoil material is blended with compost and drainage medium (Filtration Topsoil Borrow) for use in filtration basins the following tests are required: Compost – Compost material shall be provided by vendors included on the APL/QPL. Sand Drainage Material – test sand for particle size meeting the requirements of 3126, Fine Aggregate for Portland Cement Concrete.
2571 2575 2577	2. Plant Stock & Landscape Materials [b]	3861 and 2571.2A1	Field Inspection at Job Site, submit itemized report for each shipment [c.]			[b] Preliminary inspection will not be done at the source. Material must be in accordance with the Inspection and Contract Administration Guidelines for MnDOT Landscape Projects. [c] Utilize "Inspection and Contract Administration Guidelines for MnDOT Landscape Projects" to determine and measure minimum and maximum criteria thresholds. The following documentation must be provided: 1. A MnDOT 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 Agric. And/or a current nursery certificate/license from a state or provincial Dept. of Agric. 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 pest quarantines 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 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.

V. Landscaping and Erosion Control Items (cont.)

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2502 2573 2575 2577	3. Rolled Erosion Prevention Products (REPP) Category 10, 20, 30, 15, 25, 35, 45 [d]	3885	Visual Inspection	1 per 18,000 lin. feet, QA Mass, ASTM D6475 test. - See Footnote [d]		[d] Check Web site for list of approved products. www.dot.state.mn.us/products
2573 2577	4. REPP-Open Weave Textile Category 37, 47, 57 [e]	3885	Visual Inspection			[e] Check Web site for list of approved products. www.dot.state.mn.us/products
2573	5. Silt Fence [f]	3886	Check Product Label. Obtain Manufacturer's Certificate of Compliance with Roll Number and MARV values			[f] Check APL/QPL of accepted geotextiles www.dot.state.mn.us/products
2573	6. Flotation Silt Curtain [g]	3887	Visual Inspection			[g] Accepted, based on manufacturers' certification of compliance. Check weight of fabric.
2573 2575	7. REPP- Permanent Products Category 50, 55, 60, 70, 72, 74, 76 [h]	3885	Visual Inspection			[h] Check Web site for list of approved products. www.dot.state.mn.us/products
2573	8. Sediment Control Logs	3897	Visual Inspection			Meet specifications
2573	9. Flocculants [i]	3898	Visual Inspection	None		[i] Certificate of Compliance and MSDS to the Engineer.
2571 2575	10. Fertilizer [j]	3881	Visual Inspection			[j] Bagged: Inspected on the basis of guaranteed analysis. Bulk: Inspector to obtain copy of invoice of blended material stating analysis. Check Type and NPK ratio that it matches that specified in the Plan or recommendation based on soil test.
2571 2575	11. Agricultural Lime [k]	3879	1 gradation test per 200 tons			[k] Contractor must supply amount of ENP (Equivalent Neutralizing Power) for each shipment.
2575 2577	12. Mulch Material A. Type 3 Mulch - Certified Weed Free (Certified sources only) [l]	3882	Visual Inspection, Check if from Certified Vendor by Minnesota Crop Improvement Association. **Must be tagged**, grain straw only.			[l] Certified mulch will be indicated by label. Do not accept Mulch that arrives on project without tags **attached** to bales.

V. Landscaping and Erosion Control Items (cont.)

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2571 2575 2577	13. Mulch Material B. Type 6 Mulch – Woodchips	3882	Visual Inspection. Obtain Certificate of Compliance.			All wood chips supplied by a supplier outside the Emerald Ash Borer quarantine area or have an Emerald Ash Borer Compliance Agreement with the MDA.
2502 2575 2577	14. Seeds A. Seeds (Certified Vendors Only) (Mixes 21-000, 22-000 and 25-000 series) [m]	3876	Check for Certified Vendor tag from Minnesota Crop improvement Association. If materials are on hand and past the twelve months, testing must be done.			[m] Periodic sampling taken by Office of Environmental Services. Any moldy or insect contaminated seed must be rejected. Check seed Label test date is no more than 12 months old at the time of testing.
2502 2575 2577	14. Seeds B. Native Seed (Mixes 30-000 series) (Certified Vendors Only) [n]	3876	Check if from Certified Vendor by Minnesota Crop Improvement Association, must be tagged. If materials are on hand and past the twelve months, testing must be done.			[n] Certified seed will be indicated by label on containers. Reject all moldy or insect contaminated seed. Periodic sampling taken by Office of Environmental Services. Check seed Label test date is no more than 12 months old at the time of testing.
2575	15. Sod [o]	3878	A certified tag by Minnesota Crop Improvement Association for Salt tolerant sod. Final Visual Inspection at site.			[o] A Certificate of Compliance must be furnished by the producer to the Engineer for the type of sod supplied showing correct grass varieties.
2571 2575	16. Compost A. Compost Certified Source [p]	3890	Visual Inspection			[p] Check APL/QPL.
2571	17. Compost B. Compost Non-Certified Source [q]	3890	Inspection of source 6 weeks prior to delivery.			[q] Retain Certificate of Compliance, 6 weeks prior to delivery. Applies only to 2571 Landscape pay items.
2575	18. Hydraulic Erosion Control Product [r]	3884				[r] Check APL/QPL. Installer needs to show certificate of training.

VI. Chemical Items

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2401	Asphalt Plank	3204	Check for proper type and size as specified in plans. Lab Sample Required	1 per 1,000 plank or less of each thickness from each shipment	3 – 1 yard pieces sampled from different planks	
2131	Calcium Chloride	3911	Check for listing on Qualified Products website if product is a deicer. Lab Sample Required *(See Notes)*	Liquid: 1 per shipment Dry: 1 per shipment	1 pint or 1 lb. in Plastic Container	Provide copy of the BOL with sample.
2131	Magnesium Chloride	3912	Check for listing on Qualified Products website if product is a deicer. Lab Sample Required *(See Notes)*	1 per shipment	1 pint in Plastic Container	Provide copy of the BOL with sample.
2331	Hot-Pour Crack Sealant for Crack Sealing/Filling	3719 3725	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 per lot. Take samples from application wand. Use caution when handling hot containers	1/2 gallon in a one gallon steel container or silicone lined sample box	**Form 02415** List batch numbers and retain Certificate of Compliance.
2331	Pavement Joint Adhesive	Special Provisions	Lab Sample Required	1 per lot. Take samples from application wand. Use caution when handling hot containers	1 qt. in a steel container or silicone lined sample box	
2481	Waterproofing Materials Membrane Waterproofing System	3757	Check for listing on Qualified Products website. Lab Sample Required	1 per shipment (Membrane Only)	1 Sq. Ft	
2481	Waterproofing Materials Three Ply System Asphalt Primer	3165	Verify supplied material meets ASTM D 41 Lab Sample Required	1 per shipment	1 pint in steel container	
2481	Waterproofing Materials Three Ply System Waterproofing Asphalt	3166	Verify supplied material meets ASTM D 449 Lab Sample Required	1 per shipment	1 pint in steel container	

VI. Chemical Items (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2481	Waterproofing Materials Three Ply System Fabric	3201	Verify supplied material meets AASHTO M 117 Lab Sample Required	1 per shipment	1 Sq. yd.	
2582	Waterborne Latex Traffic Marking Paint.	3591	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 per lot	1 pint	**Form 02415** List batch numbers and retain Certificate of Compliance.
2582	Epoxy Traffic Paint	3590	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 Part A per lot 1 Catalyst Part B per lot	1 pint	**Form 02415** List batch numbers and retain Certificate of Compliance.
2564	Non-Traffic Marking Paints	3501 3532 3533 Special Provisions	Check for proper material as specified in plans. *(See Notes)* Lab Sample Required	1 per lot	1 pint	**Form 02415** List batch numbers.
2401	Special Surface Finish II concrete coating	3501	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	Submit Draw Down for color match/approval prior to start of painting *(See Notes)* Liquid sampling: 1 per lot or every 500 gallons of coating, whichever is greater	1 pint	**Form 02415** List batch numbers and provide Certificate of Compliance with each batch/lot of the coating to the Engineer. Confirm that the contractor provided a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the color.
2478	Bridge Structural Steel Paint	3501 3520	Check for listing on Approved Products website. (See Notes) No Lab Sample Required	Not Field Sampled or Lab Tested - Submit draw down for color match / approval prior to start of painting (See Notes)		**Form 02415** List batch numbers and provide Certificate of Compliance with each batch/lot for each component of the paint system to the Engineer. Confirm that the contractor provided a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the finish coat color.

VI. Chemical Items (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
	Exterior Masonry Paint	3584	Check for proper material as specified in plans. *(See Notes)* Lab Sample Required	1 per lot	1 pint	**Form 02415** List batch numbers.
	Noise Wall Stain	Special Provisions	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 per lot	1 pint	**Form 02415** List batch numbers.
2582	Drop-on Glass Beads	3592	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 per lot	1 quart	**Form 02415** List lot numbers and retain Certificate of Compliance
2502 2581 2582	Preformed Pavement Marking Tape and Thermoplastic	3354 3355 3556	Check for listing on Qualified Products website. *(See Notes)* Lab Sample Required	1 per lot of each color and width	**Tape:** 3 yds if 12” or less **Tape:** 1 yd if greater than 12” **Thermo:** 1 piece for lines under 12” wide or 6” x 6” for other shapes	**Form 02415** List lot numbers and retain Certificate of Compliance.
2540 2563 2564 2565 2582	Signs and Markers	3352	Check for listing on Approved Products website. No Lab Sample Required	None unless material is suspect (See Notes)		Items may be considered suspect if on visual inspection the screening or digital printing appears abnormal, the sheeting type / brand looks different than past appearance, the backing material may be the incorrect thickness / type, etc. Contact the Office of Traffic Engineering (http://www.dot.state.mn.us/trafficeng/contacts.html) for guidance on suspect items to determine need for sampling and submittal to the Chem Lab for testing.

VII. Metallic Materials and Metal Products

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2554	1. Guard Rail A. Fittings - Splicers, Bolts, etc.	3381	Visual Inspection – sample, if necessary, *(See Notes)*	Bolts: 1 Post bolt and 4 splice bolts with nuts for each 1,000 units or less.		**Form 02415 or 2403** To be approved before use. Materials from H&R may be pre-sampled and tested. Call the MnDOT inspector at 218-846-3613 to see if material has been approved. For non-pre-tested, submit laboratory samples at required rate. For small quantities, lab samples are not required, but document on Form 02415 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
2554	1.B.i. Non-High Tension Guard Rail Cable	3381	Visual Inspection – submit sample	1 per each spool	4 feet	**Form 02415 or 2403** See VII.1.A.
2554	1. B.ii. High Tension Guard Rail Cable	Special Provisions	Visual Inspection – *(See Notes)*	None, unless material is suspect *(See Notes)*	4 feet	Sample at the rate of 1 per 50,000 feet if the strand appears damaged or suspect (Accepted as part of system)
2554	1. Guard Rail C. Structural Plate Beam	3382	Visual Inspection – *(See Notes)*	1 from one end of a section for each 200 rail sections (or portion thereof) or 1 per each 100 terminal sections	Full depth x 10 inches	**Form 02415 or 2403** See VII.1.A.
2554	D. Plate Beam Guide Posts	3382	Visual Inspection	None, unless material is suspect		**Form 02415 or 2403**
2554	E. High Tension Guide Posts	Spec. Provisions	Visual Inspection	None, unless material is suspect		**Form 02415 or 2403** (Accepted as part of system)
2545 2554 2564	2. Steel Sign Posts	3401	Visual Inspection & Certification from Contractor of compliance with Domestic source requirement under 1601, if applicable. Submit sample from material being installed, (See Notes)	1 post per shipment of each mass per unit length. Submit shortest full-sized length of each weight, not a scrap piece.	(See Note)	**Form 02415 or 2403** **Check domestic steel requirement under 1601** **No Samples for project quantities less than 20**

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2554 2557	3.Posts for Traffic & Fence A.Steel fence posts, brace bars, and rails	3403 3406	Visual Inspection - submit sample of material being installed, *(See Notes)*	1 per 500 pieces. Submit full length for posts used in the ground (line, terminal, "C" and anchor posts), and 5' length of top rail and brace bar. Small Quantity (< 1000 ft. on entire project): sample line post, top rail, and brace bar only.		**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance and certified mill analysis in project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence B. Components: includes cup, cap, nut, bolt, end clamp, tension band, truss rod tightener, hog ring, tie wire, tension stretcher bar, truss rod, clamp, & tension wire	3376	Visual Inspection - submit sample of material being installed, *(See Notes)*	1 each of cup, cap, nut, bolt, end clamp, tension bands, truss rod tightener, 12 hog rings, 6 tie wires, 1 tension stretcher bar; 1 truss rod, cut to 2-foot min. with threaded section, 3 feet of tension wire. Small Quantity (< 1000 ft. on entire project): No sample required		**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence C.Gates	3379	Visual Inspection, *(See Notes)*	No sample required. *(See Notes)*		**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence D. Barbed Wire	3376	Visual Inspection – submit sample of material being installed, *(See Notes)*	1 per 50 rolls – *(See Notes)*	3 feet	**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for cert. form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence E. Woven Wire Fabric	3376	Visual Inspection - submit sample of materials being installed, (See Notes)	1 full height sample per 50 rolls	3 feet	**Form 02415 or 2403** **Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file.** **See link for cert. form right side of page, www.dot.state.mn.us/materials/lab.html**

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2557	3. Fence F. Chain Link Fabric	3376	Visual Inspection - submit sample of materials being installed, *(See Notes)*	1 full height sample for each 5,000 ft. of fencing.	1 foot	**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2402	4. Water Pipe and other Piping Materials	3364, 3365, 3366 & Special Provisions	*(See Notes)*	No sample necessary		**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. To be identified & tested if necessary, prior to use. See Special Provisions.
2301 2401 2405 2411 2412 2433 2452 2472 2514 2531 2533 2545 2564	5. Reinforcing Steel A. Bars – Uncoated	3301	Visual Check for Size and Grade Marking	No Field Sample Necessary		**Form 02415 or 2403** For Uncoated bars - Retain Certificate of Compliance and Certified Mill Analysis in Project File.
2301 2302 2401 2405 2411 2412 2433 2452 2472 2514 2531 2533 2545 2564	5. Reinforcing Steel B. Bars - Epoxy Coated	3301	Visual Check for Size and Grade Marking and "Inspected" tag. Inspect for damage to coating, verify repairs, if necessary. (See Notes)	1 bar of each size of bar for each day's coating production	3 feet	**Form 02415 or 2403** For Epoxy-Coated bars, steel will be tagged "Inspected" when sampled and tested by MnDOT prior to shipment and will be tagged "Sampled" when testing has not been completed prior to shipment. If the Epoxy-Coated bars are not tagged "Sampled" or "Inspected", submit 3 foot. samples cut from project bars, with copies of the Certificate of Compliance and Certified Mill Analysis. Replace the samples with splice bars that are supplied with the shipment. Splice bar length is 3 feet plus 40 bar diameters. Retain originals of the Certificate of Compliance and Certified Mill Analysis in the project file.

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2401	5. Reinforcing Steel C. Bars Stainless Steel	Special Provisions	Visual check for size and grade. Send sample bars from shipment. *(See Notes)*	2 bars per heat per bar size	3 feet	Submit copies of mill test reports with samples, retain originals in project file
2401 2411 2452 2472 2564	5. Reinforcing Steel D. Spirals	3305	Submit sample, inspect for damage to coating, verify repairs, if necessary.	1 per shipment	3 feet	**Same as 5.B**
2301 2401 2411 2412 2472 2531	5. Reinforcing Steel E. Steel Fabric	3303	Visual inspection. *(See Notes)*	Field sample not necessary for uncoated fabric. If epoxy-coated, submit 2-ft.-square sample.		Retain Certificate of Compliance in project file. Verify material size, normally shown on metal tag on bundles of fabric. Use caliper or micrometer if there is no metal tag. If fabric is pre-bent, examine outside of bends for cracking. Do not allow cracked material to be installed.
2301 2302 2401 2411	5. Reinforcing Steel F. Dowel Bars	3302	Sample from material being used, including basket. *(See Notes)*	1 Dowel Bar from each shipment	Full Size Dowel Bars	For all types of dowels – Each project shall have a Certificate of Compliance from the Manufacturer certifying that all materials used in fabrication of the dowel bars and baskets comply with all applicable specifications. The Manufacturer shall maintain all records necessary for certification by project.
2401 2405	5. Reinforcing Steel G. Prestressing or Post-Tensioning Strand	3348	If strand is installed at project site, sample from material being used.	2 strands from each heat (See Notes)	6 feet	Submit one copy of mill certificate and one copy of the stress-strain curve representative of the lot with the samples. For most manufacturers, a heat equals a production lot, and an individual lot, pack, or reel is a subset of a heat/production lot.
2401 2411 2433 2472	5. Reinforcing Steel H. Mechanical Splice Couplers	3301 Special Provisions	Visual Check for Size and Grade Marking. Inspect for damage to coating, verify repairs, if necessary. (See Notes)	1 for each size and of each lot supplied.	Mechanical splice coupler and reinforcement bars 3 feet each	The contractor shall submit a "Certificate of Compliance" provided by manufacturer, on a per project basis for each size of mechanical splice coupler used. Verify mechanical splice type and size is listed on APL/QPL. Pre-qualification requires contractor to submit a sample to the Department for each reinforcement bar size used on the project. Test results of sample must verify compliance to original product specifications.

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402 2506 2565	6. Drainage and Electrical Castings	3321 2471 2565	Check APL/QPL and visual inspection at the project site. *(See Notes)*	All castings: 3 tensile bars to be cast with each heat at Foundry and submitted to the lab by an approved Foundry*. See 3321.		**Form 02415 or 2403** Verify source of material is listed on APL/QPL Inspect in the field and retain Form 02415 or 2403 in project file, showing name of foundry and quantity
2401 2402 2411 2433 2545 2554 2564 2565	7. Anchor Rods (Cast in Place)	3385 3391 3392	Check APL/QPL, mill certifications, and visual inspection at the project site. Take sample if not listed on APL/QPL.	Pre-approved *(See Notes)* or 1 complete anchor rod assembly including nuts and washers from each lot supplied.		Pre-approved system requires supplier to submit a sample to the Department yearly for each anchor rod grade. Test results of sample must verify compliance to product specifications.
2401 2402 2411 2433 2545 2554 2564 2565	8. Structural Fasteners, both coated and uncoated	3385 3391 3392	Visual inspection and verify material is on APL/QPL, or submit sample for verification testing if not on APL/QPL	Pre-approved *(See Notes)* or 2 complete assemblies for each size, length, diameter, grade and finish, per increment of 1000 or fraction thereof		Pre-approved system requires the supplier to submit a sample yearly for each fastener size, grade and finish. Test results must verify compliance to specifications. If not on the APL/QPL, submit two complete assemblies for each size, length, grade and finish per increment of 1000 or fraction thereof of fasteners supplied for the project, including nuts and washers from each lot supplied. Obtain passing test results before installation.
2401 2411 2433 2545 2565	9. Anchorages (Drilled In)	Special Provisions, Standard Plates, Plan Sheet Details	Visual Inspection. Before installation, verify listing on APL/QPL. For field testing rate, of installed anchorages, see the Special Provisions.	Laboratory samples not required.		Note: Before installation, verify that anchorages are on the APL/QPL Or Verify that anchorages are in accordance with the Standard Plate or the details in the Plan.

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402	10. Structural Steel A. For Steel Bridge – Beams, Girders, Diaphragms, etc.	2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402 2405	10. Structural Steel B. For Concrete Girders-Diaphragms and sole plates	2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel C. Expansion joints	2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel D. Steel Bearings	2471	Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402	10. Structural Steel E. Railing-Structural tube and ornamental	2471	Structural Metals a Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel F. Drainage Systems	2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel G. Protection Angles	2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2564	11. Overhead Sign structures	2564 2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2545	12. High Mast Lighting Structures	2545 2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2565	13. Monotube Signal Structures	2565 2471	Structural Metals Confirmation of Inspected Material Document and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VIII. Miscellaneous Materials

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2403 2422 2452 2521 2540 2545 2554 2557 2564	1. Timber, Lumber Piling & Posts	3412 to 3471 & 3491	Visual Inspection			**Form 02415 or 2403** Untreated materials shall be inspected in the field and the results reported on Form 02415 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.
2402 2405 2557 Many	2. Miscellaneous pieces and Hardware (Galvanized)	3392 3394		3 samples of each item per shipment. Sample critical items only. (Critical items are load bearing, structurally necessary items.)	3 of each type.	**Form 02415 or 2403** Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected".
2504	3. Insulation Board	3760	Visual Inspection	None		**Form 02415 or 2403**
2402	4. Laminated Elastomeric Bearing Pads	3741 and Special Provisions	Confirmation of Inspected Material Document and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements. Products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs.
2402	4. Plain Elastomeric Bearing Pads	3741 and Special Provisions	Confirmation of Inspected Material Document and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements. Products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs.
2402	4. Cotton Duck Bearing Pads	3741 and Special Provisions	Confirmation of Inspected Material Document and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements. Products will be inspected at the plant and will be shipped with a Confirmation of Inspected Material Document. A copy of the inspection documentation will be archived in eDOCs.

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402 2422 2501 2503 2506	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			**Form 02415 or 2403** Make certain pipe is Certified on Invoice, retain certificate of compliance and certified mill analysis in project file
2501	1. Corrugated Metal Products B. Structural Plate	3231	Visual Inspection: Invoice shall include notation that material described is in accordance with fabricator's Certificate and Guarantee			**Same as 1.A**
2501	1. Corrugated Metal Products C. Aluminum Structural Plate	3233				Retain certificate of compliance and certified mill analysis in project file
2503 2506	2. Clay Pipe	3251	No samples required for less than 100 pieces	1 per 200 pieces of each size.	Full Size Pipe	**Form 02415 or 2403**
2501 2503 2506	3. Concrete Pipe Reinforced Pipe and Arches, Precast Cattle Pass Units, and Sectional Manhole Units	2462 3236	Field Inspection: Check for damage and defects. Check dimensions as required. Check for producer's "Certified" stamp and signature on the certification document.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5539 for additional information.		**Form 02415 or 2403** Product will be certified by producer, only spot checks are done by plant inspector. Make certain the invoice or certification document is signed and the product has the required markings. Maintain Form 2403 or 02415 in project records, showing source of materials and type and quantity used
2501 2503 2506	3. Concrete Pipe Fine Aggregate Quality	3126		1 quality test per month during production.	25 lb.	
2501 2503 2506	3. Concrete Pipe Coarse Aggregate Quality	3137		1 quality test per month during production.	25 lb.	

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2412	4. Precast/Prestressed Concrete Structures A. Reinforced Precast Box Culvert	2462 3238	1 air test per pour (1st load) 1 set of cylinders per 25 cubic yards, with a minimum of two cylinders per set. Alternate cylinder acceptance systems may be allowed with the approval of the State Materials Engineer.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5539 for additional information.		Precast/prestressed Concrete Structure (beams, posts, etc.) will be inspected and stamped at plant. Field personnel are responsible for checking for plant inspector's stamp, for shipping/handling damage or defects, and dimensions. An inspection report will be completed by plant personnel and sent to the field personnel.
	Fine Aggregate Quality	3126		1 quality test per month during production.	25 lb.	
	Coarse Aggregate Quality	3137		1 quality test per month during production.	25 lb.	
2405	4. Precast/Prestressed Concrete Structures B. Precast/Prestressed Concrete Structure (beams, posts, wetcast pipe and manholes, miscellaneous concrete products, etc.).	2405 2462	1 air test per pour (1st load) 1 slump/spread test 1 set of cylinders per 25 cubic yards, with a minimum of two cylinders per set, and one set per beam. Alternate cylinder acceptance systems may be allowed with the approval of the State Materials Engineer.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5539 for additional information.		Precast/prestressed Concrete Structure (beams, posts, etc.) will be inspected and stamped at plant. Field personnel are responsible for checking for plant inspector's stamp, for shipping/handling damage or defects, and dimensions. An inspection report will be completed by plant personnel and sent to the field personnel.
	Fine Aggregate Gradation and Quality	3126	Gradation: 1 per 200 Cu. yd. or fraction thereof. 1 per day of production or 3 per week, whichever is less.	1 gradation and 1 quality test per month during production from a split sample. Include producer's gradation results on sample card.	25 lb.	
	Coarse Aggregate Gradation and Quality	3137	Gradation: 1 per 100 Cu. yd. or fraction thereof. 1 per day of production or 3 per week, whichever is less.	1 gradation and 1 quality test per month during production from a split sample. Include producer's gradation results on sample card.	25 lb.	

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2506	5. Manholes and Catch Basins (Construction)	2462 2506 3622	Field Inspection: Check for damage and defects. Check dimensions as required. Check for Producer's "Certified" stamp and signature on the certification document.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5539 for additional information.		**Form 02415 or 2403** Product will be certified by producer or inspected, tested and stamped at source. Only spot checks are done by plant inspector. Make certain the invoice or certification document is signed and the product has the required markings. Maintain Form 2403 or 02415 in project records, showing source of materials and type and quantity used (bricks, blocks, precast, or combination).
2502	6. Drain Tile (Clay or Concrete)	3276	Visual Inspection	2 samples of each size from each source		
2502 2503	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.	None		**Form 02415 or 2403** See Spec. 3245 for specific AASHTO or ASTM Pipe types are approved under this specification.
2502	8. Corrugated Polyethylene Pipe – Single wall for edge drains, etc.	3278	Check for markings (AASHTO M 252) Certificate of Compliance. Field Inspect for damage or defects.	No Laboratory tests required		**Form 02415 or 2403**
2503	9. Sewer Joint Sealing Compound	3724	None	1 per shipment	1 pint	
2412 2501 2503	10. Preformed Plastic Sealer for Pipe	3726 Type b	None	1 from each source	1 foot	
2412 2501 2503	11. Bituminous Mastic Joint Sealer for Pipe	3728	Visual Inspection	Sample, if questionable		
2106	12. EPS Geofoam	Special Provisions	Visual Inspection Check for yellow aged material, uniformity and dimensions. Weigh 1'x1'x1' cut coupon to verify density every 250 yd3	None		Form 02415 or 2403

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2501 2503	13. Plastic Pipe A. Corrugated Polyethylene (CP) – Dual Wall B. Polypropylene (PP) – Dual Wall C. Polyvinyl Chloride (PVC) – Profile Wall	3247 3246 3248	Inspect for damage or defects. Deflection test no less than 30 calendar days after installation. Recommend test completed at least 5-10 calendar days prior to paving. Pipe cannot be deflected more than 5%.	None		Form P2501 Send form to State Hydraulic Engineer PP, CP or PVC culvert and storm sewer pipe manufactures that meet structural requirements and are in compliance with AASHTO's National Transportation Product Evaluation Program (NTPEP) are listed on the APL/QPL. A Certificate of Compliance in accordance with Specification 1603 is required.
2108 2511	14. Geotextile Fabric and Geogrid Reinforcement	3733 and Special Provisions	Inspect for damage and uniformity of texture. Rolls of both geotextile and geotextile wrapped PE Tubing must be wrapped in UV protective plastic. (Usually Black). Obtain Certificate of Compliance If using adhesive for seams, see Approved/Qualified Product List available at the Department's website	(a) 1 per project for pipe wrap or trench lining for Permeable base designs. (b) 1 per 50,000 yd^2 of each type of fabric or geogrid. (c) Seam, if required, 1 per project. Small Quantity Acceptance • For fabric totals < 200 yd^2 • For pipe wrap totals < 1000 Lin. Ft • No sampling required • Use Inspection Report for Small Quantities (Form 2403) Check: ○ Certificate of Compliance ○ Identifying label on product ○ Geotextile Small Quantity Acceptance List at http://www.dot.state.mn.us/materials/aggregatedocs/gtxlist.pdf	(a) 10 Lin. Ft. (b) 4 yd2* (c) 10 Lin. Ft. **	Provide a Certificate of Compliance with minimum average roll values (MARV) for all specified geotextile properties. Values must meet Specification 3733 requirements for the specific application. Submit copy of Certificate with material samples & send to the CO Materials Laboratory. Obtain a random sample with no more than 1 sample per individual roll. For Type 6 & special geosynthetics, submit pages of Special Provisions that list required material properties. For Modular Block Walls or Reinforced Soil Slopes, submit page(s) of shop drawings that reference geogrid/geotextile to be used (product name) and/or required properties. * Do not sample first full turn of rolled product. ** Provide seam sample with 3 feet of geosynthetic material on each side of seam (in direction perpendicular to seam).

X. Brick, Stone, and Masonry Units

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2506	1. Brick A. Sewer (clay) and Building	3612 to 3615	Visual Inspection	1 per 50,000 brick or fraction thereof	6 whole bricks	
2506	1. Brick B. Sewer (Concrete)*	3616	Visual Inspection	1 per shipment.	6 whole bricks	* Air entrainment required. Obtain air content statement from supplier.
2506	2. Concrete Masonry Units A. For Sewer Construction	3621	Visual Inspection	1 per shipment	6 whole units	Air entrainment required. Obtain air content statement from supplier.
2411	2. Concrete Masonry Units B. For Modular Block Retaining Walls	Special Provisions	Visual Inspection Check for cracks and broken corners	1 per 10,000 units or fraction thereof, with a minimum of one sample per product (block) type per contract.*	5 whole units	All lots of block upon delivery shall have Manufacturer or Independent laboratory test results to verify passing both compression and freeze-thaw requirements. * Wall units and cap units are considered separate block types.
2422	3. Reinforced Concrete Cribbing	3661	Concrete control tests Air Tests Visual Inspection if previously tested	1 cylinder per 100 units, but not less than 5 cylinders for a given contract. Other materials as required herein.	6 x 12 inch Cylinders	Form 02415 or 2403 Will be stamped when inspected prior to shipment.

Pay Item No.	Kind of Material	Spec. No.	Minimum Quality Control (Contractor Testing Rate)	Quality Assurance (Department)	Notes
2511 2512 2577	4A Class I – V Random Riprap.	3601 and/or Special Provisions	1 gradation per product per year of Class I – V Random Riprap, adhering to the requirements listed in Supplemental Specification 2511.3F.1. Provide certification for each product, using Form G&B-104.	1 gradation per project, source and Class using D_{85} method 5-692.210 in the Grading and Base Manual. Use Form G&B 108a.	See special provisions. For questions on quality, contact District Materials or Geology Unit.
	4B All other Riprap	3601 and/or Special Provisions	Provide certification for each product, using Form G&B-104.	Visual Inspection	See special provisions. For questions on quality, contact District Materials or Geology Unit.

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545	1. Light Poles (Aluminum, Coated Steel, or Stainless Steel)	3811	Visual Inspection-verify product is as shown on MnDOT's APL/QPL for Lighting	None	The Fabricator shall submit "Certificate of Compliance", on a per project basis, to the Project Engineer. Materials should not be ordered until required shop drawings have been signed off by the Department. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2565	2. Signal Poles and Mast Arms	3831	Visual Inspection	None	The Fabricator shall submit "Certificate of Compliance", on a per project basis, to the Project Engineer. Materials should not be ordered until required shop drawings have been signed off by the Department. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2565	3. Signal Head Pedestal Pole	2565 Special Provisions	Visual Inspection verify product is as shown on MnDOT's APL/QPL for Signals	None	Signal Head Pedestal Poles are listed on MnDOT's APL/QPL for Signals
2545 2550 2565	4. Hand Holes for use in non-deliberate vehicular traffic applications (installed in sidewalk and along the roadside)	3819.2A	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None	**Form 02415 or 2403** Traffic control signals and lighting projects require handholes (HH) and frames and covers for use in non-deliberate vehicular traffic applications to be listed on the MnDOT APL/QPL for signals. See Standard Specifications for Construction 3819.
2545 2550 2565	5. Hand Holes (Concrete Precast) for use in deliberate heavy vehicular traffic applications.	2545 2550 2565		None	**Form 02415 or 2403** For precast concrete HH's and cast iron frame and cover: see Standard Plate 8117, VII.6, Drainage Castings and Standard Specifications for Construction 3819. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2545 2550 2565	6. Pulling Vaults and Splice Vaults (Polymer Concrete)	3820 3821	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None	**Form 02415 or 2403** Traffic control signals, roadway lighting projects, and traffic management systems require pulling vaults and splice vaults to be listed on MnDOT's APL/QPL for Traffic Management Systems/ITS
2545 2550 2565	7. Underground Non-Detectable Marking Tape	3806	Visual Inspection	None	Tape shall be labeled as required.

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545 2565	8. Foundation	2545	Refer to Section IV. Concrete Field Testing – General Concrete Grades F, G, M, P, and R	Refer to Section IV. Concrete Field Testing – General Concrete Grades F, G, M, P, and R	Rebar is required in concrete foundations as specified in the Contract documents for all traffic control signals and roadway lighting projects. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2545 2565	9. Steel Screw in Foundations	2545 2565	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None	Steel Screw in Foundations are listed on MnDOT's APL/QPL for Lighting & Signals. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2402 2545 2550 2565	10. Conduit and Fittings Rigid Steel Conduit (RSC)	3801	Visual Inspection	None	**Form 02415 or 2403** Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2402 2545 2550 2565	12. Conduit and Fittings (Cont.) Non-Metallic Rigid PVC and HDPE Conduit **A.** Rigid PVC Conduit **B.** High Density Polyethylene (HDPE) Conduit	3803	Visual Inspection	None	**Form 02415 or 2403** Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File
2402 2545 2550 2565	13. Conduit and Fittings (Cont.) Liquid Tight Flexible Non-Metallic Conduit (LFNC-B)	3804	Visual Inspection	None	**Form 02415 or 2403** Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545 2565	14. Conduit and Fittings (Cont.) PVC Coated Hot Dipped Galvanized Rigid Steel Conduit (PVC Coated RSC)	3805	Visual Inspection	None	**Form 02415 or 2403** Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File. For traffic control signals and roadway lighting projects, specific requirements are contained in the Special Provisions for each project. Verify compliance with (23CFR635.410) Buy America requirements listed under Division S 1601 Special Provisions. Retain Certificate of Compliance and certified mill analysis in the project file.
2545 2565	15. Anchor bolts (cast in place) Epoxy Adhesive	3385			See section VII, 7.
2545 2565	16. Anchorages (Drilled In)	3885			See section VII, 9.
2545 2565	17. Accessible Pedestrian Signal (APS) Pushbutton Base Adhesive Anchoring System	2545 2565	Visual Inspection - verify product is as listed on MnDOT's APL/QPL	None	Traffic control signals require epoxy for securing anchor rods used for APS ped stations, service cabinets, and traffic control signal cabinets. Additionally, lighting projects require epoxy for securing anchor rods used for the service cabinets.
2545 2565	18. Anti-Seize and Lubricating Compound (Bridge Grease)	3842.2A	Visual Inspection - verify product is as listed on MnDOT's APL/QPL	None	Traffic control signals, roadway lighting projects, require Anti-Seize Compound to be listed on MnDOT's APL/QPL for Bridge
2545 2565	19. Conductor Anti-Oxidant Joint Compound	3842.2B	Visual Inspection	None	Traffic control signals, roadway lighting projects, require Anti-Oxidant Compound be used on grounding connections.
2545 2565	20. Ferrous Metal Electrically-Conductive Corrosion Resistant Compound	3842.2C	Visual Inspection	None	Traffic control signals, lighting projects, require Ferrous Metal Electrically-Conductive Corrosion Resistant Compound be used on rigid metal conduit threads and PVC coated rigid steel conduit threaded fittings.
2545 2565	21. Light Pole and Luminaire Numbering Labels	3844.2A	Visual Inspection - verify product is as listed on MnDOT's APL/QPL	None	Traffic control signals, lighting projects, require Light Pole and Luminaire Numbering Labels be used on all light poles and luminaires.

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545 2565	22. Arc Flash Warning Labels	3844.2B.1 and 3844.2B.2	Visual Inspection - verify the self-adhering label has proper calculated values displayed as required	None	Traffic control signals, lighting projects, require the electrical service cabinet be labeled with the appropriate arc flash warning labels.
2545 2565	23. Available Fault Current Calculation Labels	3844.2C	Visual Inspection - verify the self-adhering label has proper calculated values displayed as required	None	Traffic control signals and lighting projects, require service cabinet be labeled with the calculated available fault current calculation labels.
2545 2565	24. Miscellaneous Hardware	2545 2565	Visual Inspection	Sample critical items only. One of each item per shipment. (Critical Items are load bearing, structurally necessary items.)	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. For traffic control signals and roadway light lighting projects, various miscellaneous hardware is required to be listed on the MnDOT Signals and Lighting APL/QPL. The Contract documents indicate which items must be on the Signals and/or Lighting APL/QPL.
2545 2550 2565	25. Cable and Conductors A. Service, Feeder, and Branch Circuit Conductors PVC Loop Detector Conductors Underground Service Entrance (USE) cables	3815.2B.1	Visual Inspection	None	**Form 02415 or 2403** Make certain the conductors are the type specified. Submit Field Inspection report showing type and quantities used. Shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL) and type where applicable. Ensure Service Entrance Cables (SE) and Underground Service Entrance Cables (SE) are installed in accordance with the NEC
2545 2550 2565	26. Cable and Conductors (Cont.) B. Electrical Cables and Single Conductors with Jacket	3815.2B.2(b) 3815.2B.3 3815.2B.5 3815.2C.1 3815.2C.3 3815.2C.4 3815.2C.5 3815.2C.6 3815.2C.7 3815.2C.8 3815.2C.14	Visual Inspection	1 per size per lot Sample Size: 5 feet	**Form 02415 or 2403** Usually inspected at Distributor. Documentation showing project number, reel number(s), and MnDOT test number(s) will be included with each project shipment. If such documentation is not received from Contractor, submit sample for testing along with material certification from manufacturer. Do not use if not tested. Pre-inspected materials will not be tagged; an inspection report will be sent by the MnDOT inspector for each shipment. Project inspectors should verify that the shipping documents agree with this inspection report. Call the Concrete and Metals Lab at 651-366-5536 with questions.

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545 2550 2565	27. Cable and Conductors (Cont.) C. Fiber Optic Cables	3815.2C.13	Visual Inspection - verify make and model number as shown in Special Provisions	None	**Form 02415 or 2403** Fiber optic cables shall be listed on the MnDOT APL/QPL for Traffic Management Systems/ITS.
	28. Saw Cut Loop Detector Conductors (Tube Loop Detector)	3815.2B.3	Visual Inspection	1 per size per lot Sample Size: 5 feet	**Form 02415 or 2403** Usually inspected at the distributor. Documentation showing project number, reel number(s), and MnDOT test number(s) will be included with each project shipment. If such documentation is not received from Contractor, submit sample for testing along with material certification from manufacturer. Do not use if not tested. Pre-inspected materials will not be tagged; an inspection report will be sent by the MnDOT inspector for each shipment. Project inspectors should verify that the shipping documents agree with this inspection report. Call the Physical Testing Engineer at 651-366-5540 or the Concrete and Metals Lab at 651-366-5536 with questions
2545 2565	29. Grounding Electrodes (Ground Rods) (Plate Electrodes)	2545 2565 3818	Visual Inspection	None.	**Form 02415 or 2403** Retain Form 02415 or 2403 in project file. Shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL).
2545	30. Luminaires	3810	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None.	**Form 02415 or 2403** Traffic control signals and roadway lighting projects require luminaries and lamps to be listed on the MnDOT APL/QPL for Lighting. The conductors shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL) and type, where applicable.
2545	31. Air Obstruction Lights	3816	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None.	Air Obstruction Lights are listed on MnDOT's APL/QPL for Lighting.
2545	32. Navigation Lanterns	3817	Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None.	Navigation Lanterns are listed on MnDOT's APL/QPL for Lighting.

XI. Lighting Systems, Traffic Management Systems, and Traffic Control Signals Electrical Materials (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Notes
2545 2565	33. Rodent Intrusion Barrier	3836	**A.** Ensure the stainless-steel woven wire cloth meets the requirements. **B.** Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL **C.** Visual Inspection - verify make and model number as shown on MnDOT's APL/QPL	None.	In both lighting and traffic control signal pole bases some type of rodent intrusion barrier is required. See Standard Specifications for Construction 3836.
2545 2565	34. Sponge Rubber Expansion Joint. Used for wrapping expansion and deflection/expansion conduit joints on bridges.	3841	Visual Inspection		
2545	35. Lighting System	2545			Lighting Systems are to be certified by the Project Engineer.
2545	36. Electrical Systems				Electrical Systems are to be certified by the Project Engineer.
2565	37. Traffic Control Signal Systems	2565			Traffic Control Signal Systems are to be certified by the Project Engineer.

Certifications List

Material	SMC Section	Sub Section	Page	Certification Required
All Base, Surface, and Granular Materials	I. Grading & Base	Many	2-9	Form G&B-104 (24346)
Plant Mixed Asphalt (PMA)	II. Bituminous	Many	10-14	All PMA from certified supplier www.dot.state.mn.us/materials/bituminous.html
Shingles	II. Bituminous		11-12	Contractor shall provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.
Bituminous Material	II. Bituminous		15-16	Only Bituminous Materials from certified asphalt binder sources are allowed for use. The most current list of Certified Sources can at http://www.dot.state.mn.us/products
Emulsified Asphalt	II. Bituminous		15	Use Emulsion for seal coat from a certified emulsified asphalt source.
Portland Cement Fly Ash Slag Cement Admixtures Clarified Water	IV. Concrete		25	Concrete Plant Batching Materials: All materials must come from certified approved, or qualified sources. All certified sources must state so on the Bill of Lading Delivery invoice including MnDOT standardized certification statement for cement, fly ash, and slag. The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.
Certified Ready Mix	IV. Concrete	Many	26-27	Contact Report from Ready-Mix Plant. All concrete from certified plant including a computerized certificate of compliance with each load.
Plastic for Curing	IV. Concrete		33	A Certificate of Compliance shall be submitted to the Project Engineer from the Manufacturer certifying that the plastic complies with AASHTO M171.
Profiler	Introduction IV. Concrete		1,37	Contractor provides MnDOT certified Inertial Profiler Results for bumps/dips and/or Areas of Localized Roughness for the entire project.
Aggregate for Low Slump Overlays	IV. Concrete		38	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Concrete Pavement Repair	IV. Concrete		39	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Dowel Bar Retrofits	IV. Concrete		40	Aggregate pit numbers and 1 passing gradation result per fraction per source
Plant Stock & Landscape Materials	V: Landscaping etc.	2	41	Several certifications
Silt Fence	V: Landscaping etc.	5	42	APL/QPL www.dot.state.mn.us/products
Flotation Silt Curtain	V: Landscaping etc.	6	42	Manufacturers' certification of compliance
Mulch Type 3	V: Landscaping etc.	12	45	Certified Vendor by Minnesota Crop Improvement Association must be tagged grain straw only on label.
Mulch Type 6 Wood Chips	V: Landscaping etc.	13	42	Emerald Ash Borer Compliance Agreement with the MDA
Seeds	V: Landscaping etc.	14	43	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Seeds - Native	V: Landscaping etc.	14	43	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Sod	V: Landscaping etc.	15	43	A certified tag by Minnesota Crop Improvement Association for Salt tolerant sod. A certificate of Compliance for all other types of sod listing grass varieties.

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Required
Compost	V: Landscaping etc.	16	43	APL/QPL http://www.dot.state.mn.us/products/erosioncontrolandlandscaping/compost.html
Hydraulic Erosion Control Product	V: Landscaping etc.	18	43	If DNR Permit on project Certification of Compliance stating it is plastic/synthetic free.
Waterproofing material membrane waterproof system	VI: Chemical Items		44	Certificate and test results
Waterborne latex traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Epoxy traffic paint	VI: Chemical Items		45	Certificate of Compliance
Traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Non-traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Bridge structural steel paint	VI: Chemical Items		45	Certificate of Compliance
Exterior masonry paint	VI: Chemical Items		46	Certificate of Compliance
Noise wall stain	VI: Chemical Items		46	Certificate of Compliance
Drop-on glass beads	VI: Chemical Items		46	Certificate of Compliance
Pavement marking tape	VI: Chemical Items		46	Certificate of Compliance
Steel sign posts	VII: Metallic	2	47	Certification of domestic source if applicable under 1601
Posts for traffic or fence	VII: Metallic	3A	48	Certification of domestic source if applicable under 1601 For fence: Fence certification form (Optional)
Fence components	VII: Metallic	3B	48	Fence certification form (Optional)
Fence gates	VII: Metallic	3C	48	Fence certification form (Optional)
Fence barbed wire fabric	VII: Metallic	3D	48	Fence certification form (Optional)
Fence woven wire fabric	VII: Metallic	3E	48	Fence certification form (Optional)
Fence chain link wire fabric	VII: Metallic	3F	49	Fence certification form (Optional)
Reinforcing steel uncoated bars	VII: Metallic	5A	49	Certificate of Compliance & certified mill analysis
Reinforcing steel epoxy bars	VII: Metallic	5B	49	Inspected tag or Certificate of Compliance & certified mill analysis
Steel Fabric	VII: Metallic	5E	50	Certificate of Compliance
Dowel Bars	VII: Metallic	5F	50	Certificate of Compliance
Pre or post tensioning strand	VII: Metallic	5G	50	Mill analysis
Anchor rods & Structural Fasteners	VII: Metallic	7, 8	51	Yearly MnDOT passing test report

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Required
Timber & lumber	VIII: Miscellaneous	1	55	Certified on invoice
Bearing pads	VIII: Miscellaneous	4	55	Certificate of Compliance
Corrugated metal pipe	IX: Geosynthetics & Pipe	1A	56	Certified on invoice
Corrugated metal structural plate	IX: Geosynthetics & Pipe	1B	56	Certified on invoice
Corrugated metal aluminum plate	IX: Geosynthetics & Pipe	1C	56	Fabricator's Certificate and guarantee
Concrete pipe	IX: Geosynthetics & Pipe	3A	56	Certified stamp and certification document
Precast box culverts	IX: Geosynthetics & Pipe	4A	57	Stamped & field inspection report
Prestressed beams & posts, etc.	IX: Geosynthetics & Pipe	4B	57	Stamped & field inspection report
Manholes & catch basins	IX: Geosynthetics & Pipe	5	58	Certification document or stamped
Thermoplastic pipe ABS & PVC	IX: Geosynthetics & Pipe	7	58	Certificate of Compliance
Corrugated PE Pipe: Single wall – edge drains	IX: Geosynthetics & Pipe	8	58	Certificate of Compliance
Plastic Pipe – culverts or storm sewers: A. Corrugated Polyethylene (CP) B. Polypropylene (PP) C. Polyvinyl Chloride (PVC)	IX: Geosynthetics & Pipe	13	59	Certificate of Compliance
Geotextile fabric	IX: Geosynthetics & Pipe	14	59	Manufacturers' Certification of compliance
Brick sewer concrete	X: Brick, Stone, Masonry	1B	60	Air content statement
Concrete masonry units	X: Brick, Stone, Masonry	2A	60	Air content statement
Light poles	XI: Electrical & Signal	1	61	Certificate of Compliance
Cable & Conductors	XI: Electrical & Signal	7	64	Usually inspected at the distributor. Documentation showing project number, reel number(s), & MnDOT test number(s) will be included with each project shipment. If not received from Contractor, submit sample for testing along with manufacturers' material certification.
Electrical systems	XI: Electrical & Signal	14	66	Electrical Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report.
Traffic control signal systems	XI: Electrical & Signal	15	66	Traffic Control Signal Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report.

Telephone Index for Schedule of Materials Control

Section	Page	Section Name	Contact	Phone
Part I	Page 2	Grading, Base & Reclamation – Specifications 2106, 2111, 2112, 2118, 2211, 2212, 2215, 2221, and 2390	Terry Beaudry John Bormann	(651) 366-5456 (651) 366-5596
Website: www.dot.state.mn.us/materials/gradingandbase.html				
Part II Part II C	Page 10 Page 15	Bituminous - Spec. 2360 Asphalt Binder	John Garrity Allen Gallistel Jason Szondy	(651) 366-5577 (651) 366-5545 (651) 366-5549
Website: www.dot.state.mn.us/materials/bituminous.html				
Part III	Page 17	Bituminous Specialty Items	Joel Ulring Jerry Geib	(651) 366-5432 (651) 366-5496
Part IV	Page 24	Concrete – General Aggregates, Mix Designs and Certified Ready-Mix – Metro Certified Ready Mix – Greater MN North Certified Ready Mix – Greater MN South Paving Bridges Pavement Rehabilitation	Maria Masten Matt Herbst Brad Swenson Mike Daniels Rob Golish Jake Gave Gordy Bruhn	(651) 334-4015 (651) 283-7127 (218) 232-1012 (320) 293-9421 (651) 216-0516 (612) 554-9289 (651) 398-9597
Website: www.dot.state.mn.us/materials/concrete.html				
Part V	Page 41	Landscaping and Erosion Control Items Erosion Control Landscaping Wood Chips	 Ken Graeve Carol Zoff Tina Markeson	 (612) 386-6101 (612) 449-0754 (651) 366-3619
Part VI	Page 44	Chemical Items	Allen Gallistel Jason Krogman	(651) 366-5545 (651) 366-5550
Part VII	Page 47	Metallic Materials and Metal Products Sampling Test Results Bridge Structural Metals	 Jemal Jeju Laboratory Rich Karras	 (651) 366-5539 (651) 366-5560 (651) 366-4569
Part VIII	Page 55	Miscellaneous Materials Sections 1thru 3 Section 4 Test Results	 Jemal Jeju Rich Karras Laboratory	 (651) 366-5539 (651) 366-4569 (651) 366-5560
Part IX	Page 56	Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete Sections 1 -2, 6-11, & 13 Sections 3, 4 & 5 Section 12 Section 14 Test Results	 Jemal Jeju Rich Lamb Blake Nelson Laboratory	 (651) 366-5539 (651) 366-5595 (651) 366-5599 (651) 366-5560
Part X	Page 60	Brick, Stone and Masonry Units/Modular Retaining Wall Blocks Sections 1, 2A & 3 Section 2B Section 4 Test Results	 Jemal Jeju Blake Nelson Andrea Hendrickson Laboratory	 (651) 366-5539 (651) 366-5599 (651) 366-4466 (651) 366-5560
Part XI	Page 61	Electrical & Signal Sections 1, 8-11 Section 5 Section 3 Test Results	 Susan Zarling Jemal Jeju Gordy Bruhn Laboratory	 (651) 234-7052 (651) 366-5539 (651) 398-9597 (651) 366-5560

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Form Index

Grading and Base	
Form No.	**Form Name**
G&B – 001	Grading & Base Report
G&B – 002b	Random Sampling Acceptance for use with 2018 Spec Book
G&B – 101	Sieve Analysis
G&B – 103	Percent Crushing Report
G&B – 104	Certificate of Aggregates & Granular Materials
G&B – 105	Moisture Test
G&B – 106	Relative Moisture Test for Nuclear Gauge
G&B – 107	Excel Spreadsheet for Computing D60/D10 for Drainable Bases Specs 2212 and 3136
G&B – 203	(Table 2106.3-5) DCP Penetration Index Method
G&B – 204	(Table 2211.3-3) DCP Penetration Index Method
G&B – 205	2215 DCP Penetration Index Form – Full Depth Reclamation
G&B – 303	Moisture - Density (Proctor) Test
G&B – 304	Relative Density Test
G&B – 305	Estimated Optimum Moisture Content
G&B – 401	Depth Report – FDR, CIR, SFDR
G&B – 402	Yield Report Cement SFDR & CIR
G&B – 403	Yield Report Bitumen SFDR & CIR
G&B – 404	Foam AC Report
G&B – 405	SFDR Compaction Report
G&B – 601	LWD Option 1: Control Strip- Road Embankment
G&B – 602	LWD Option 1: Control Strip- Misc., Trench, Culvert, Tapered Construction

Bituminous	
Form No.	**Form Name**
2413	Asphalt Sample Identification Card
	Test Summary Worksheet
	QM Workbook
	Core Stationing Worksheet
	Core Incentive/Disincentive Worksheet
	Bituminous Profile Summary Worksheet
	Plant Certification Application
	Bituminous Batch Plant – Contact Report
	Dryer Drum Plant – Certification Report
	Daily Production Report
	Bituminous Plant Spotcheck
	Bituminous Plant Diary

Form Index (cont.)

Concrete	
Form No.	**Form/Workbook Name**
2409	ID Card Concrete Test Cylinder
21412	Weekly Report of "Low Slump Concrete"
24300	ID Card Cement Samples
24308	ID Card Fly Ash Samples
CONC-302	Aggregate Gradation Control Charts and Sample Log
CONC-304	Concrete Ready-Mix Plant QC Workbook
CONC-305	Concrete Ready-Mix Plant QA Workbook
	Concrete Profile Summary Worksheet
CONC-401	Air Content Workbook
CONC-402	Concrete Test Beam Data Worksheet
CONC-404	Thickness, Texture and MIT-SCAN Workbook
CONC-405	Coarse Aggregate Quality Incentive/Disincentive Workbook
CONC-409	W/C Ratio Calculation Workbook
CONC-410	QC - JMF Concrete Aggregate Workbook
CONC-411	QA- JMF Concrete Aggregate Workbook
CONC-501	Concrete Pavement Repair (CPR) Workbook
CONC-503	3U18 and 3U58M Quality Control Worksheet

Miscellaneous	
Form No.	**Form Name**
2410	Sample ID Card
02415	Inspection Report for Small Quantities (May be used for documentation or use another method to capture required documentation)
2403	Inspection Report for Small Quantities (May be used for documentation or use another method to capture required documentation)
	Certification Form for Type of Fence used (right side of page at website location below) www.dot.state.mn.us/materials/lab.html
P2501	Plastic Pipe Installation and Mandrel Test Results