Minnesota Department of Transportation Schedule of Materials Control (SMC) – Introduction Page

(Federal Aid, State Funds, County/Municipal Federal Aid Projects and State Aid Projects)

This schedule outlines the minimum sampling and testing required for most materials used in highway construction. Some items that are rarely used or materials of recent development are often covered by special provisions and may not be shown on the schedule. For more information regarding contract requirements for testing, please reference the "Standard Specifications for Construction", Specification 1603 Materials: Specifications, Samples, Tests, and Acceptance.

Laboratories performing acceptance tests for payment shall be accredited by the AASHTO Materials Reference Laboratory (AMRL) or a comparable accreditation program approved by MnDOT and the FHWA for all test procedures performed. Grading and Base materials are exempt from the accreditation requirement.

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, include the project number for which the material was originally approved.

If Forms 02415 and 2403 are referenced by form number within the Materials Control Schedule 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 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. www.dot.state.mn.us/materials.html

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.

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

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Certifications List

Material	SMC Section	Sub Section	Page	Certification Needed
All Base, Surface, and Granular Materials	I. Grading & Base	Many	7-13	Form G&B-104 (24346) include gradation, crushing, bitumen content, and quality test results
Plant Mixed Asphalt (PMA)	II. Bituminous	Many	14-20	All PMA from certified supplier www.dot.state.mn.us/materials/bituminous.html
Shingles	II. Bituminous		15	Contractor shall provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.
Bituminous Material	II. Bituminous		19	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		19	Use Emulsion for seal coat from a certified emulsified asphalt source.
Certified Ready Mix	IV. Concrete	Many	28-29	Contact Report from Ready-Mix Plant. All concrete from certified plant including a computerized certificate of compliance with each load.
Portland Cement Fly Ash Ground Granulated Blast Furnace Slag Cement Admixtures	IV. Concrete		27	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, flyash, and slag. The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.
Plastic for Curing	IV. Concrete		35	A Certificate of Compliance shall be submitted to the Project Engineer from the Manufacturer certifying that the plastic complies with AASHTO M171.
Aggregate for Low Slump Overlays	IV. Concrete		39	Aggregate pit numbers and 1 passing gradation result per fraction per source

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Needed
Profiler	IV. Concrete		38	Contractor provides MnDOT certified Inertial Profiler Results for bumps/dips and/or Areas of Localized Roughness for the entire project.
Aggregate for Concrete Pavement Repair	IV. Concrete		40	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Dowel Bar Retrofits	IV. Concrete		42	Aggregate pit numbers and 1 passing gradation result per fraction per source
Plant Stock & Landscape Materials	V: Landscaping etc.	2	43	Several certifications
Silt Fence	V: Landscaping etc.	5	44	Certificate of Compliance with MARV values
Flotation Silt Curtain	V: Landscaping etc.	6	44	Manufacturers' certification of compliance
Mulch Type 3	V: Landscaping etc.	12	44	Certified Vendor by Minnesota Crop Improvement Association must be tagged grain straw only on label.
Mulch Type 6 Wood Chips	V: Landscaping etc.	13	45	Emerald Ash Borer Compliance Agreement with the MDA
Seeds	V: Landscaping etc.	14	45	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Seeds - Native	V: Landscaping etc.	14	45	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Sod	V: Landscaping etc.	15	45	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.
Compost	V: Landscaping etc.	16	45	A/QPL with certified test reports.
Waterproofing material membrane waterproof system	VI: Chemical Items		46	Certificate and test results
Waterborne latex traffic marking paint	VI: Chemical Items		47	Certificate of Compliance
Epoxy traffic paint	VI: Chemical Items		47	Certificate of Compliance
Traffic marking paint	VI: Chemical Items		47	Certificate of Compliance
Non-traffic marking paint	VI: Chemical Items		47	Certificate of Compliance
Bridge structural steel paint	VI: Chemical Items		48	Certificate of Compliance
Exterior masonry paint	VI: Chemical Items		48	Certificate of Compliance
Noise wall stain	VI: Chemical Items		48	Certificate of Compliance
Drop-on glass beads	VI: Chemical Items		48	Certificate of Compliance
Pavement marking tape	VI: Chemical Items		48	Certificate of Compliance
Steel sign posts	VII: Metallic	2	50	Certification of domestic source if applicable under 1601
Posts for traffic or fence	VII: Metallic	3A	50	Certification of domestic source if applicable under 1601 For fence: Fence certification form (Optional)
Fence components	VII: Metallic	3B	50	Fence certification form (Optional)
Fence gates	VII: Metallic	3C	50	Fence certification form (Optional)
Fence barbed wire fabric	VII: Metallic	3D	50	Fence certification form (Optional)
Fence woven wire fabric	VII: Metallic	3E	51	Fence certification form (Optional)
Fence chain link wire fabric	VII: Metallic	3F	51	Fence certification form (Optional)
Reinforcing steel uncoated bars	VII: Metallic	5A	51	Certificate of Compliance & certified mill analysis
Reinforcing steel epoxy bars	VII: Metallic	5B	52	Inspected tag or Certificate of Compliance & certified mill analysis
Steel Fabric	VII: Metallic	5E	52	Certificate of Compliance

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Needed
Dowel Bars	VII: Metallic	5F	52	Certificate of Compliance
Pre or post tensioning strand	VII: Metallic	5G	53	Mill analysis
Anchor rods & Structural Fasteners	VII: Metallic	7, 8	53	Yearly MnDOT passing test report
Timber & lumber	VIII: Miscellaneous	1	57	Certified on invoice
Bearing pads	VIII: Miscellaneous	4	57	Certificate of Compliance
Corrugated metal pipe	IX: Geosynthetics & Pipe	1A	58	Certified on invoice
Corrugated metal structural plate	IX: Geosynthetics & Pipe	1B	58	Certified on invoice
Corrugated metal aluminum plate	IX: Geosynthetics & Pipe	1C	58	Fabricator's Certificate and guarantee
Concrete pipe & manholes reinforced	IX: Geosynthetics & Pipe	3A	58	Certified stamp and certification document
Precast box culverts	IX: Geosynthetics & Pipe	4A	59	Stamped & field inspection report
Prestressed beams & posts, etc	IX: Geosynthetics & Pipe	4B	59	Stamped & field inspection report
Manholes & catch basins	IX: Geosynthetics & Pipe	5	60	Certification document or stamped
Thermoplastic pipe ABS & PVC	IX: Geosynthetics & Pipe	7	60	Certificate of Compliance
Corrugated PE Pipe: Single wall – edge drains	IX: Geosynthetics & Pipe	8	60	Certificate of Compliance
Corrugated PE Pipe: dual wall – 12"-48"	IX: Geosynthetics & Pipe	13	61	Certificate of Compliance
Geotextile fabric	IX: Geosynthetics & Pipe	14	62	Manufacturers' Certification of compliance
Brick sewer concrete	X: Brick, Stone, Masonry	1B	63	Air content statement
Concrete masonry units	X: Brick, Stone, Masonry	2A	63	Air content statement
Light standards	XI: Electrical & Signal	1	64	Certificate of Compliance
Cable & Conductors	XI: Electrical & Signal	7	65	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	10	66	Electrical Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report.
Traffic signal systems	XI: Electrical & Signal	11	66	Traffic 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 7	Grading & Base – Specifications 2105, 2106, 2118, 2211, 2212, 2215, and 2221	Terry Beaudry Cary Efta Rebecca Embacher	(651) 366-5456 (651) 366-5421 (651) 366-5525
Website: www.dot.state.mn.us/materials/gradingandbase.html				
Part II Part II C	Page 14 Page 19	Bituminous - Spec. 2360 Asphalt Binder	John Garrity Jim McGraw Jason Szondy	(651) 366-5577 (651) 366-5548 (651) 366-5549
Website: www.dot.state.mn.us/materials/bituminous.html				
Part III	Page 21	Bituminous Specialty Items	Terry Beaudry Greg Schneider Tom Wood	(651) 366-5456 (651) 366-5403 (651) 366-5573
Part IV	Page 26	Concrete – Aggregates and Mix Design Concrete – Certified Ready Mix Concrete Concrete Paving Concrete – Bridges Concrete – Pavement Rehabilitation	Wendy Garr Wendy Garr Rob Golish Ron Mulvaney Gordy Bruhn	(651) 366-5423 (651) 366-5423 (651) 366-5576 (651) 366-5575 (651) 366-5523
Website: www.dot.state.mn.us/materials/concrete.html				
Part V	Page 43	Landscaping and Erosion Control Items Erosion Control Landscaping Wood Chips	 Lori Belz Scott Bradley Tina Markeson	 (651) 366-3607 (651) 366-4612 (651) 366-3619
Part VI	Page 46	Chemical Items	Jim McGraw Dave Iverson	(651) 366-5548 (651) 366-5550
Part VII	Page 49	Metallic Materials and Metal Products Sampling Test Results Bridge Structural Metals	 Steve Grover Laboratory Todd Niemann Barry Glassman	 (651) 366-5540 (651) 366-5560 (651) 366-4567 (651) 366-4568
Part VIII	Page 57	Miscellaneous Materials Sections 1thru 3 Section 4 Test Results	 Steve Grover Todd Niemann Barry Glassman Laboratory	 (651) 366-5540 (651) 366-4567 (651) 366-4568 (651) 366-5560
Part IX	Page 58	Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete Sections 1 thru 11, & 13 Section 12 Section 14 Test Results	 Steve Grover Rich Lamb Randy Tilseth Laboratory	 (651) 366-5540 (651) 366-5595 (651) 366-5451 (651) 366-5560
Part X	Page 63	Brick, Stone and Masonry Units/Modular Retaining Wall Blocks Sections 1, 2A,3, & 4 Section 2B Test Results	 Steve Grover Blake Nelson Laboratory	 (651) 366-5540 (651) 366-5599 (651) 366-5561
Part XI	Page 64	Electrical & Signal Sections 1, 8-11 Section 2, 4- 7 Section 3 Test Results	 Susan Zarling Steve Grover Wendy Garr Laboratory	 (651) 234-7052 (651) 366-5540 (651) 366-5423 (651) 366-5560

Form Index

Grading and Base	
Form No.	**Form Name**
G&B – 001 (02115-03)	Grading & Base Report
G&B – 002 (02154-02)	Random Sampling Acceptance
G&B – 101 (02402-03)	Sieve Analysis
G&B – 103 (02463)	Percent Crushing Report
G&B – 104 (24346)	Certificate of Aggregates & Granular Materials
G&B – 105 (21850)	Moisture Test
G&B – 203	(Table 2105-6, 2106-6) DCP Penetration Index Method
G&B – 204	(Table 2211-3) DCP Penetration Index Method
G&B – 205	2215 DCP Penetration Index Form – Full Depth Reclamation
G&B – 303 (24587-01)	Moisture - Density (Proctor) Test
G&B – 304 (02140-03)	Relative Density Test

Concrete	
Form No.	**Form Name**
2152	Concrete Batching Report
2162	Concrete Test Beam Data
2409	ID Card Concrete Test Cylinder
2448	Weekly Concrete Report
2449	Weekly Concrete Aggregate Report (QC/QA)
21412	Weekly Report of "Low Slump Concrete"
21763	Concrete Aggregate Worksheet
21764	Concrete Aggregate Worksheet JMF - Paving
21765	Concrete Aggregate Worksheet JMF
24143	Weekly Certified Ready-Mix Plant Report (Verification)
24300	ID Card Cement Samples
24308	ID Card Fly Ash Samples
24327	Field Core Report
	Concrete W/C Ratio Calculation Worksheet
	Incentive/Disincentive Smoothness Worksheet

Bituminous	
Form No.	**Form Name**
2413	Asphalt Sample Identification Card

Miscellaneous	
Form No.	**Form Name**
2410	Sample ID Card
02415	Inspection Report on …….. (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, see on right side of page, www.dot.state.mn.us/materials/lab.html

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing (See Note 1)		Minimum Companion (Split Lab) Sample (See Notes 2 & 3)		Form No. (See Note 5)
				Rate	**Size**	**Rate**	**Size**	
(a) 2118 (b) 2211 (c) 2221 or 2118 (d) Spec. Prov. or 2212	**1. Gradation** (a) Aggregate Surfacing (b) Aggregate Base (c) Aggregate Shoulders (d) Drainable Aggregate Base (OGAB & DSB)	3136, 3138, & Special Provisions	Production: 1/550 yd^3 (CV)	**<u>Random Sampling</u>** • < 280 yd^3 (CV) No tests Required • ≥ 280 yd^3 (CV) to < 1,100 yd^3 (CV) 1. Lot Size = Total Quantity 2. Divide lot into two equal sublots 3. Collect one random sample from each sublot 4. Average results to determine compliance • ≥ 1,100 yd^3 (CV) to < 5,500 yd^3 (CV) 1. Lot Size = Total Quantity 2. Divide Lot into four equal sublots 3. Collect one random sample from each sublot. 4. Average results to determine compliance • ≥ 5,500 yd^3 (CV) 1. #Lots = $\frac{\text{Total Bid Quantity}}{5{,}500}$ 2. Round # Lots up to next whole number 3. Lot Size = $\frac{\text{Total Bid Quantity}}{\text{\#Lots}}$ 4. Divide each Lot into four equal sublots. 5. Collect one random sample from each sublot. 6. Average results for each Lot to determine compliance.	60 lb	1 per project in this category. Obtain split sample from the 1st verification sample.	30 lb.	**G&B-001** (02115-03) **G&B-002** (02154-02) **G&B-101** (02402) **G&B-104** (24346-02)

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing (See note 1)		Minimum Companion (Split Lab) Sample (See Notes 2 & 3)		Form No. (See Note 5)
				Rate	Size	Rate	Size	
(e) 2105 2106	**1. Gradation**(Continued) (e) Granular Borrow Select Granular Borrow Modified Granular Borrow Stabilizing Aggregate	3149 & Special Provisions	1/10,000 yd^3 (CV)	1/20,000 yd^3 (CV)	30 lb.	1 per project in this category. Obtain split sample from the 1st verification sample	30 lb.	**G&B-001** (02115-03), **G&B-101** (02402-03) **G&B-104** (24346-02)
(f) Special Provisions & 2215	(f) Full Depth Reclamation (FDR)	Special Provisions & 3135	1/6,000 yd^2 (See Note 10)	1/12,000 yd^2	60 lb	NA		**G&B-001** (02115-03) **G&B-101** (02402-03)
(g) 2511	(g) Granular Filter	3601 & Special Provisions	1 per source before delivery on project	1 per source	300 lb	NA		**G&B-001** (02115-03) **G&B-101** (02402-03) **G&B-104** (24346-02)
(h) 2451 (i) 2451 (j) 2451 (k) 2451 (l) 2451 (m) 2502	(h) Granular Backfill (i) Aggregate Backfill (j) Granular Bedding (k) Aggregate Bedding (l) Coarse Filter Aggregate (m) Fine Filter Aggregate	3149 & Special Provisions	Two per source before delivery on project	1 per source	60 lb	NA		**G&B-001** (02115-03) **G&B-101** (02402-03) **G&B-104** (24346-02)

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing (See Note 1)		Minimum Companion (Split Lab) Sample (See Notes 2 & 3)		Form No. (See Note 5)
				Rate	Size	Rate	Size	
(a) 2211 (b) 2221	**2. Proctor Test** (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221, & Special Provisions		(See Note 8) **2005 Spec Book**: 1 per source **2013 Spec Book** 1 per source	50 lbs.	1 per project in this category. Obtain split sample from the 1st verification sample	25 lb.	**G&B-303** (24587-01)
(c) 2105 2106	(c) Embankment Soil, Granular Borrow, Select Granular Borrow, & Modified Granular Borrow	2105 & 2106	**2005 Spec Book**: **2013 Spec Book**: 1major soil type (See Notes 7 & 11)	**2005 & 2013 Spec Book :** For Specified Density: 1/major soil type. **2013 Spec Book:** For all other compaction requirements: One Contractor Companion/project				
(a) 2211 (b) 2221	**3. Specified Density Test (Sand Cone or other)** (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221 & Special Provisions		(See Note 8) 1/1,000 yd^3 (CV)		NA	NA	**G&B-001** (02115-03) **G&B-304** (02140-03)
(c) 2105 2106	(c) Embankment Soil, Granular Borrow, Select Granular Borrow & Modified Granular Borrow	2105, 2106 & Special Provisions		1/4,000 yd^3 (CV)				

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing Rate (See Note 1)	Form No. (See Note 5)
(a) 2211 (b) 2221	**4. Dynamic Cone Penetration (DCP) Index Method** (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221, & Special Provisions		1 DCP test/500 yd^3(CV)	**G&B-001** (02115-03) **G&B-204** (02170-02)
(c) 2215	(c) Full Depth Reclamation (FDR)	3135 & Special Provisions		1 DCP test/3,000 yd^2	**G&B-001** (02115-03) **G&B-205**
(d) 2105 2106	(d) Granular Borrow Select Granular Borrow & Modified Granular Borrow and all other granular materials.	2105, 2106, 3149 & Special Provisions		**Roadway Embankment:** One DCP test/2,000 yd^3 (CV). **Structure Trenches:** One DCP test/2,000 yd^3 (CV), with a minimum of one DCP test per 250 feet of each structure length. Test entire layer.	**G&B-001** (02115-03) **G&B-203** (02170-02)
(a) 2118 (b) 2211 (c) 2212 (d) 2221	**5. Moisture Content Test During Compaction** (See Note 9) (a) Aggregate Surfacing (b) Aggregate Base (c) Drainable Aggregate Base (d) Shoulder Base Aggregate	2211, 2221, & Special Provisions	**2005 Spec Book** — **2013 Spec Book** 1/1,000 yd^3	**2005 Spec book:** 1/1,000 yd^3 or 10 tests whichever is less **2013 Spec Book:** One Contractor Companion/project	**G&B-001** (02115-03) **G&B-105** (21850-02)
(e) 2215	(e) Full Depth Reclamation (See Note 9)	2215 or Special Provisions	**2005 Spec Book** — **2013 Spec Book** 1/6,000 yd^2	**2005 Spec book:** 1/6,000 yd^2 **2013 Spec Book:** —	
(f) 2105 2106	(f) All embankment materials (See Note 9)	2105, 2106 & Special Provisions	**2005 Spec Book** — **2013 Spec Book** 1/10,000 yd^3	**2005 Spec Book** 1/10,000 yd^3 **2013 Spec Book** One Contractor Companion/project	

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing (See Note 4)		Form No. (See Note 5)
				Rate	Size	
2105 2106 2118 2211 2212 2221	**6. Percent Crushing**	3136, 3138, 3149 & Special Provisions	1/Day	2 per source	30 lb.	**G&B-103** (02463) **G&B-104** (24346-02)
2105 2106 2118 2206 2211 2212 2221 2451 2502	**7. Aggregate Quality** (LAR, Insoluble Residue, Lithological Exam & Bitumen Content)		1/source (See Note 6)			**G&B-104** (24346-02)
2215	**8. Depth Check** Full Depth Reclamation (FDR)	3135 or Special Provisions	1/1000 feet	1/3000 feet		

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

General Notes: Sampling and Testing Procedures are found in the Grading and Base Manual in Section 5-692.200. Obtain all gradation, quality and crushing samples after spreading 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 and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html**)**

Note 1: Verification gradation samples are not required for 280 yd^3 (CV) (500 tons) or less. Report small quantities on Form 02415 or 2403. http://www.dot.state.mn.us/const/tools/forms.html.

Note 2: Perform Companion testing using different equipment and personnel from the Verification sample. Obtain the Companion sample as a split sample from the first Agency Verification sample, and include the gradation results on the sample card. Laboratories with AMRL accreditation that are performing the Agency Verification testing are not required to submit companion samples.

Note 3: Companion gradation and proctor, and Verification crushing and aggregate quality samples are not required for 550 yd^3 (CV) (1,000 tons) or less.

Note 4:

- Carbonate aggregates require 50 lb. samples for lab testing.
- Submit the initial aggregate quality and crushing sample from the first day's production.
- The crushing test will not be required when the material is crushed from a quarry.
- A second test is required, when the first test fails. Average both tests to determined compliance, when two tests are performed.
- Not all quality and crushing tests are required for each material, see specifications
- Use the table below as a **guideline**, **determination of specific required tests is through the Specifications and/or the Special Provisions.**

Note 5: Tests may be reported on Grading and Base forms or on MnDOT LIMs Reports. Forms are available on the Grading & Base website at: http://www.dot.state.mn.us/materials/gradingandbase.html

Note 6: Use the Centrifuge Method (MnDOT Lab. Manual Method 1852) to determine bitumen content.

Note 7: Major soil types are defined in the Triaxial Chart located in the Grading and Base Manual.

Note 8: Required only for specified density.

Note 9: Required during Compaction. For Quality Compaction of Shoulder Surfacing Aggregate (2118 or 2221), the Engineer may replace the moisture testing requirement with time stamped photo documentation of water being applied.

Note 10: Provide gradation test results to the Engineer within the first 500 feet (150 m) of production and within 500 feet (150 m) after a failing gradation.

Note 11: The Contractor may use a one point Proctor, or the estimated optimum moisture content formula (Form G&B- 305) to determine the optimum moisture.

I. Grading and Base Construction Items 2005 and 2013 Spec Book (www.dot.state.mn.us/materials/gradingandbase.html)

	Table: Guidelines for Required Crushing and Aggregate Quality Tests				
Material	**Crushing**	**Bitumen Content**	**LAR**	**Insoluble Residue**	**Lithological Exam & Shale Float Test**
3136 Drainable Bases	Yes. Not required for quarried sources.	Not applicable	Yes	Yes, if source from a carbonate quarry	Yes, when not from quarried source.
3138 Aggregate for Surface and Base	Yes for Class 5, 5Q and 6. Test waived if material contains recycled at twice the minimum crushing requirement. Not required for quarried sources.	Yes, if it contains Bitumen.	Yes, if source is carbonate quarry and does not contain bitumen.	Yes, if source from a carbonate quarry, and does not contain bitumen.	Yes for Class 3, 4, 5, 5Q and 6, when not from quarried rock, and does not contain bitumen.
3149 Granular Material *	Yes for Stabilizing Aggregate, Fine Aggregate Bedding and Medium Filter Aggregate. Test waived if material contains recycled at twice the minimum crushing requirement. Not required for quarried sources.	Yes, if it contains Bitumen	Not applicable	Yes, if source from a carbonate quarry, and does not contain bitumen	Yes for Medium Filter Aggregate
* Note for 3149.2D.2 Granular Materials - Structural Backfill, perform all tests required of 3137.2B3, shear angle test (AASHTO T236) and Proctor.					

Grading and Base Conversion from Volume (CV) to Weight

If possible, always perform a proctor for the material in question to obtain a conversion factor.

Only use the following conversion factor for materials meeting specifications 3138 or 3149 Stabilizing Aggregate. Material may be composed of crushed limestone, granite, gneiss, quartzite, recycled materials or natural gravel. **Do not** use the conversion factor for crushed basalt, taconite, or other heavy or light-weight aggregates. For other materials or gradations contact the Grading and Base Unit.

To convert from volume to weight use the following: **1 yd^3 (CV) = 1.8 tons.**

See the Grading and Base Manual section .430 for further explanation.

II. Bituminous Construction Items for Specification 2360

Note: Projects with bituminous tonnage less than or equal to 300 tons (272 metric 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 Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor Contractor (mixture) Agency (density cores)	Contractor	Agency
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.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's Verification sample provided to the Contractor. The Contractor is required to test this sample. The results shall be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

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. (35 kg)
Minus #4 aggregate for quality testing	35 lb. (15 kg)
Bituminous mixture plus 2 Gyratory specimens for volumetric testing	80 lb. (35 kg)
Bituminous mixture for TSR testing (option A)	80 lb. (35 kg)
Bituminous mixture for TSR testing plus 6 Gyratory specimens (option B)	20 lb. (10 kg)
Mineral filler.	2 lb (1 kg)
RAP for Quality Testing	80 lb (35 kg)
RAS (shingles) for Gradation and Quality Testing	10 lb (5 kg)
Asphalt Binder	1 qt (1L)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency 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 2360.2E5a(3). 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. Agency has the option to monitor sampling. Submits to the Bituminous Engineer or the District Materials Engineer one (1) sample of each non-asphaltic aggregate type or class per source per year. 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)	2360	One (1) sample per shipment of 50 tons (45 metric 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 qt. (1 L). Sample first shipment of each type of material, then submit one sample per 250,000 gal. (1,000 m3) (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 Agency 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. (15 kg)
	Plus #4 Aggregate Type for Quality Testing	80 lb. (35 kg)for each source
	Minus #4 Aggregate Type for Quality Testing	35 lb. (15 kg) for each source
	RAP material for Quality Testing	80 lb. (35 kg) for each source
	RAS (Shingles) for Processed Gradation and Quality Testing	10 lb. (5 kg)
	Mixture Properties (QC/QA) 3 full 6" by 12" cylinder molds for QA	65 lb. (30 kg)
	TSR (QC/QA) 4 full 6” by 12” cylinder molds for QA	90 lb. (40 kg)
	Aggregate Specific Gravity (QC/QA)	90 lb. (40 kg)
	Asphalt Binder (QA)	1 qt (1 L)
	Emulsified Asphalt (QA)	½ gal (2 L)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Aggregate Quality Testing Including aggregate specific gravity (QA Only)	2360		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.	Lab report
2360	Moisture Content in Mixture (QC/QA) Lab Manual 1855	2360	Sample and test as directed by the Engineer.		Test Summary Sheet (TSS)

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

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency 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. See Note #1, Note #2 & Note #4. A computer file of the plant's control settings is required every 20 minutes of production.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample 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. 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). The Agency reviews the computer files of the plant's control settings. REMARKS: See Note # 3 & Note #7	TSS
2360	Mixture Properties (QC/QA, Verification*) Maximum Specific Gravity Lab Manual 1807	2360	Contractor performs test 1807 REMARKS: See Note #1, Note #2, & Note #4.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample 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. 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: Note # 3 & Note #7	TSS
2360	Mixture Properties (QC/QA, Verification*) Gyratory Bulk Specific Gravity - 2 Specimen Average, Lab Manual 1806, 1820	2360	Contractor performs test 1806 REMARKS: See Note #1, Note #2, & Note #6.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample 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. 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 Note #3 & Note #7.	TSS

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

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
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 Agency 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). REMARKS: See Note #1, Note #2, Note #4, Note #5, & Note #6. The production start-up testing rates for the CAA and FAA is 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 mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample 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. 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 Note # 3 & Note #7.	TSS
2360	Core Density and Thickness Lab manual 1810	2360	Contractor cuts two 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 Agency 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 (Agency 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 Agency companion cores transport them to the Agency 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: Note #3 & Note #6.	Core Density Worksheet Core Density Incentive/ Disincentive worksheet.
2360	Tensile Strength Ratio (T.S.R.) (QC/QA) Lab Manual 1813	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

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)	1qt (1 L) Metal can with pressure fit lid
Emulsified Asphalt (QA)	½ gal (2 L) plastic

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency 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. During Asphalt Mixture Production Obtain asphalt binder samples from a sampling valve located between the pump and the drum. Sample each type of asphalt binder used in mixture production after 50 tons of mixture has been produced, then sample at a rate of one per 250,000 gal [1,000,000 L]. 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 one L (1 qt) steel container. The Inspector will monitor the sampling the Contractor performs.	Asphalt Supplier Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory. During Asphalt Mixture Production Observe contractor personnel taking sample from sampling valve and submit to MnDOT Chem ical Lab	2413 Asphalt Sample Identification Card
2201 2355 2356 2357 2514	Emulsified Asphalt (QA only)	3151.2	QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program. Tack Coat During mixture production the Contractor will sample first shipment, then submit one sample per 50,000 gal (200,000 L). Sample emulsified asphalt in clean ½ gal (2 L) plastic container with wide screw top and send to MnDOT Chemical Lab within 7 days of sampling.. Sample all emulsified asphalt from the distributor.	Asphalt Supplier Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory. Tack Coat Observe contractor personnel taking sample from the distributor and submit to MnDOT Chemical Lab.	2413 Asphalt Sample Identification Card

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

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2357 2358 2514	Cutback Asphalt (QA only)	3151.2	QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program. <u>Tack Coat</u> During mixture production the Contractor will sample first shipment, then submit one sample per 50,000 gal (200,000 L). Sample emulsified asphalt in clean ½ gal (2 L) plastic container with wide screw top and send to MnDOT Chemical Lab within 7 days of sampling.. Sample all emulsified asphalt from the distributor.	<u>Asphalt Supplier</u> Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory. <u>Tack Coat</u> Observe contractor personnel taking sample from the distributor. Cutback Asphalt should only be used in cold temperature applications with the Engineer's approval. Contact Bituminous Engineering Unit for cold temperature application guidelines.	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 MnDOT 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 test/ 500 tons	
Divide daily tonnage by 1000 and round up to next whole number		1 test/ 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 the MnDOT Bituminous Manual Section 5-693.7 Table A or 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:

- **2350 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB)**
- **2354 Micro-Surfacing**
- **2355 Bituminous Fog Seal**
- **2356 Bituminous Seal Coat**
- **2356 Otta Seal**
- **2356 Ultra-Thin Bonded Wearing Course (UTBWC)**
- **2357 Bituminous Tack Coat**
- **2360 Stone Matrix Asphalt (SMA)**

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 Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor Contractor (mixture) Agency (density cores)	Contractor	Agency
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.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's Verification sample provided to the Contractor. The Contractor is required to test this sample. The results shall be used as part of the QC program.	Agency	Agency	Contractor
IAST	The Independent Assurance Sampling and Testing assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

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

Pay Item Number	Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form No.
(a) 2350 (b) 2350	**1. Mix Design (Pre-Production)** (a) PASSRC (b) PASB	2350	Complete 1 Job Mix Formula (gradation blend only) per mix Submit to agency:100 lbs each coarse agg., 35 lbs each fine agg. & 4 qt. asphalt binder	Agency Performs Mix Design	Approved Mix Design Report
(c) 2354	(c) Micro-Surfacing	2354	Complete 1 mix design per aggregate source. See specification or special provision. Submit to Agency: 150 lbs aggregate	Review Submitted Mix Design (See Note 1)	Approved Mix Design Report
(d) 2356	(d) Bituminous Seal Coat	2356	At least two weeks before beginning construction complete 1 design per mix and provide information to Engineer. See specification or special provision. Submit to Agency: 150 lbs aggregate	Review Submitted Mix Design (See Note 1)	
(e) 2356	(e) UTBWC	2356 UTBWC	Complete and submit 1design per mix	Review Submitted Mix Design	Approved Mix Design Report
(f) 2360	(f) SMA	2360 SMA	Complete 1 design per mix Submit to Agency: 80 lb. (35 kg) - bituminous mixture plus 6 Gyratory specimens for TSR testing. 150lbs +4 aggregate from JMF blend for VCA 80 lbs each coarse agg. & 30 lbs each fine agg for quality testing	Review & verify Submitted Mix Design Test as directed by the Engineer	Approved Mix Design Report
(a) 2350 (b) 2350	**2.Production Gradation** (a) PASSRC (b) PASB Lab manual 1202, 1203	2350	One per 1,000 ton with a minimum of one per day Submit to Agency: 35 lbs Note # 2	1/day	Test Report
(c) 2354	(c) Micro-Surfacing Lab manual 1202, 1203	2354	Stockpile: 1/1,500 tons (min. 1/ day) Machine Hopper: 1/500 tons (min. 1/day) Submit to Agency: 30 lbs	1/1500Ton or min 1 per project whichever is greater.	Test Report

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

Pay Item Number	Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form No.
(d) 2356 (e) 2356	(d) Bituminous Seal Coat (e) Otta Seal Lab manual 1202, 1203	2356	Stockpile: 1/1,500 tons (min. 1/ day) Chip Spreader Hopper: 1/day Submit to Agency : 30 lbs from Hopper	1/day	Test Report
(a) 2350 (b) 2350	**3. Production % Crushing (CAA)** (a) PASSRC (b) PASB Lab manual 1214	2350	One per 1,000 with a minimum one per day Submit to Agency: 35 lbs from Belt	1/day	Test Report
(a) 2354	**4. Moisture (In Aggregate)** (a)Micro-Surfacing Grading & Base manual, 5-692.245.B	2354	Machine Hopper: 1/500 tons (min. 3/day) Submit to Agency: 2 lbs	1/day	Test Report
(a) 2354	**5. Sand Equivalence** (a) Micro-Surfacing AASHTO T 176	2354	Stockpile or Machine Hopper: 1/500 tons (min. 1/day) Submit to Agency: 25 lbs	1/day	Test Report
(a)2356	**6. Flakiness Index** (a) Bituminous Seal Coat Lab Manual 1223	2356	Sample taken from first load on fist day Submit to Agency: 30 lbs	See Note 1	Test Report
(a) 2356	**7. Bituminous Mixture Tests** (a) UTBWC Lab Manual 1203, 1807, 1852, 1853, 1854	2356 UTBWC	Tests: % AC, Gradation, Max Gravity, Adjusted AFT Rate: (1/300 tons, min. 1 per day) Note #3: Submit to Agency:20 lbs (1 cylinder from truck box)	1 per day	TSS

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

Pay Item Number	Test type	Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form
(b) 2350	(b) PASSRC, PASB Bit Manual	3151	Test: Asphalt spot check Rate: minimum one per day		Test Report
c) 2360	(c) SMA Lab M 1203,1204, 1205, 1211, 1214, 1806, 1807, 1808, 1813, 1853, 1854, 1855, AI SP-2 AASHTO T305	2360 SMA	**Tests:** % AC, Gradation, Max Gravity, Bulk Gravity, Voids, VMA, CAA, Draindown, , voids in coarse aggregate (VCA) fines/effective asphalt. **Rate:** (1/1000 tons, min. 1 per day) Aggregate sp gravity, mix moisture content to be tested as directed by the Engineer See Note: #3 Submit companion 1 per day to agency: 65 lb. (30 kg) 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 Note # 3 & Note #4	TSS
(b) 2356	**8. Asphalt Binder** (b) UTBWC	2356 UTBWC 3151	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory. Asphalt Binder: First load, then 1/250,000 gal. 1 qt Emulsified Asphalt: First load, then 1/50,000 gal. ½ gal*	Observe contractor personnel taking sample from sampling valve and submit to MnDOT Chemical Lab.	Test Report
(c) 2354 (d) 2356 (e) 2356 (f) 2357	(c) Micro-Surfacing (d) Bituminous Seal Coat (e) Otta Seal (f) Bituminous Tack Coat	2354, 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 / 50,000 gal. ½ gal*	Test Report
(g) 2360	(g) PASSRC, PASB (h) SMA	3151, 2360 SMA	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory. Asphalt Binder (1 qt): First load, then 1/250,000 gal. Note: SMA to be test as in Section C. BITUMINOUS MATERIALS for Specification 2360	Observe contractor personnel taking sample and submit to MnDOT Chemical Lab. Note: SMA to be test as in Section C. BITUMINOUS MATERIALS for Specification 2360.	Test Report

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

Pay Item Number	Test type	Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form
(a) 2354	**9. Asphalt Binder Application Rate** (a) Micro-Surfacing	2354	Verify Application rate 3/day	Verify Application rate 1/day	
(b) 2355 (c) 2356 (d) 2356 (e) 2357	(b) Fog Seal (c) Bituminous Seal Coat (d) Otta Seal (e) Bit Tack Coat	2355, 2356, 2357	Verify Application rate 1/day	Verify Application rate 1/day	
2399	**10. Inertial Profiler**	2399	Pass Annual Certification at MNROAD	Perform a side by side comparison with the MnDOT IP once a year.	Profile Summary

***Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 days of sampling.**
Note 1: Contractor submits samples to Agency. Agency will test at their discretion, based upon prior experience with submitted aggregate.
Note 2: Run test on gradation sample taken from aggregate belt
Note 3: TSR testing on production mixture is at the discretion of the Engineer.
Note 4: Agency is not required to run draindown testing on QA/Verification samples.

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

The testing rates shown in this Schedule of Materials Control are minimums. All samples shall be taken in a random manner using an appropriate number generator. Take as many tests as necessary to ensure quality concrete. **All field samples shall be taken at the point of placement unless otherwise allowed by the Engineer.**

It is recommended that the Agency Plant Monitor be present during critical pours, such as superstructure or paving concrete (i.e. 3Y33, 3Y36, 3Y46, 3A21).

If any field test fails, reject the concrete or if the Producer makes adjustments to the load to meet requirements, record the adjustments on the Certificate of Compliance and the Weekly Concrete Report. Retest the load and record the adjusted test results. Make sure the next load is tested before it gets into the work.

If batching adjustments are made at the plant, test the adjusted load, before it gets into the work. Continue to test the concrete when test results are inconsistent or marginal.

The first load of concrete for any pour must have passing air content and slump results, prior to placing.

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 deductions recommendations.

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

Should circumstances arise on a project which makes the testing rate impractical, contact the Concrete Engineering Unit.

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

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.

Sample Sizes:

Cementitious: 5 lb (2 kg)

Admixture: 1/2 pt. (0.25 L) Producer obtains samples from dispensing tubes. Store samples in plastic container.

Water: 1 gal (3.5 L) Store sample in a clean glass or plastic container.

Pay Item No.	Material	Spec. No.	Minimum Required Sampling Rate for Laboratory Testing	Form No.
2301 2302 2401 2405 2411 2412 2422 2452 2461 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Portland Cement Slag Blended Cement	3101 3102 3103	For certified ready-mix and concrete paving: 1 sample when the plant is certified. Take an additional sample: 1) At 6 months, if producing Agency concrete, 2) If the plant changes sources, or 3) As the Contract requires. For precast concrete: 1 sample every 3 months during Agency production The Producer obtains and stores the sample in a sealed container provided by the Agency, and includes the supplier's delivery invoice from which the sample is obtained. Take additional samples as directed by the Concrete Engineer	24300 ID Card Cement Samples
	Fly Ash	3115		24308 ID Card Fly Ash Samples
	Admixtures (Accelerating, Retarding, Water-Reducing, Air-Entraining, etc.)	3113	For all concrete: 1 sample when the plant is certified. Take additional samples: 1) At 3 month intervals during Agency production, 2) If the plant changes sources, or 3) As the Contract requires. The Producer obtains and stores the sample in a sealed container provided by the Agency. Take additional samples as directed by the Concrete Engineer	2410 Sample ID Card
	Water	3906	1 sample from any questionable source	2410 Sample ID Card

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

Certified Ready-Mix - Concrete Plant Production

Remarks:

(1) Mix design is provided by MnDOT unless otherwise specified in the Contract.
(2) All gradation and quality tests require companion samples. Samples taken at location identified on Contact Report located at plant.
(3) Perform Quality testing as directed by the Concrete Engineer.
(4) Record all gradation weights in metric.

Minimum Sample Sizes:

Gradation Test:

3/4" Plus (+19 mm)	25 lb. (12 kg)
3/4" Minus (–19 mm)	10 lb. (5 kg)
CA-70	6 lb. (2.5 kg)
CA-80, Sand	1.1 lb. (500 g)

Moisture Test:

Coarse Aggregate	2000 g
Fine Aggregate	500 g

Quality Sample Size for Lab Submittal:

3/4" Plus (+19 mm)	50 lb. (24 kg)
3/4" Minus (–19 mm)	30 lb. (15 kg)
Fine Aggregate	30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2302 2401 2405 2411 2412 2422 2452 2461 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Gradation Testing (QC/QA) (5-694.145 and 5-694.148)	2461 3126 3137	When over 20 yd^3 (m^3) of Agency concrete produced per day: **Coarse:** 1 per 200 yd^3 (m^3) **Fine:** 1 per 200 yd^3 (m^3) Passing aggregate gradations are required prior to the start of concrete production each day. Performing testing on representative material at the end of the most recent day of production is allowed. Washing the fine aggregate gradation (QC) sample is not required when the result on the -75µm (#200) sieve of the unwashed sample is less than 1.0%, Hold QA (QC companion) samples until they are picked up by the Agency monitor. Discard after 14 calendar days if not picked up. **For Contractor Mix Designs utilizing an approved JMF:** 1 per 400 yd^3 (m^3) or completed every 4 hours, whichever results in the higher sampling rate.	None	21763 Concrete Aggregate Worksheet (QC/QA) 2449 Weekly Concrete Aggregate Report 21765 Concrete Aggregate Worksheet JMF (QC/QA)

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	Agency Testing	Form No.
2302 2401 2405 2411 2412 2422 2452 2461 2506 2511 2514 2519 2521 2531 2533 2545 2550 2554 2557 2564 2565	Gradation Testing (Verification/ Verification Companion) (5-694.145 and 5-694.148)	2461 3126 3137	Test the Verification Companion sample. Complete on the day the sample was taken. Wash all fine aggregate Verification Companion samples.	**Coarse and Fine:** 1 Verification sample per week when Agency production is 1 or 2 days per week. 2 Verification samples per week when Agency production is 3 or more days per week. **For small quantities:** When less than **25 yd^3 (m^3)** of Agency concrete is produced **per week,** Verification samples are not required Include verification companion results on Sample ID Card.	2449 Weekly Concrete Aggregate Report 24143 Weekly Certified Ready-Mix Plant Report (Verification)
	Quality Testing including Coarse Aggregate Testing on - #200 (-75µm) (5-694.146)	3126 3137	Test at Contractor's Discretion	1 test each fraction per month Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.	2410 Sample ID Card
	Aggregate Moisture Testing (QC) (5-694.142)	2461	**When over 20 yd^3 (m^3) of Agency concrete produced per day:** **Coarse and Fine:** 1 per 200 yd^3 (m^3) or completed every 4 hours, whichever results in the higher sampling rate. - Complete the initial moisture content and adjust the batch water prior to the start of concrete production each day. - If weather conditions allow, performing moisture testing on representative material at the end of production the prior evening is allowed. In this event, the four-hour rate will commence with the first pour of the day, regardless if it is placed in Agency or private work.	None	2152 Concrete Batching Report

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

Concrete Pavement - Concrete Plant Production

Remarks:

(1) Mix Design is Contractor's responsibility with review by MnDOT unless otherwise specified in the Contract.

(2) Use Certified Ready-Mix - Concrete Plant Production testing rates schedule when:

a) The entire concrete paving project is < 3,500 cu. yd (2,900 m^3)

b) When a secondary plant is used to provide minor work.

(3) When w/c incentives apply according to 2301:

a) Contractor QC Technician and Agency Plant Monitor are required to be present during the entire pour. **If w/c incentives do not apply, the Agency Plant Monitor shall monitor as necessary to ensure compliance with the requirements of the Contract.**

b) A certified ready-mix plant shall be **dedicated (provides concrete only to the concrete paving project)**.

(4) All gradation samples shall be taken in the presence of the Agency, unless otherwise authorized by the Engineer. All samples shall be taken off the belt leading to the weigh hopper unless otherwise approved by the Engineer. All gradation and quality tests require companion samples.

(5) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:		**Moisture Test:**		**Quality Sample Size for Lab Submittal:**		**75µm (#200) Coarse Aggregate Sample Size**	
3/4" Plus (+19 mm)	25 lb. (12 kg)	Coarse Aggregate	2000 g	3/4" Plus (+19 mm)	50 lb. (24 kg)	3/4" Plus (+19 mm)	10 lb. (5000 g)
3/4" Minus (–19 mm)	10 lb. (5 kg)	Fine Aggregate	500 g	3/4" Minus (–19 mm)	30 lb. (15 kg)	3/4" Minus (–19 mm)	6 lb. (2500 g)
CA-70	6 lb. (2.5 kg)			Fine Aggregate	30 lb. (15 kg)		
CA-80, Sand	1.1 lb. (500 g)						

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing		Agency Testing		Form No.
2301	Gradation Testing (QC/QA) (5-694.145 and 5-694.148)	3126 3137	**For a concrete paving batch plant:** **When over 250 yd^3 (m^3) is produced per day:** 1 per 1500 yd^3 (m^3) or completed 1 per ½ day, whichever results in the higher sampling rate.	**For a certified ready-mix plant:** **When over 20 yd^3 (m^3) is produced per day:** 1 per 400 yd^3 (m^3) or completed every 4 hours, whichever results in the higher sampling rate.	Test the first 4 QA samples of production each time the Contractor mobilizes the plant or changes aggregate sources. **For a concrete paving batch plant:** 1 per day on randomly selected samples thereafter.	**For a certified ready-mix plant:** 1 per 1000 yd^3 (m^3) or 1 per week, whichever results in higher sampling rate on randomly selected samples thereafter.	21764 Concrete Aggregate Worksheet JMF Well-graded Concrete Aggregate Worksheet
			Performing testing on representative material at the end of the most recent day of production is allowed. **If well-graded aggregate incentives apply:** Use the Contractor's gradation results for well-graded aggregate incentive calculations as verified by Agency testing		Identify the gradation samples with "QA Gradation" on the Sample ID Card and include the JMF Number and the QC Gradation results. **If Coarse Aggregate Quality Incentive/Disincentives apply:** The Agency may also use the QA gradation sample for the Coarse Aggregate Quality incentive/disincentive testing. In this case, notify the Producer/Contractor to double the QC/QA gradation sample size.		

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		Agency Testing		Form No.
2301	Coarse Aggregate Testing on - #200 (-75µm) (QC/QA) (5-694.146)	3137	Test the first sample and then at least 1 of the next 3 samples 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. 1 test per day thereafter **Test these samples at the plant**.		**For a concrete paving batch plant:** 1 randomly selected 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. 1 test per week thereafter **Test these samples at the plant.**	**For a certified ready-mix plant:** 1 randomly selected 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. 1 per 1000 yd^3 (m^3) or 1 per week, whichever results in the higher sampling rate on randomly selected samples thereafter.	21764 Concrete Aggregate Worksheet JMF - Paving
	Aggregate Moisture Testing (QC/Verification) **(5-694.142)**		**For a concrete paving batch plant:** **If w/c incentives do not apply:** 1 per 1000 yd^3 (m^3) or completed every 4 hours, whichever results in the higher sampling rate**.**	**For a certified ready-mix plant:** **If w/c incentives do not apply:** 1 per 200 yd^3 (m^3) or completed every 4 hours, whichever results in the higher sampling rate	**For a concrete paving batch plant:** **If w/c incentives apply:** 1 per 1000 yd^3 (m^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 (m^3).	**For a certified ready-mix plant:** **If w/c incentives apply:** 1 per 200 yd^3 (m^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 (m^3).	Concrete W/C Ratio Calculation Worksheet
			Complete the initial moisture content and adjust the batch water prior to the start of concrete production each day. If weather conditions allow, performing moisture testing on representative material at the end of production the prior evening is allowed.		**If w/c incentives apply:** Use aggregate moisture results for determining the water content to calculate the w/c ratio incentive/disincentive. **Do not leave samples unattended.**		

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**	**Agency Testing**		**Form No.**
2301	Water Content Verification Testing **(Microwave Oven Verification) (5-694.532)**	2301	Obtain the plastic concrete sample at the plant.	**If w/c incentives apply:** Microwave oven verification testing to verify the w/c ratio is completed in conjunction with Agency aggregate moisture testing. **Do not leave samples unattended.**		Concrete W/C Ratio Calculation Worksheet
				<u>For a concrete paving batch plant:</u> Take initial sample for microwave oven verification testing within the first 250 yd^3 (m^3). At least one additional verification test should be taken if more than 1,000 yd^3 (m^3) is produced in a day.	**<u>For a certified ready-mix plant:</u>** Take initial sample for microwave oven verification testing within the first 100 yd^3 (m^3). At least one additional verification test should be taken if more than 400 yd^3 (m^3) is produced in a day.	
	Unit Weight (QC) (5-694.542)		Test one load of concrete per day at the plant.	None		
	Air Content for Type 3 Concrete (QC) (5-694.541)	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.)					
Pay Item No.	**Test Type**	**Spec. No.**	**Producer/Contractor Testing**	**Agency Testing**	**Form No.**
2301	Quality Testing including Coarse Aggregate Testing on - #200 (-75µm)	3126 3137	**Prior to concrete production:** Test the Agency's pre-production sample at the Contractor's discretion **During concrete production:** Test the -#200 (-75µm) on the Quality companion sample the day it was sampled. All other testing is at the Contractor's discretion	**Prior to concrete production for the primary concrete plant:** 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 (-75µm) test may be performed at the lab instead of at the plant at the discretion of the Engineer. **If the Entire Project is < 3,500 cu. yd (2,900 m^3), pre-production sampling is not required.** **During concrete production:** 1 randomly selected test each fraction every 20,000 yd^3 (m^3) of production. Split the Quality sample 4 ways: 1) Provide 2 quarters of the sample to the Producer/Contractor. 2) Test the -#200 (-75µm) on the quality sample <u>at the plant</u> the day it was sampled. 3) Submit the remaining sample to the lab for quality testing including testing on the -#200 (-75µm) sieve. Identify quality samples with a "Q" and record the QC and QA -#200 (-75µm) test results on the Sample ID Card. Identify the Quality Companion samples with a "Q". **See additional requirements for first sand quality sample under ASR Testing.**	2410 Sample ID Card
2301	Alkali Silica Reactivity (ASR) Testing	2301	None	1 per paving project per sand source Provide one 5 lb sample of: 1) cement, and 2) supplementary cementitious material (fly ash or slag), 3) with the first sand quality. Write "Project Specific ASR Testing" on all 3 Sample ID cards. **If the Entire Project is < 3,500 cu. yd (2,900 m^3), ASR testing is not required.**	2410 Sample ID Card 24300 ID Card Cement Samples 24308 ID Card Fly Ash Samples

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	Agency Testing	Form No.
2301	Coarse Aggregate Quality Testing for Incentive/ Disincentive	3137	Test at Contractor's discretion	**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:	2410 Sample ID Card Coarse Aggregate Quality Incentive/ Disincentive Worksheet

Coarse Aggregate Quality Incentive/Disincentive Sampling Rates	
Plan Concrete cu. yd [cu. m]	Samples per fraction (n)
3,500 – 7,500 [2,900 – 6,250]	3
7,501 – 10,000 [6,251 – 8,500]	5
10,001 – 25,000 [8,501 – 21,000]	10
25,001 – 50,000 [21,001 – 42,000]	15
> 50,000 [42,000]	20

Identify incentive samples on the Sample ID Card with "I/D"

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.)

Sample Sizes:

Joint Materials:

Hot Poured Elastomeric: 5 lb. (2.26 kg) Take samples from application wand, store in steel (1 gal) container.

Silicone Joint Sealer: 1 pt. (0.5 L) Store sample in steel container.

Preformed Elastomeric: 6 ft (2 m)

Preformed: 2 ft^2(0.25 m^2)

Curing Materials:

Burlap: 1 yd^2 (m^2)

Paper and Plastic: 2 ft^2(0.25 m^2)

Membrane Compound 1 qt. (1 L) If sampling is required, materials must be thoroughly stirred or agitated immediately prior to taking sample. Store sample in steel container and cover immediately.

Pay Item No.	Material	Spec. No.	Minimum Required Field Sampling Rate	Form No.
2301 2302 2401 2411 2514 2521 2531	Preformed	3702	Visual Inspection	2410 Sample ID Card
2301 2302 2401	Preformed Elastomeric Type	3721	1 per lot Only joint materials from qualified sources are allowed. The most current lists can be found at www.dot.state.mn.us/products	
	Silicone Joint Sealer	3722		
	Hot Poured Elastomeric Type	3723 3725		
2301 2302 2401 2411 2514 2520 2521 2531 2533	Burlap	3751	Visual Inspection	
	Paper	3752	Visual Inspection - Must be white opaque	
	Membrane Curing Compound	3754 3754AMS 3755	Visual Inspection – Use only Pre-Approved Curing Compounds. Refer to the approved products list of curing compounds for **pre-approved** lots at http://www.mrrapps.dot.state.mn.us/CuringCompoundProducts/curingcompounds.aspx	
	Plastic	3756	Visual Inspection -Must be white opaque and free from holes. A Certificate of Compliance shall be submitted to the Project Engineer from the Manufacturer certifying that the plastic complies with AASHTO M171.	

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

Concrete Field Testing – Bridges and General Concrete

Pay Item No.	Test Type	Spec. No.	Agency Testing	Form No.
2302 2401 2405 2411 2412 2422 2452 2461 2506 2511 2514 2520 2521 2531 2533 2545 2550 2554 2557 2564 2565	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461	1 per 100 yd^3 (m^3) Test first load each day per mix Test when adjustments are made to the mix.	2448 Weekly Concrete Report If concrete quantities on the entire project total < 100 yd^3 (m^3), document the test results Weekly Concrete Report or on Form 02415 or Form 2403 Inspection Report for Small Quantities.
	Slump (Verification) (5-694.531)	2461	1 per 100 yd^3 (m^3) Test first load each day per mix Test as necessary to verify passing slump No slump testing required for slipform placement	
	Concrete Temperature (Verification) (5-694.550)	2461	Record temperature each time air content, slump, or strength test specimen is performed/fabricated.	
	Compressive Strength (Verification) (5-694.511)	2461	1 cylinder (28-day) per 100 yd^3 (m^3) 1 cylinder (28-day) per day for sidewalk and curb and gutter Cast up to three (3) control cylinders. Any additional control cylinders are the responsibility of the Contractor. MnDOT standard cylinder mold size is 4 x 8 inch (100 x 200 mm). If aggregate has a maximum size greater than 1-1/4 inch (31.5 mm), use 6 x 12 inch (150 x 300 mm) molds.	2409 ID Card Concrete Test Cylinder

Concrete Field Testing – Cellular Concrete

Pay Item No.	Test Type	Spec. No.	Agency Testing	Form No.
2519	Compressive Strength (Verification) **(5-694.511)**	2461 2519	1 set of 4 cylinders (28-day) per day 4 x 8 inch (100 x 200 mm) cylinders shall be filled in two equal lifts, do not rod the concrete, lightly tap the sides, cover and move to area with minimal or no vibration. Do not disturb for 24 hours.	2409 ID Card Concrete Test Cylinder

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

Concrete Field Testing – Concrete Pavement

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2301	Air Content Before Consolidation for Type 3 Concrete (QC/QA) (5-694.541)	2461	1 per 300 yd^3 (m^3) or 1 per hour, whichever is less Test first load each day per mix	1 correlation air test per day	2448 Weekly Concrete Report
	Air Content After Consolidation for Type 3 Concrete (QC/QA) (5-694.541)	2461	Test 1 air content per ½ day of slip form paving to establish an air loss correction factor (ACF). See Special Provisions for additional information.	1 air test per day	
	Slump (QC/QA) (5-694.531)	2461	**For fixed form placement:** 1 per 300 yd^3 (m^3) and as directed by the Engineer Test first load each day per mix **For slipform placement:** No slump testing is required	**For fixed form placement:** 1 slump test per day **For slipform placement:** No slump testing is required	
	Concrete Temperature (QC/QA) (5-694.550)	2461	Record temperature each time air content, slump or strength test specimen is performed/fabricated by the Contractor.	Record temperature each time air content, slump or strength test specimen is performed/fabricated by the Agency.	
	Flexural Strength (QC) (5-694.521)	2301	1 beam (28-day) per day - Make additional control beams as necessary. - Control beams shall be made within the last hour of concrete poured each day. Fabricate beams, deliver beams to curing site, and clean beam boxes. Cylinders may be substituted for beams at the discretion of the Engineer	Supply beam boxes, cure, and test beams. MnDOT standard beam box size is 6" x 6" x 20" unless other sizes or types are approved by the Concrete Engineer.	2162 Concrete Test Beam Data
	Concrete Pavement Texture (QC)	2301	1 per 1000 linear feet per lane of concrete pavement at locations determined by the Agency. All adjoining lanes shall be tested at the same location if paved at the same time. The Contractor supplies all materials necessary to perform the required testing.	Determine texture testing locations using random numbers.	Concrete Texture Worksheet

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

Concrete Field Testing – Concrete Pavement (cont.)					
Pay Item No.	**Test Type**	**Spec. No.**	**Contractor Testing**	**Agency Testing**	**Form No.**
2301	Thickness (QC/Verification)	2301	The Contractor drills concrete cores at locations determined by the Agency. The Contractor probes the plastic concrete at locations determined by the Agency.	Determine probing and coring locations using random numbers. Initial pavement at core locations and re-initial the sides of specimens after coring to clearly verify their authenticity.	24327 Field Core Report Probing and Coring Report
2301	Surface Smoothness	2301	Contractor provides MnDOT certified inertial profiler results for the entire project as required by the Contract.	None	Concrete Profile Summary Worksheet

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

Concrete Field Testing - 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 field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
(3) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

CA-70 6 lb. (2.5 kg)
Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

Coarse Aggregate 50 lb. (24 kg)
Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2404	Gradation and Quality Testing including Coarse Aggregate Testing on - #200 (-75µm) (QC/Verification) (5-694.145, 5-694.146) and 5-694.148))	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source No quality test results are required. Test companion samples at Contractor's discretion.	1 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 Card 21412 Weekly Report of "Low Slump Concrete"
	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461	None	1 per 15 yd^3 (m^3) Test at beginning of pour each day	
	Slump (Verification) (5-694.531)	2461	None	1 per 15 yd^3 (m^3) Test at beginning of pour each day For concrete from a concrete-mobile, allow mix to hydrate 4 to 5 minutes before slump test to assure all cement is saturated.	
	Compressive Strength (Verification) (5-694.511)	2461	None	1 cylinder (28-day) per 30 yd^3 (m^3)	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.
(2) Testing rates apply to concrete that is produced on site.
(3) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
(4) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

3/4" Minus (–19 mm)	10 lb. (5 kg)
CA-70	6 lb. (2.5 kg)
CA-80, Sand	1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

Fine Aggregate	30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and (QC/Verification) (5-694.145 and 5-694.148)	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source. Test companion samples at Contractor's discretion.	1 per aggregate fraction prior to concrete production and each time aggregate is delivered to the site.	2410 Sample ID Card
	Quality Testing <u>including</u> Coarse Aggregate Testing on - #200 (-75µm) (5-694.146)	3126 3137	No quality test results are required.	1 test each aggregate fraction per source The Agency 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
	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461	None	1 per 15 yd^3 (m^3) Test at beginning of pour each day.	2448 Weekly Concrete Report

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

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

Remarks:

(4) Mix design is provided in accordance with MnDOT Spec 3105 unless otherwise specified in the Contract.
(5) Testing rates apply to concrete that is produced on site.
(6) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
(5) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

3/4" Minus (–19 mm)	10 lb. (5 kg)
CA-70	6 lb. (2.5 kg)
CA-80, Sand	1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

Fine Aggregate	30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Slump (Verification) (5-694.531)	2461	None	1 per 15 yd^3 (m^3) Test at beginning of pour each day. Allow mix to hydrate 5 minutes before slump test to assure all cement is saturated.	
	Compressive Strength (Verification) (5-694.511)	2461	None	1 cylinder (28-day) per 30 yd^3 (m^3)	2409 ID Card Concrete Test Cylinder

Concrete Field Testing –Dowel Bar Retrofit (DBR)

Remarks:

(1) Mix Design is Contractor's responsibility with review by MnDOT unless otherwise specified in the Contract.
(2) Testing rates apply to concrete that is produced on site. (Not from a certified ready-mix plant.)
(3) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
(4) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:
CA-80, Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:
Coarse Aggregate 50 lb. (24 kg)
Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and Quality Testing including Coarse Aggregate Testing on - #200 (-75µm) (QC/Verification) (5-694.145, 5-694.146) and 5-694.148)	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source. No quality test results are required. Test companion samples at Contractor's discretion.	1 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 Card
	Dowel Bar Retrofit Material Compressive Strength (Verification) (5-694.511)	2301 2302	None	During the pre-production test operations: 1 set of 3 cylinders tested at a rate as directed by the Engineer. Testing may need to be repeated if any problems with the dowel bar retrofit material are encountered. First day of production: 1 set of 3 cylinders tested at a rate as directed by the Concrete Engineer. After the first day of production: 1 cylinder per day during production tested at rate determined by Engineer to determine opening to traffic strength.	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
2105 2571 2575	1. Manufactured Topsoil borrow [a] Salvaged Topsoil (stockpiled)	3877.2	None	From each source: One composite sample for the first 765 m^3 (1,000 Cu yd). One composite sample for each additional 2,300 m^3 (3,000 Cu yd). Small quantities under 75 m^3 (100 Cu yd.), no sample required. One composite sample for each stockpiled topsoil, test for fertility.	10 kg (20 lb.)	[a] Test results showing meets specifications. Testing for all topsoil for fertility by Contractor at Certified Soils Lab. Sampling shall be done once source is identified or existing topsoil is stockpiled.
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.
2502 2573 2575 2577	3. Erosion Control Blanket [d]	3885	Visual Inspection	Random - See Footnote [d]		[d] Check Web site for list of approved products.. www.dot.state.mn.us/products

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
2573 2577	4. Erosion Control Netting [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 Certificate of Compliance with MARV values			[f] Check Approved/Qualified Products List (A/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. Erosion Stabilization Mat [h]	3885	Visual Inspection			[h] Check Web site for list of approved products. www.dot.state.mn.us/products
2573	8. Filter Logs	3897	Visual Inspection	None		
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. Rate based on fertility analysis of slope dressing/topsoil. Bulk: Inspector to obtain copy of invoice of blended material stating analysis. Check the type specified.
2571 2575	11. Agricultural Lime [k]	3879	One gradation test for each 180 Metric Ton (200 ton)			[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.

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, one gradation per supplier. Obtain Certificate of Compliance.	Gradation 1/10,000 yd^3 per supplier.		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 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.
2502 2575 2577	14. Seeds B. Native Seed (Mixes 30-000 series) certified seed 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.
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 Approved/Qualified Products List (A/QPL), retain Certificate of Compliance.
2571 2575	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.
2575	18. Hydraulic Soil Stabilizer [r]	3884		None		[r] Check Approved/Qualified Products List (A/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	Visual Inspection	1 per 1,000 plank or less of each thickness in each shipment	3 – 1 m (yd) pieces samples from different planks	
2131	Calcium Chloride	3911	Visual Inspection	Liquid: 1 per 40,000 L (1 per 10,000 gal) Dry: 1 per shipment	0.5 L (1 pint) or 0.5 kg (1 lb.) in Plastic Container	
2131	Magnesium Chloride	3912	Visual Inspection	1 per 40,000 L (1 per 10,000 gal.)	0.5 L (1 pint) in Plastic Container	
2331	Hot-Pour Crack Sealant for Crack Sealing/Filling	3719 3723 3725	Visual Inspection	1 per lot. Take samples from application wand. Use caution when handling hot containers	2.26 kg (5 lb.) in a 1gal steel container.	
2331	Pavement Joint Adhesive	Special Provisions	Visual Inspection	1 per lot. Take samples from application wand. Use caution when handling hot containers	2.26 kg (5 lb.) in a 1gal steel container	2410 Sample ID Card –including manufacturer and lot number
2481	Waterproofing Materials Membrane Waterproofing System	3757	Visual Inspection	1 per shipment (Membrane Only)	0.1 m^2 (1 Sq Ft)	Only waterproofing systems from qualified sources are allowed for use. The most current list can be found at www.dot.state.mn.us/products Membrane Waterproofing System: The manufacturer shall submit a one square foot sample of the membrane along with a letter of Certification and test results stating that the membranes meet the requirements of this specification. Other components of the waterproofing system do not need to be sampled for testing.

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 Asphalt Primer	3165	Visual Inspection	1 per shipment	0.5 L (1 pt.) in steel container	
2481	Waterproofing Materials Three Ply System Waterproofing Asphalt	3166	Visual Inspection	1 per shipment	0.5 L (1 pt.) in steel container	
2481	Waterproofing Materials Three Ply System Fabric	3201	Visual Inspection	1 per shipment	1 m^2 (1 Sq yd)	
2582	Waterborne Latex Traffic Marking Paint.	3591	Visual Inspection	1 per lot	0.5 L (1 pint)	**Form 02415** List batch numbers and retain Certificate of Compliance. Only traffic marking paints from Qualified Products List are allowed for use. The most current Qualified Products list can be found at www.dot.state.mn.us/products
2582	Epoxy Traffic Paint	3590	Visual Inspection	1 Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	**Form 02415** List batch numbers and retain Certificate of Compliance. Only traffic marking paints from Qualified Products List are allowed for use. The most current Qualified Products list can be found at www.dot.state.mn.us/products
2582	Traffic Marking Paint	Special Provisions	Visual Inspection	1 Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	**Form 02415** List batch numbers and retain Certificate of Compliance. Only traffic marking paints from Qualified Products List are allowed for use. The most current Qualified Products list can be found at www.dot.state.mn.us/products For traffic marking paints other than Waterborne Latex and Epoxy. See Special Provision for Qualified Products List.
2564	Non-Traffic Striping Paints	3500 Series Special Provisions	Visual Inspection		0.5 L (1 pint)	**Form 02415** List batch numbers and retain Certification of Compliance. For all others, see Special Provisions. Send color sample to Chemical Laboratory for color matching.

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
2478	Bridge Structural Steel Paint	3520	Visual Inspection	Certificate of Compliance with each batch/lot for each component of the paint system to the Engineer. Provide a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the finish coat color		**Form 02415** List batch numbers and retain Certificate of Compliance. Only paints from Approved Products List are allowed for use. The most current Approved Products List can be found at www.dot.state.mn.us/products
	Exterior Masonry Paint	3584	Visual Inspection	1 per lot Provide a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the finish coat color.	0.5 L (1 pint)	**Form 02415** List batch numbers and retain Certificate of Compliance Only paints from Approved Products List are allowed for use. The most current Approved Products List can be found at www.dot.state.mn.us/products
	Noise Wall Stain	Special Provisions	Visual Inspection	Certificate of Compliance for each batch/lot of paint. Provide a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the finish coat color.		**Form 02415** List batch numbers and retain Certificate of Compliance Only paints from Approved Products List are allowed for use. The most current Approved Products List can be found at www.dot.state.mn.us/
2582	Drop-on Glass Beads	3592	Visual Inspection	1 per lot	1 L (qt.)	**Form 02415** List batch numbers and retain Certificate of Compliance Only glass beads from Qualified Products List are allowed for use. The most current Qualified Products List can be found at www.dot.state.mn.us/products
2502 2581 2582	Pavement Marking Tape	3354 3355 Special Provisions	Visual Inspection	1 clean sample of each color per lot	3 m (3 yds.)	**Form 02415** List batch numbers and retain Certificate of Compliance. Only pavement marking tape from Qualified Products List are allowed for use. The most current Qualified Products List can be found at www.dot.state.mn.us/products

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
2540 2563 2564 2565 2582	Signs and Markers	3352	Visual Inspection	None unless material suspect		**Form 02415** Only Signs and Markers from Qualified Products List are allowed for use. The most current Qualified Products List can be found at www.dot.state.mn.us/products

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	Bolts: 2 Post bolts 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	1 sample from each spool	1.2 m (4 ft)	**Form 02415 or 2403** See VII.1.A.
2554	1. B.ii. High Tension Guard Rail Cable	Special Provisions	Visual Inspection	None, unless material is suspect (see note)	1.2 m (4 ft)	Sample at the rate of 1/50,000 ft. if the strand appears damaged or suspect (Accepted as part of system)
2554	1. Guard Rail C. Structural Plate Beam	3382	Visual Inspection	One sample from one edge of each 200 rail sections or one sample of each 100 terminal sections	Full depth x 0.25 m (full depth x 10")	**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)

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 2554 2564	2. Steel Sign Posts	3401	Visual Inspection & Certification from Contractor of compliance with Domestic source requirement under 1601, if applicable.	Two posts 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
2554 2557	3.Posts for Traffic & Fence A.Steel fence posts, brace bars, and rails	3403 3406	Visual Inspection	One sample 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.		**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	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.		**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	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.	One sample per 50 rolls	1 m (3 ft)	**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

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 E. Woven Wire Fabric	3376	Visual Inspection	One full height sample per 50 rolls	1 m (3 ft)	**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
2557	3. Fence F. Chain Link Fabric	3376	Visual Inspection	One full height sample for each 5,000 ft of fencing.	0.3 m (1 ft)	**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				**Form 02415 or 2403** Check domestic steel requirement under 1601 Special Provision. To be identified & tested if necessary prior to use. See Special Provisions.
2201 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.

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
2201 2301 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	One sample (1 bar) of each size bar for each day's coating production	1 m (3 ft)	**Form 02415 or 2403** For Epoxy-Coated bars, steel will be tagged "Inspected" when it has been sampled and tested by MnDOT prior to shipment, and it 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 samples with copies of the , Certificate of Compliance, and Certified Mill Analysis. Retain originals of the Certificate of Compliance and Certified Mill Analysis in the project file.
2401	5. Reinforcing Steel C. Bars Stainless Steel	Special Provisions		One sample (2 Bars) per heat per bar size	1 m (3 ft)	Submit copies of mill test reports with samples, retain originals in project file
2401 2411 2452 2472 2564	5. Reinforcing Steel D. Spirals	3305		One per shipment	1 m (3 ft)	**Same as 5.B**
2201 2301 2401 2411 2412 2472 2531	5. Reinforcing Steel E. Steel Fabric	3303	Visual Inspection	No Field Sample Necessary		Retain Certificate of Compliance in project file.
2201 2301 2401 2411	5. Reinforcing Steel F. Dowel Bars	3302		One 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. The Certificate of Compliance shall be submitted to the Project Engineer.

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 2405	5. Reinforcing Steel G. Prestressing or Post-Tensioning Strand	3348		One sample (2 strands) from each heat (see **Notes**)	1.8 m (6 ft)	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.
2402 2506 2565	6. Drainage and Electrical Castings	3321 2471 2565	Visual Inspection	All castings: Three 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** Call Maplewood Laboratory at 651-366-5540 for list of approved foundries, or see website. 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 Approved/Qualified Products list, mill certifications, and visual inspection at the project site.	Pre-approved (see notes) or one 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 two 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	9. Anchorages (Drilled In)	Special Provisions	Visual Inspection	No laboratory samples required		Note: Before installation, verify that anchorages are on the qualified products list www.dot.state.mn.us/products

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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag . An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag . An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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
2564	11. Overhead Sign structures	2564 2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag . An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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/
2545	12. High Mast Lighting Structures	2545 2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag . An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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 Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag . An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. 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.)	Three 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	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.
2402	4. Plain Elastomeric Bearing Pads	3741 and Special Provisions	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.
2402	4. Cotton Duck Bearing Pads	3741 and Special Provisions	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.

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 sample per 200 pieces of each size.	Full Size Pipe	**Form 02415 or 2403**
2501 2503 2506	3. Concrete Pipe A. Reinforced Pipe and Arches, Precast Cattle Pass Units, and Sectional Manhole Units	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 651-366-5540 for additional information.		**Form 02415 or 2403** For Concrete Pipe Both A & B: 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	3126		1 quality test per month during production for A and B above.	10 kg. (25 lb.)	
2501 2503 2506	3. Concrete Pipe Coarse Aggregate	3137		1 quality test per month during production for A and B above.	10 kg. (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	3238	1 air test per pour (1st load), One 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 651-366-5540 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	3126		1 quality test per month during production.	10 kg. (25 lb.)	
	Coarse Aggregate	3137		1 quality test per month during production.	10 kg. (25 lb.)	
2405	4. Precast/Prestressed Concrete Structures B. Precast/Prestressed Concrete Structure (beams, posts, etc.).	2405	1 air test per pour (1st load), One 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 651-366-5540 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	3126	Gradation: 1 per 150 m^3 (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.	10 kg (25 lb.)	
	Coarse Aggregate	3137	Gradation: 1 per 75 m^3 (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.	10 kg (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)	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 651-366-5540 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.			**Form 02415 or 2403** See Spec. 3245 for specific AASHTO or ASTM Pipe types are approved under this specification. If perforated, holes should be 5mm - 10 mm (3/16 - 3/8 inch) diameter, two rows for 4", and four rows for 6" diameter; approximately 75 mm (3 inches) on center.
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		One per shipment	0.5 liter (l pt.)	
2412 2501 2503	10. Preformed Plastic Sealer for Pipe	3726 Type b		One from each source	0.3 m (1 ft)	
2412 2501 2503	11. Bituminous Mastic Joint Sealer for Pipe	3728	Visual Inspection	Sample, if questionable		

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
2105	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 200 m^3 (250 yd^3)			Form 02415 or 2403
2501 2503	13. Corrugated Polyethylene Pipe – Dual Wall, 12" – 48"	3247				For Specification 3247, Corrugated Polyethylene Pipe (HDPE) manufacturing facilities are required to be reviewed yearly and in compliance with AASHTO's National Transportation Product Evaluation Program (NTPEP) for producers of AASHTO M294 HDPE pipe. To determine if a pipe manufacturing plant is qualified, click on the following link for M294 pipe. http://data.ntpep.org/Module/PIPE/StatusReport.aspx If a plant has a compliant NTPEP audit for AASHTO M294 pipe at the time the pipe is manufactured, then the plant has met requirements. Note that a previous year's audit shall govern until NTPEP issues the next year's audit. A Certificate of Compliance shall be provided in accordance with Specification 1603.

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

2105
2411
2412
2501
2502
2511
2512
	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 (40,000 m^2) or fraction thereof of each type fabric or geogrid for all other uses.
				
				(c) Seam, if required, 1 per project minimum, additional as appropriate.
				
				Small Quantity Acceptance
				• For fabric totals less than 200 yd^2 (170 m^2)
				• For pipe wrap totals less than 1000 Lin. Ft
				• No sampling required
				• Use Inspection Report for Small Quantities (Form 2403)
				• Check:
				  o Certificate of Compliance
				  o Identifying label on product
				  o Geotextile Small Quantity Acceptance List at
				
				http://www.dot.state.mn.us/materials/aggregatedocs/gtxlist.pdf
					(a) 10 Lin. Ft. (3 m)
					
					(b) 4 yd^2 (3 m^2)*
					
					(c) 10 Lin. Ft. (3 m)**
						Certificate of Compliance shall state material identification (e.g. Propex 2002, Miragrid 8XT), and minimum average roll values (MARV) for all specified geotextile properties. MARV values must meet the Specification 3733 Types 1 through 7 requirements for the specific application. Submit copy of Certificate with material samples sent to the Materials Laboratory.
						
						Submit additional sample(s), if the manufacturer or model of geotextile or geogrid used changes during construction.
						
						Sampling shall be by random selection and no more than one sample shall be taken from an individual roll. For type 6 applications (including geogrids), submit pages of Special Provisions that list required material properties. (Type 6 requirements are job specific.) 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.
						** Seam sample to include approximately 3 ft (1 m) 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	One sample per 50,000 brick or fraction thereof	6 whole bricks	
2506	1. Brick B. Sewer (Concrete)*	3616	Visual Inspection	One sample 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	One sample 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	One sample 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	One cylinder per 100 units, but not less than 5 cylinders for a given contract. Other materials as required herein.	150 x 300mm (6 x 12 in) Cylinders	Form 02415 or 2403 Will be stamped when inspected prior to shipment.
2511 2512 2577	4. Stone for Masonry or Rip-Rap	3601 and Special Provisions	Visual Inspection Submit Form 02415 unless special testing is specified			Form 02415 or 2403 Each source shall be approved by Project Engineer or Supervisor for quality, prior to use. For questions on quality, contact District Materials or Geology Unit.

XI. Electrical and Signal Equipment 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
2545	1. Lighting Standards (Aluminum or Steel)	3811	Visual Inspection			The Fabricator shall submit "Certificate of Compliance", on a per project basis, to the Project Engineer..
2545 2550 2565	2. Hand Holes (Precast, PVC, and LLDPE)	2545 2550 2565				Form 02415 or 2403 Traffic signals and street lighting projects require handholes and frames and covers to be listed on the MnDOT Approved/Qualified Products List (A/QPL) for signal. For cast iron frame and cover: see VII.6, Drainage Castings
2545 2565	3. Foundation	2545	Slump as needed	1 cylinder per 20 m^3 (25 Cu. yd.)		Rebar is required in concrete foundations as specified in the Contract documents for all traffic signal and street lighting projects.
2402 2545 2565	4. Conduit and Fittings A. Metallic	3801 3802	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
2545 2565	4. Conduit and Fittings B. Non-Metallic (Rigid and HDPE)	3803 Special Provisions	Visual Inspection			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 signal and street lighting projects, specific requirements are contained in the Special Provisions for each project.
2545 2565	5a. Anchor bolts (cast in place)	2545 2565				See section VII, 7.
2545	5b. Anchorages (Drilled In)	2545				See section VII, 8.

XI. Electrical and Signal Equipment 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
2545 2565	6. 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 signal and street light lighting projects, various miscellaneous hardware is required to be listed on the MnDOT Signals and Lighting Approved/Qualified Products Lists (A/QPL). The Contract documents indicate which items must be on the Signals and/or Lighting APL.
2545 2550 2565	7. Cable and Conductors A. Power Conductors Loop Detector Conductors (No Tubing) Underground Service Entrance (USE) cables	3815.2B1 3815.2B2(a) Special Provisions	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.
2545 2550 2565	7. Cable and Conductors B. Electrical Cables and Single Conductors with Jacket	3815.2B2(b) 3815.2B3 3815.2B5 3815.2C1 3815.2C3 3815.2C4 3815.2C5 3815.2C6 3815.2C7 3815.2C8 3815.2C14 Special Provisions	Visual Inspection	1 sample per size per lot	1.5m (5 ft)	**Form 02415 or 2403** Usually inspected at the distributor. Documentation showing project number, reel number(s), & 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 Steve Grover at 651-366-5540 or Cindy Schellack at 651-366-5543 with questions. For traffic signal and street lighting projects, the Special Provisions for each project contain electrical cable and conductor specifications.
2545 2550 2565	7. Cable and Conductors C. Fiber Optic Cables	3815.2C13	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 Approved/Qualified Products List (A/QPL) for Traffic Management Systems/ITS.

XI. Electrical and Signal Equipment 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
2545 2565	8. Ground Rods	2545 2565	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	9. Luminaires and Lamps	3810				**Form 02415 or 2403** Traffic signal and street lighting projects require luminaries and lamps to be listed on the MnDOT Approved/Qualified Products List (A/QPL) for Lighting. The conductors shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL) and type, where applicable.
2545	10. Electrical Systems					Electrical Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report. To be certified by the Project Engineer.
2565	11. Traffic Signal Systems	2565				Traffic Signal Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report. To be certified by the Project Engineer.