

**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 Mn/DOT and the FHWA for all test procedures performed.

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](http://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 Mn/DOT District Independent Assurance Inspector when project starts to provide the proper servicing of your project.

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**Certifications List**

<b>Material</b>	<b>SMC Section</b>	<b>Sub Section</b>	<b>Page</b>	<b>Certification Needed</b>
All Base, Surface, and Granular Materials	I. Grading & Base	Many	7-12	Form G&B-104 (24346) include gradation and quality test results
Plant Mixed Asphalt (PMA)	II. Bituminous	Many	13-18	All PMA from certified supplier <a href="http://www.dot.state.mn.us/materials/bituminous.html">www.dot.state.mn.us/materials/bituminous.html</a>
Shingles	II. Bituminous	2	14	Contractor shall provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.
Bituminous Material	II. Bituminous	9	17	Only Bituminous Materials from certified asphalt binder sources are allowed for use. The most current list of Certified Sources can at <a href="http://www.dot.state.mn.us/products">http://www.dot.state.mn.us/products</a>
Emulsified Asphalt	III. Bituminous Specialty Items		19	Use Emulsion for seal coat from a certified emulsified asphalt source.
Concrete Ready Mix	IV. Concrete	Many	22-37	Contact Report from Ready-Mix Plant. All concrete from certified plant including a computerized certificate of compliance with each load.
Ground Granulated Blast Furnace Slag Fly Ash Admixtures Portland Cement	IV. Concrete		23	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 Mn/DOT standardized certification statement for cement, flyash, and slag. The most current list of certified/approved sources can be found at <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a> .
Plastic for Curing	IV. Concrete		30	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		34	Aggregate pit numbers and 1 passing gradation result per fraction per source

Material	SMC Section	Sub Section	Page	Certification Needed
Profiler	IV. Concrete		33	Contractor provides Mn/DOT certified Inertial Profiler Results for bumps/dips and/or Areas of Localized Roughness for the entire project.
Aggregate for Concrete Pavement Repair	IV. Concrete		35	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Dowel Bar Retrofits	IV. Concrete		36	Aggregate pit numbers and 1 passing gradation result per fraction per source
Plant Stock & Landscape Materials	V: Landscaping etc.	2	37	Several certifications
Silt Fence	V: Landscaping etc.	5	38	Certificate of Compliance with MARV values
Flotation Silt Curtain	V: Landscaping etc.	6	38	Manufacturers' certification of compliance
Mulch Type 3	V: Landscaping etc.	12	38	Certified Vendor by Minnesota Crop Improvement Association must be tagged grain straw only on label.
Mulch Type 6 Wood Chips	V: Landscaping etc.	13	39	Emerald Ash Borer Compliance Agreement with the MDA
Seeds	V: Landscaping etc.	14	39	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Seeds - Native	V: Landscaping etc.	14	39	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Sod	V: Landscaping etc.	15	39	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	39	A/QPL with certified test reports.
Waterproofing material membrane waterproof system	VI: Chemical Items		40	Certificate and test results
Waterborne latex traffic marking paint	VI: Chemical Items		41	Certificate of Compliance
Epoxy traffic paint	VI: Chemical Items		41	Certificate of Compliance
Traffic marking paint	VI: Chemical Items		41	Certificate of Compliance
Non-traffic marking paint	VI: Chemical Items		41	Certificate of Compliance
Bridge structural steel paint	VI: Chemical Items		42	Certificate of Compliance
Exterior masonry paint	VI: Chemical Items		42	Certificate of Compliance
Noise wall stain	VI: Chemical Items		42	Certificate of Compliance
Drop-on glass beads	VI: Chemical Items		42	Certificate of Compliance
Pavement marking tape	VI: Chemical Items		42	Certificate of Compliance
Steel sign posts	VII: Metallic	2	44	Certification of domestic source if applicable under 1601.
Posts for traffic or fence	VII: Metallic	3A	44	Certification of domestic source if applicable under 1601. For fence: fence certification form.
Fence components	VII: Metallic	3B	44	Fence certification form.
Fence gates	VII: Metallic	3C	44	Fence certification form.
Fence barbed wire fabric	VII: Metallic	3D	44	Fence certification form.
Fence woven wire fabric	VII: Metallic	3E	45	Fence certification form.
Fence chain link wire fabric	VII: Metallic	3F	45	Fence certification form.
Reinforcing steel uncoated bars	VII: Metallic	5A	45	Certificate of Compliance & certified mill analysis
Reinforcing steel epoxy bars	VII: Metallic	5B	45	Inspected tag or Certificate of Compliance & certified mill analysis
Steel Fabric	VII: Metallic	5E	46	Certificate of Compliance
Dowel Bars	VII: Metallic	5F	46	Certificate of Compliance
Pre or post tensioning strand	VII: Metallic	5G	47	Mill analysis

Material	SMC Section	Sub Section	Page	Certification Needed
Anchor rods & Structural Fasteners	VII: Metallic	7	47	Yearly Mn/DOT passing test report
Timber & lumber	VIII: Miscellaneous	1	51	Certified on invoice
Elastomeric bearing pad	VIII: Miscellaneous	4	51	Certificate of Compliance
Corrugated metal pipe	IX: Geosynthetics & Pipe	1A	51	Certified on invoice
Corrugated metal structural plate	IX: Geosynthetics & Pipe	1B	51	Certified on invoice
Corrugated metal aluminum plate	IX: Geosynthetics & Pipe	1C	52	Fabricator's Certificate and guarantee
Concrete pipe & manholes reinforced	IX: Geosynthetics & Pipe	3A	52	Certified stamp and certification document
Concrete pipe non reinforced	IX: Geosynthetics & Pipe	3B	52	Certified stamp and certification document
Precast box culverts	IX: Geosynthetics & Pipe	4A	53	Stamped & field inspection report
Prestressed beams & posts, etc	IX: Geosynthetics & Pipe	4B	53	Stamped & field inspection report
Manholes & catch basins	IX: Geosynthetics & Pipe	5	54	Certification document or stamped
Thermoplastic pipe ABS & PVC	IX: Geosynthetics & Pipe	7	54	Certificate of Compliance
Corrugated PE Pipe: Single wall – edge drains	IX: Geosynthetics & Pipe	8	54	Certificate of Compliance
Corrugated PE Pipe: dual wall – 12"-48"	IX: Geosynthetics & Pipe	13	55	Certificate of Compliance
Geotextile fabric	IX: Geosynthetics & Pipe	14	56	Manufacturers' Certification of compliance
Brick sewer concrete	X: Brick, Stone, Masonry	1B	57	Air content statement
Concrete masonry units	X: Brick, Stone, Masonry	2A	57	Air content statement
Light standards	XI: Electrical & Signal	1	58	Certificate of Compliance
Cable & Conductors	XI: Electrical & Signal	7	59	Usually inspected at the distributor. Documentation showing project number, reel number(s), & Mn/DOT 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	60	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	60	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**

<b>Section</b>	<b>Page</b>	<b>Section Name</b>	<b>Contact</b>	<b>Phone</b>
Part I	Page 7	Grading & Base – Specifications 2105, 2118, 2211, 2212, 2215, and 2221	Terry Beaudry Cary Efta Rebecca Embacher Mark Watson	(651) 366-5456 (651) 366-5421 (651) 366-5525 (651) 366-5596
Website: <a href="http://www.dot.state.mn.us/materials/gradingandbase.html">www.dot.state.mn.us/materials/gradingandbase.html</a>				
Part II Part II B 4	Page 13 Page 17	Bituminous - Spec. 2360 Asphalt Binder	John Garrity Jim McGraw Jason Szondy	(651) 366-5577 (651) 366-5548 (651) 366-5549
Website: <a href="http://www.dot.state.mn.us/materials/bituminous.html">www.dot.state.mn.us/materials/bituminous.html</a>				
Part III	Page 19	Bituminous Specialty Items	Mark Watson Terry Beaudry	(651) 366-5596 (651) 366-5456
Part IV	Page 22	Concrete – Aggregates and Mix Design Concrete – Certified Ready Mix Concrete Concrete Paving Concrete – Bridges	Wendy Garr Wendy Garr Rob Golish Ron Mulvaney	(651) 366-5423 (651) 366-5423 (651) 366-5576 (651) 366-5575
Website: <a href="http://www.dot.state.mn.us/materials/concrete.html">www.dot.state.mn.us/materials/concrete.html</a>				
Part V	Page 38	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 40	Chemical Items	Jim McGraw Dave Iverson	(651) 366-5548 (651) 366-5550
Part VII	Page 43	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 51	Miscellaneous Materials Sections 1 thru 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 51	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 57	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 58	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**

<b>Grading and Base</b>	
<b>Form No.</b>	<b>Form Name</b>
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
<b>Concrete</b>	
<b>Form No.</b>	<b>Form Name</b>
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
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
<b>Bituminous</b>	
<b>Form No.</b>	<b>Form Name</b>
2413	Asphalt Sample Identification Card
<b>Miscellaneous</b>	
<b>Form No.</b>	<b>Form Name</b>
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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>

I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://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 Notes 1 & 2)		Minimum Companion (Lab) Sample (See Note 2)		Form No. (See Note 4)	
				Rate	Size	Rate	Size		
(a) 2118 (b) 2211 (c) 2221 (d) 2212	<b>1. Gradation</b> (a) Aggregate Surfacing (b) Aggregate Base (c) Aggregate Shoulders (d) Drainable Aggregate Base (OGAB & DSB)	3136, 3138, & Special Provisions	Production: 1/550 yd <sup>3</sup> (CV) Placement: 1/2,750 yd <sup>3</sup> (CV)	<p><b>Random Sampling</b></p> <ul style="list-style-type: none"> <li>&lt; 280 yd<sup>3</sup> (CV) No tests Required</li> <li>≥ 280 yd<sup>3</sup> (CV) to &lt; 1,100 yd<sup>3</sup> (CV)                             <ol style="list-style-type: none"> <li>Lot Size = Total Quantity</li> <li>Divide lot into two equal sublots</li> <li>Collect one random sample from each subplot</li> <li>Average results to determine compliance</li> </ol> </li> <li>≥ 1,100 yd<sup>3</sup> (CV) to &lt; 5,500 yd<sup>3</sup> (CV)                             <ol style="list-style-type: none"> <li>Lot Size = Total Quantity</li> <li>Divide Lot into four equal sublots</li> <li>Collect one random sample from each subplot.</li> <li>Average results to determine compliance</li> </ol> </li> <li>≥ 5,500 yd<sup>3</sup> (CV)                             <ol style="list-style-type: none"> <li>#Lots = <math>\frac{\text{Total Bid Quantity}}{5,500}</math></li> <li>Round # Lots up to next whole number</li> <li>Lot Size = <math>\frac{\text{Total Bid Quantity}}{\text{\#Lots}}</math></li> <li>Divide each Lot into four equal sublots.</li> <li>Collect one random sample from each subplot.</li> <li>Average results for each Lot to determine compliance.</li> </ol> </li> </ul>		60 lb	(a, b, & c) 1 per source	(a, b, & c) 30 lb.	<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-002</b> (02154-02)  <b>G&amp;B-101</b> (02402)  <b>G&amp;B-104</b> (24346-02)
						(d) OGAB & DSB 2 per source	(d) OGAB & DSB 75 lb. send to G&B Unit.		

I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://www.dot.state.mn.us/materials/gradingandbase.html))

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Field Testing (see note 1)		Minimum Companion (Lab) Sample (See Note 2)		Form No. (See Note 4)
				Rate	Size	Rate	Size	
(e) 2105	<b>1. Gradation</b> (Continued) (e) Granular Borrow Select Granular Borrow Stabilizing Aggregate	3149 & Special Provisions	1/10,000 yd <sup>3</sup> (CV)	1/20,000 yd <sup>3</sup> (CV)		1 per source	30 lb.	<b>G&amp;B-001</b> (02115-03), <b>G&amp;B-101</b> (02402-03) <b>G&amp;B-104</b> (24346-02)
(f) 2215 Check the proposal; projects awarded in 2012 may reference 2331for FDR	(f) Full Depth Reclamation (FDR)	3135 & Special Provisions	1/6,000 yd <sup>2</sup> (See Note 12)	1/12,000 yd <sup>2</sup>	60 lb			<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-101</b> (02402-03)
(g) 2511	(g) Granular Filter	3601 & Special Provisions	1 per source before delivery on project	1 per source	300 lb	1 per source	150 lb	<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-101</b> (02402-03)  <b>G&amp;B-104</b> (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	1 per source	30 lb	<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-101</b> (02402-03)  <b>G&amp;B-104</b> (24346-02)

**I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://www.dot.state.mn.us/materials/gradingandbase.html))**

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Field Testing (see note 1)		Minimum Companion (Lab) Sample (See Note 2)		Form No. (See Note 4)
				Rate	Size	Rate	Size	
(a) 2211 (b) 2221	<b>2. Proctor Test</b> (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221, & Special Provisions		(See Note 10) <b>2005 Spec Book:</b> 1 per source <b>2012 Spec Book</b> 1 per source	50 lb	One per project	25 lb.	<b>G&amp;B-303</b> (24587-01)
(c) 2105	(c) Embankment Soil	2105	<b>2005 Spec Book:</b>  <b>2012 Spec Book:</b> 1 major soil type (See Note 6)	<b>2005 &amp; 2012 Specs Book :</b> For Specified Density: 1/major soil type.  <b>2012 Spec Book:</b> For all other compaction requirements: One Contractor Companion/project				
(a) 2211 (b) 2221	<b>3. Specified Density Test (Sand Cone or other)</b> (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221 & Special Provisions		(See Note 10) 1/1,000 yd <sup>3</sup> (CV)				<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-304</b> (02140-03)
(c) 2105	(c) Embankment Soil (Excavation & Borrow)	2105 & Special Provisions		1/4,000 yd <sup>3</sup> (CV)				

I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://www.dot.state.mn.us/materials/gradingandbase.html))

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Field Testing (See Note 1 & 2)		Minimum Companion (Lab) Sample (See Note 2)		Form No.  (See Note 4)
				Rate	Size	Rate	Size	
(a) 2211 (b) 2221	<b>4. Dynamic Cone Penetration (DCP) Index Method</b> (a) Aggregate Base (b) Aggregate Shoulder	2211, 2221, & Special Provisions		1 DCP test/500 yd <sup>3</sup> (CV)				<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-204</b> (02170-02)
(c) 2215	(c) Full Depth Reclamation (FDR)	3135 & Special Provisions		1 DCP test/3,000 yd <sup>2</sup>				<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-205</b>
(d) 2105	(d) Granular Borrow Select Granular Borrow	2105, 3149, & Special Provisions		1 DCP test/2,000 yd <sup>3</sup> (CV)				<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-203</b> (02170-02)
(a) 2211 (b) 2221	<b>5. Moisture Content Test</b> (a) Aggregate Base (b) Aggregate Shoulder (see Note 11)	2211, 2221, & Special Provisions	<b>2005 Spec Book</b> — <b>2012 Spec Book</b> 1/1,000 yd <sup>3</sup>	<b>2005 spec book:</b> 1/1,000 yd <sup>3</sup> or 10 tests whichever is less <b>2012 Spec Book:</b> One Contractor Companion/project				<b>G&amp;B-001</b> (02115-03)  <b>G&amp;B-105</b> (21850-02)
(c) 2215	(c) Full Depth Reclamation	2215 or Special Provisions	<b>2005 Spec Book</b> — <b>2012 Spec Book</b> 1/6,000 yd <sup>2</sup>	<b>2005 spec book:</b> 1/6,000 yd <sup>2</sup> <b>2012 Spec Book:</b>				
(d) 2105	(d) Embankment Soil (see Note 10)	2105 & Special Provisions	<b>2005 Spec Book</b> — <b>2012 Specifications</b> 1/10,000 yd <sup>3</sup>	<b>2005 Spec Book</b> 1/10,000 yd <sup>3</sup> <b>2012 Spec Book</b> One Contractor Companion/project				

**I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://www.dot.state.mn.us/materials/gradingandbase.html))**

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Field Testing (See Note 1 & 2)		Minimum Lab Sample		Form No.  (See Note 4)
				Rate	Size	Rate	Size	
2105 2118 2211 2212 2221	<b>6. Percent Crushing</b>	3136, 3138, 3149, & Special Provisions	1/Day			2 per source	30 lb. (See Notes 3, 7, 8 & 9)	<b>G&amp;B-103</b> (02463)
2105 2118 2206 2211 2212 2221 2451 2502	<b>7. Aggregate Quality</b> (LAR, Insoluble Residue, Lithological Exam & Bitumen Content)		1/source  (See Note 5)					<b>G&amp;B-104</b> (24346-02)
2215	<b>8. Depth Check</b>	3135 or Special Provision	1/1000 feet	1/3000 feet				

**I. Grading and Base Construction Items 2005 and 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://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. When additional samples are obtained and tested beyond those required in the Schedule of Materials Control, incorporate the additional results to compute the average for compliance with the specifications.

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 2012 Spec Book ([www.dot.state.mn.us/materials/gradingandbase.html](http://www.dot.state.mn.us/materials/gradingandbase.html))**

**General Notes (cont)**

**Note 1:** Samples are not required for 280 yd<sup>3</sup> (500 tons) or less. Report small quantities on form 02415 or 2403.

**Note 2:**

- a) Laboratory samples are not required for 440 yd<sup>3</sup> (1,000 tons) or less.
- b) Include the laboratory companion with the first field sample.
- c) Include the field sample results with the laboratory sample.
- d) Laboratories with AMRL Accreditation are not required to submit laboratory companion samples.

**Note 3:** Carbonate aggregates require 50 lbs. samples for lab testing.

**Note 4:** 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 5:** The Contractor may use the Ignition Oven (Mn/DOT Lab. Manual Method 1853) to determine bitumen content.

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

**Note 7:** The Lab Quality/Crushing sample is the Verification Test for quality requirements. Submit the initial random quality and crushing sample from the first day's production.

**Note 8:** The crushing test will not be required when the material is crushed from a quarry or contains greater than 25% recycled material.

**Note 9:** A second test is required, when the first test fails. Average all tests to determined compliance, when multiple tests are performed. Laboratory samples are not required for 440 yd<sup>3</sup> (1,000 tons) or less.

**Note 10:** Required only for specified density.

**Note 11:** Required for Quality Compaction or DCP Method

**Note 12:** Provide gradation test results to the Engineer within the first 500 ft (150 m) of production and within 500 ft (150 m] after a failing gradation.

**II. Bituminous Construction Items for Specification 2360 (Note #1)**(All bituminous mixtures are from Certified Plants) ([www.dot.state.mn.us/materialsbituminous.html](http://www.dot.state.mn.us/materialsbituminous.html))**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 <u>is required</u> to test this sample. The results <u>shall be used</u> as part of the QC program.	Agency	Agency	Contractor
IAST	The <u>I</u> ndependent <u>A</u> ssurance <u>S</u> ampling and <u>T</u> esting assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

**A. Pre-Production Sampling and Testing for Specification 2360**

**SAMPLE SIZE:** 80 lb. (35 kg) - plus #4 aggregate sample for quality testing and Percent Crushing  
35 lb. (15 kg) - minus #4 aggregate for quality testing  
80 lb. (35 kg) - RAP for Quality Testing  
10 lb. (5 kg) - RAS (Shingles) for Gradation and Quality Testing  
80 lb. (35 kg) - bituminous mixture plus 2 Gyratory specimens for volumetric testing  
80 lb. (35 kg) - bituminous mixture for TSR testing (option A)  
20 lb. (10 kg) - bituminous mixture for TSR testing plus 6 Gyratory specimens (option B)  
2 lb. (1 kg) - for mineral filler.

**1. Bituminous Mix Design (QC/QA)**QC Testing

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

QA Testing

For Gyratory Design, Option 1- Laboratory Mix Design: In addition to reviewing the Trial Mix data (JMF), test Contractor's two Gyratory specimens and uncompact mixture (specimens and mixture submitted at optimum asphalt content). Also, evaluate TSR per 2360.2E5a(3).

For Gyratory Design Option 2, Modified Mix Design, review Trial Mix data only.

**II. Bituminous Construction for Specification 2360 (Part A, cont.)****2. Aggregate Quality Testing (QA Only)**QA Testing

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

Contractor submits to the Bituminous Engineer or the District Materials Engineer one (1) sample of each non-asphaltic aggregate type or class per source per year. Contractor shall also submit the asphaltic aggregate material when the mixture contains RAP or RAS.

Quality testing will be performed as directed by the Bituminous Engineer or the District Materials Engineer. When aggregate qualities approach specification limits or when material variation is observed, take additional field samples.

Contractor shall provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.

**3. Mineral Filler (QA Only)**QA Testing

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

**4. Additives (QA Only)**QA Testing

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

**B. BITUMINOUS PRODUCTION for Specification 2360**

**SAMPLE SIZE:** 35 lb. (15 kg) for Aggregate for Gradation (QC/QA)

75 lb. (35 kg) for each plus #4 Aggregate Type for Quality Testing

35 lb. (15 kg) for each minus #4 Aggregate Type for Quality Testing

70 lb. (35 kg) for each RAP material for Quality Testing

10 lb. (5 kg) RAS (Shingles) for Processed Gradation and Quality Testing

65 lb. (30 kg) for Mixture Properties (QC/QA) 3 full 6" by 12" cylinder molds for QA (Gyratory mixes)

90 lb. (40 kg) for TSR (QC/QA) 4 full 6" by 12" cylinder molds for QA

90 lb. (40 kg) for Aggregate Specific Gravity (QC/QA)

1 qt (1 L) for Asphalt Binder (QA)

½ gal (2 L) for Emulsified Asphalt (QA)

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

1 per 500 tons (450 metric tons) at start of production, for the first 2,000 tons (1,800 metric tons) of mixture produced, then

1 per 1,000 tons (900 metric tons) or portion thereof per mix blend as required by 2360. 2G6

Companion samples taken for agency.

REMARKS: See Note #2, Note #3, & Note #5.

QA Testing

Companions to QC samples set aside for 10 calendar days & tested as needed. The Agency representative observes QC testing.

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

Testing rates as required by 2360.2G6 CAA, 2360.2G6 FAA. Two tests per day (CAA, FAA) for first two days. If CAA results exceed the specification minimum by 8% of the requirement; sample daily, test minimum one per week. If FAA results exceed the specification minimum by 5% of the requirement; sample daily, test minimum one per week.

REMARKS: See Note #2, Note #3, & Note #4

QA Testing

Companions to QC samples set-aside for 10 calendar days and tested as needed. The Agency representative observes QC testing.

**3. Aggregate Quality Testing (QA Only)**QA Testing

When aggregate qualities approach specification limits or when material variation is observed, take additional field samples as requested by Project Engineer.

When material variation is observed in RAP or RAS take additional field samples as requested by Project Engineer.

**II. Bituminous Construction for Specification 2360****B. Bituminous Production for Specification 2360 (cont.)****4. Asphalt Binder Content, % (QC/QA, Verification)**QC Testing

1 per 500 tons (450 metric tons) per mix blend for first 2,000 tons (1,800 metric tons) of mixture produced. Then 1 per 1000 tons (900 metric tons) or portion thereof per mix blend as required by 2360.2G6

REMARKS: See Note #5.

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

REMARKS: The verification companion sample must use Method (b) or (c) only. When more than one Mn/DOT approved test procedure is available, the Contractor shall select one method at the beginning of the project (when material is submitted for Trial Mix Review) and use that method for the entire project. The Contractor and Engineer may agree to change test procedures during the construction of the Project.

REMARKS: See Note #2 & Note #3. If a member of a monitoring team observes the Contractor test, note and sign under remarks.

REMARKS: A computer file of the plant's control settings is required every 20 minutes for verifying the % add AC

QA Testing Companions to QC samples set aside for 10 calendar & tested as needed. The Agency representative observes QC testing as needed. The Agency will review the computer files of the plant's control settings.

**5. Mixture Properties (QC/QA, Verification\*)**

Maximum Specific Gravity, Gyratory Bulk Specific Gravity - 2 Specimen Average, air voids, Adjusted Asphalt Film Thickness (AFT), asphalt binder content, gradation, and AC/Total AC ratio.

REMARKS: See Note #7 Asphalt Film Thickness (AFT)

QC Testing

1 per 500 tons (450 metric tons) per mix blend, at the start of production, for first 2,000 tons (1,800 metric tons) of mixture produced. Determine planned tonnage for each mixture to be produced during the production day. Divide the planned production by 1,000; round up to the next higher whole number. This number will be the number of production tests required for that mixture.

Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day.

REMARKS: See Note #2, Note #3, & Note #9.

QA Testing

Companion samples to QC samples set aside for 10 calendar days and tested as needed. The agency representative shall review QC operations on a daily basis. Review shall include but is not limited to monitoring QC summary sheets and comparing allowable tolerances for verification sample/verification companion sample test results. The Agency representative shall observe QC testing.

\*Verification Testing

Verification Companion testing from Agency split sample is required to be performed and shall be used as a QC sample once per day. The verification companion shall also be tested for CAA and FAA at a rate of 1 test per week, if the CAA and FAA exceed the requirements by 8% and 5% respectively, otherwise test daily.

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

**II. Bituminous Construction for Specification 2360****B. Bituminous Production for Specification 2360 (cont.)****6. Core Density and Thickness**QC Testing

Production/lot testing rate requirements.

Daily Production		Lots
English Ton	(Metric Ton)	
300* – 600	(270* – 545)	1
601 – 1000	(546 – 910)	2
1001 – 1600	(911 – 1455)	3
1601 – 2600	(1456 – 2359)	4
2601 – 4600	(2360 – 4173)	5
4601+	(4174+)	#

# Add 1 lot/every 900 tons over 4601 tons (4174 metric tons)

\*When mix production is less than 300 tons (270 metric tons), establish 1<sup>st</sup> lot when accumulative tonnage exceeds tons 300 tons (270 metric tons).

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

REMARKS: Sawing of cores into separate lifts is required. Contractor is required to have a saw capable of separating the core lifts without damaging the material. See Note #8 for Longitudinal joint density cores.

QA Testing

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

Remarks: See Note #6, Note #8, and Note #9

**7. Aggregate Specific Gravity (QC/QA)**QC Sampling: Sampled and tested by Contractor, if requested by District Materials Engineer.QA Testing: Companion sample to QC sample shall be submitted to the District Materials Lab and tested as needed.**8. Tensile Strength Ratio (T.S.R.) (QC/QA)**QC Sampling

Sample as directed by the Engineer. If the Engineer requires the samples to be tested, both the Contractor and the Department will be required to test these samples within 72 hours after they are sampled.

QA Testing

When QC sampling is required, the companion sample to QC sample shall be submitted to the District/Division Materials Lab and tested as needed.

**II. Bituminous Construction Items for Specification 2360****B. Bituminous Production for Specification 2360 (cont.)**

9. BITUMINOUS MATERIALS					
Only Bituminous Materials from Certified Sources are allowed for use. The most current list of Certified Sources: <a href="http://www.dot.state.mn.us/products">http://www.dot.state.mn.us/products</a>					
SAMPLE SIZE: 1 L (1 qt) for Asphalt Binder (QA)/Cutback Asphalt (QA)			2 L (½ gal) for Emulsified Asphalt (QA)		
Pay Item No.	Material	Spec. No.	Quality Control (QC)	Quality Assurance (QA)	Form No.
2360	Asphalt Binder	3151.2	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the Mn/DOT Chemical Laboratory.	State inspector observes contractor personnel taking sample. Sample first shipment of each grade of material at the start of a plant's production or after set-up of a portable plant. Thereafter, sample and submit one sample per 1,000,000 liters (250,000 gal). Sample asphalt binder in clean one L (1 qt) steel container.	2413 Asphalt Sample Identification Card
2201 2355 2356 2357 2514	Emulsified Asphalt	3151.2		Sample first shipment, then submit one sample per 200 m <sup>3</sup> ((50,000 gal.). Sample emulsified asphalt in clean two L (2 qt.) plastic container with wide screw top and send to Mn/DOT Chemical Lab within 7 days of sampling.	
2357 2358 2514	Cutback Asphalt	3151.2		Cutback Asphalt should only be used in cold temperature applications with the Engineer's approval. Contact Bituminous Engineering Unit for cold temperature application guidelines. Pressure fit 1 L (1qt.) container for cutback asphalt.	
10. Moisture Content in Mixture (QC only)					
<u>QC Testing</u>					
Sampling and testing shall be conducted by the Contractor on a daily basis unless exempted by the Engineer and tested according to the procedures in the Laboratory Manual 1855. Moisture contents above 0.3% are not allowed.					

**Note #1** 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.

**II. Bituminous Construction for Specification 2360****B. Bituminous Production for Specification 2360 (cont.)**

**Note #2** All QA test samples shall be from split samples.

If a member of the monitoring team observes the Contractor Test, note and sign under remarks.

The Project Engineer is responsible for:

- 1.) Reviewing control charts & Test summary sheets for accuracy and completeness,
- 2.) Checking sampling and testing procedures,
- 3.) Discussing QC problems with the Contractor,
- 4.) Obtaining Verification Samples,
- 5.) When additional testing is necessary, collect QA samples which have been acquired and retained by the Contractor and/or additional verification samples.

**Note #3** For Mixture Quality Management, acceptance will be based on Contractor's test results as verified by Mn/DOT test results.

**Note #4** Bituminous mixes composed entirely of Class A and/or Class B aggregates are not required to be tested for CAA (Coarse Aggregate Angularity).

**Note #5** When the required sampling rate is one test per 500 tons, divide the bituminous mixture production planned for the day by 500, and round up to the next higher whole number; this will be the number of tests required for the day. When the required sampling rate is one test per 1000 tons, divide the bituminous mixture production planned for the day by 1000, and round up to the next higher whole number; this will be the number of tests required for the day. When the required sampling rate is one test per 2000 tons, divide the bituminous mixture production planned for the day by 2000, and round up to the next higher whole number; this will be the number of tests required for the day.

**Note #6** The Department will select at least one of the two companion cores per lot to be tested for mat density. However, the Department may elect to test all companions to provide a direct verification of all individual and daily average test results. Agency representative observes all Contractor coring, sawing, measuring and testing, and takes possession of Mn/DOT cores after sawing. Agency cores shall be transported and tested at the Laboratory (Agency field or District/Division) as soon as possible to prevent damage due to improper handling or exposure to heat. A completed coring log shall be submitted to the Laboratory (Agency field or District/Division).

**Note #7** Mn/DOT projects in the 2011 Construction season 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 shall be calculated each time a gradation test is required.

**Note #8** When required, Longitudinal Joint (LJ) Density will be evaluated at random lots as determined by the engineer. Number of LJ lots for the day = number of lots calculated for mat density divided by .20 and rounding up to the next integer. Minimum of one LJ lot per day. For designated LJ lots the agency will test at least one of the mat density companion cores and at least one of the LJ companion cores.

**Note #9** Random number generation and determination of random sample location shall be consistent with the Mn/DOT Bituminous Manual Section 5-693.7 Table A or Section 5 of ASTM D3665. The Engineer may approve alternate methods of random number generation.

**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**

<b>DEFINITIONS</b>				
<b>Sample Type</b>	<b>Definitions</b> <i>Definitions from 23 CFR 637.203</i>	<b>Sample Location Determined By</b>	<b>Sample Taken By</b>	<b>Sample Tested By</b>
QA Quality Assurance	All those planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality			
QC Quality Control	All contractor/vendor operational techniques and activities that are performed or conducted to fulfill the contract requirements.	Contractor	Contractor	Contractor
Verification sampling and testing	Sampling and testing performed to validate the quality of the product.	Agency	Agency	Agency
IAST (MnDOT Definition)	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	Material	Material Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing		Minimum Lab Sample Testing	
				Rate	Size	Rate	Size
(a) 2350 (b) 2350	<b>1. Mix Design (Pre-Production)</b> (a) PASSRC (b) PASB	2350, 2360, 3139, 3151 & Special Provisions	Complete 1 design per mix	Contractor Submits Proposed JMF Blend & Agency Performs Mix Design	n/a	1/ JMF blend	80 lbs each coarse agg. 30 lbs each fine agg. 4 qt. asphalt binder
(c) 2354	(c) Micro-Surfacing	2354 & Special Provisions	Complete 1 per aggregate source	Review Submitted Mix Design		1/ mix design (See Note 1)	150 lbs. aggregate
(d) 2356	(d) Bituminous Seal Coat	2356 & Special Provisions					
(e) 2356	(e) UTBWC		Complete 1 design per mix			1/ JMF blend	
(a) 2350 (b) 2350	<b>2. Gradation</b> (a) PASSRC (b) PASB	2350, 2360 & Special Provisions	One per 1,000 ton with a minimum of one per day	1/day	Belt: 35 lbs.	—	—
(c) 2354	(c) Micro-Surfacing	2354 & Special Provisions	Stockpile: 1/1,500 tons (min. 1/ day) Machine Hopper: 1/500 tons (min. 1/day)	Stockpile & Machine Hopper: 1/day	Stockpile & Machine Hopper: 60 lbs	—	—
(d) 2356 (e) 2356	(d) Bituminous Seal Coat (e) Otta Seal	2356 & Special Provisions	Stockpile: 1/1,500 tons (min. 1/ day) Chip Spreader Hopper: 1/day	1/day	Hopper: 60 lbs	—	—
(a) 2350 (b) 2350	<b>3. Production % Crushing (CAA)</b> (a) PASSRC (b) PASB	2350, 2360 & Special Provisions	One per 1,000 with a minimum one per day	1/day	Belt: 35 lbs (Note 2)	—	—
(a) 2354	<b>4. Moisture (In Aggregate)</b> (a) Micro-Surfacing	2354 & Special Provisions	Machine Hopper: 1/500 tons (min. 3/day)	1/day	2 lbs.	—	—
(a) 2354	<b>5. Sand Equivalence</b> (a) Micro-Surfacing	2354 & Special Provisions	Stockpile or Machine Hopper: 1/500 tons (min. 1/day)	—	—	1/day (See Note 1)	25 lbs.

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

Pay Item Number	Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Verification (Acceptance) Testing		Minimum (Lab) Sample Testing Observe All Sampling	
				Rate	Size	Rate	Size
(a) 2356	<b>6. Bituminous Mixture Tests</b> (a) UTBWC	2356, 3151 & Special Provisions	<b>Tests:</b> % AC, Gradation, Max Gravity, Adjusted AFT <b>Rate:</b> (1/300 tons, min. 1 per day)	1 per day	20 lbs (1 cylinder)	1/300 tons, minimum 1 per day	Truck: 55 lbs
(b) 2350	(b) PASSRC, PASB	3151 & Special Provisions	<b>Test:</b> Asphalt spot check <b>Rate:</b> minimum one per day	—	—	First load, then 1/250,000 gal.	1 qt.
(a) 2355	<b>7. Asphalt Binder Tests</b> (a) Bituminous Fog Seal	3151	<b>Test:</b> Dilution Rate <b>Rate:</b> one per project	—	—	First load, then 1/50,000 gal.	½ gal.*
(b) 2356	(b) UTBWC	2356, 3151 & Special Provisions	—	—	—	Asphalt Binder: First load, then 1/250,000 gal.  Emulsified Asphalt: First load, then 1/50,000 gal.	Asphalt Binder: 1 qt.  Emulsified Asphalt ½ gal.*
(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 & Special Provisions	—	—	—	First load, then 1 / 50,000 gal.	½ gal.*
(a) 2354	<b>8. Asphalt Binder Application Rate</b> (a) Micro-Surfacing	2354 & Special Provisions	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) Bituminous Tack Coat	2355, 2356, 2357 & Special Provisions	Verify Application rate 1/day	Verify Application rate 1/day	—	—	—

**\*Use plastic containers for Emulsified Asphalt Samples**

**Note 1:** Contractor submits samples to Agency and Agency will retain and test at the discretion of the Engineer

**Note 2:** Run test on gradation sample

**IV. Concrete Construction Items ([www.dot.state.mn.us/materials/concrete.html](http://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 Mn/DOT 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.

<b>DEFINITIONS</b>				
	<b>Description</b>	<b>Sample Location Determined By</b>	<b>Sample Taken By</b>	<b>Sample Tested By</b>
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 <u>is required</u> to test this sample. The results shall be used as part of the QC program.	Agency	Agency	Contractor
IAST	The <u>I</u> ndependent <u>A</u> ssurance <u>S</u> ampling and <u>T</u> esting 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](http://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](http://www.dot.state.mn.us/products).

**Sample Sizes:****Cementitious:** 2 kg (5 lb)**Admixture:** 0.25 L (1/2 pt) Producer obtains samples from dispensing tubes. Store samples in plastic container.**Water:** 3.5 L (1 gal) 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	Portland Cement	3101	1 sample per project or 1 every 3 months, whichever is less.	24300 ID Card Cement Samples
2422 2452	Slag	3102	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.	
2461 2506 2511 2514 2519 2521 2531 2533	Blended Cement	3103	<u>Take additional samples</u> as Concrete Engineer directs.	24308 ID Card Fly Ash Samples
2545 2550 2554 2557 2564 2565	Fly Ash	3115		
2301	Admixtures (Accelerating, Retarding, Water-Reducing, Air-Entraining, etc.)	3113	<u>For Concrete Paving:</u> 1 sample of each shipment <u>For Other Concrete:</u> 1 sample per project or 1 every 3 months, whichever is less.  The Producer obtains and stores the sample in a sealed container provided by the Agency.	2410 Sample ID Card
2301	Water	3906	1 sample from any questionable source	2410 Sample ID Card
2301	Alkali Silica Reactivity (ASR) Testing	2301	1 per paving project per sand source Write "Project Specific ASR Testing" on 2410 Sample ID card for the first sand quality and cementitious samples submitted.	

**IV. Concrete Construction Items (cont.) ([www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html))**

**Certified Ready-Mix - Concrete Plant Production**

**Remarks:**

- (1) Mix design is provided by Mn/DOT 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.

**Minimum Sample Sizes:**

**Gradation Test:**

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

**Moisture Test:**

Coarse Aggregate	2000 g
Fine Aggregate	500 g

**Quality Sample Size for Lab Submittal:**

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

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2302	Gradation Testing (QC/QA) (5-694.145 and 5-694.148)	2461	When over 20 m <sup>3</sup> (yd <sup>3</sup> ) of Agency concrete produced per day: <b>Coarse:</b> 1 per 100 m <sup>3</sup> (yd <sup>3</sup> ) <b>Fine:</b> 1 per 200 m <sup>3</sup> (yd <sup>3</sup> )  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.  <b>For Contractor Mix Designs utilizing an approved JMF:</b> 1 per 400 m <sup>3</sup> (yd <sup>3</sup> ) or completed every 4 hours, whichever results in the higher sampling rate.	None	21763 Concrete Aggregate Worksheet (QC/QA)  2449 Weekly Concrete Aggregate Report
2401		3126			
2405		3137			
2411					
2412					
2422					
2452					
2461					
2506					
2511					
2514					
2519					
2521					
2531					
2533					
2545					
2550					
2554					
2557					
2564					
2565					

IV. Concrete Construction Items (cont.) ([www.dot.state.mn.us/materials/concrete.html](http://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.	<b>Coarse and Fine:</b> 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.  When $\leq 20 \text{ m}^3$ ( $\text{yd}^3$ ) of Agency concrete is produced <b>per week</b> , Verification samples are not required.  Identify verification samples with a "V" on the Sample ID Card and the verification companion sample. Include verification companion results.	2449 Weekly Concrete Aggregate Report 24143 Weekly Certified Ready-Mix Plant Report (Verification)
	Quality Testing <u>including</u> Coarse Aggregate Testing on $-75\mu\text{m}$ (#200) (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	<b><u>When over <math>20 \text{ m}^3</math> (<math>\text{yd}^3</math>) of Agency concrete produced per day:</u></b> <b>Coarse and Fine:</b> 1 per $200 \text{ m}^3$ ( $\text{yd}^3$ ) 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](http://www.dot.state.mn.us/materials/concrete.html))**

**Concrete Pavement - Concrete Plant Production**

**Remarks:**

- (1) Mix Design is Contractor's responsibility with review by Mn/DOT unless otherwise specified in the Contract.
- (2) 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)**.
- (3) 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.
- (4) Perform Quality testing as directed by the Concrete Engineer.

**Minimum Sample Sizes:**

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

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	<u>For a concrete paving batch plant:</u>  <u>When over 200 m<sup>3</sup> (250 yd<sup>3</sup>) is produced per day:</u> 1 per 1200 m <sup>3</sup> (1500 yd <sup>3</sup> ) or completed 1 per ½ day, whichever results in the higher sampling rate.	<u>For a certified ready-mix plant:</u>  <u>When over 20 m<sup>3</sup> (yd<sup>3</sup>) is produced per day:</u> 1 per 400 m <sup>3</sup> (yd <sup>3</sup> ) 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.		21764 Concrete Aggregate Worksheet JMF  Well-graded Concrete Aggregate Worksheet
		3137			<u>For a concrete paving batch plant:</u>  1 per day on randomly selected samples thereafter.	<u>For a certified ready-mix plant:</u>  1 per 1000 m <sup>3</sup> (yd <sup>3</sup> ) or 1 per week, whichever results in higher sampling rate on randomly selected samples thereafter.	
		Performing testing on representative material at the end of the most recent day of production is allowed.  <b>If well-graded aggregate incentives apply:</b> 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.  <b>If Coarse Aggregate Quality Incentive/Disincentives apply:</b> 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](http://www.dot.state.mn.us/materials/concrete.html))

Concrete Pavement - Concrete Plant Production							
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing		Agency Testing		Form No.
2301	Coarse Aggregate Testing on -75 µm (#200) (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 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.		21764 Concrete Aggregate Worksheet JMF
			1 test per day thereafter		<b>Test these samples at the plant.</b>		
			<b>Test these samples at the plant.</b>		<b>Test these samples at the plant.</b>		
Aggregate Moisture Testing (QC/Verification) (5-694.142)			<b><u>For a concrete paving batch plant:</u></b>	<b><u>For a certified ready-mix plant:</u></b>	<b><u>For a concrete paving batch plant:</u></b>	<b><u>For a certified ready-mix plant:</u></b>	Concrete W/C Ratio Calculation Worksheet
			<b>If w/c incentives do not apply:</b> 1 per 750 m <sup>3</sup> (1000 yd <sup>3</sup> ) or completed every 4 hours, whichever results in the higher sampling rate.	<b>If w/c incentives do not apply:</b> 1 per 200 m <sup>3</sup> (yd <sup>3</sup> ) or completed every 4 hours, whichever results in the higher sampling rate	<b>If w/c incentives apply:</b> 1 per 750 m <sup>3</sup> (1000 yd <sup>3</sup> ) or completed every 4 hours, whichever results in the higher sampling rate.	<b>If w/c incentives apply:</b> 1 per 200 m <sup>3</sup> (yd <sup>3</sup> ) 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.		<b>If w/c incentives apply:</b> Use aggregate moisture results for determining the water content to calculate the w/c ratio incentive/disincentive.  <b>Do not leave samples unattended.</b>		

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

Concrete Pavement - Concrete Plant Production					
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.	<p><b>If w/c incentives apply:</b>                      Microwave oven verification testing to verify the w/c ratio is completed in conjunction with Agency aggregate moisture testing.</p> <p><b>Do not leave samples unattended.</b></p>	Concrete W/C Ratio Calculation Worksheet
				<table border="1"> <tr> <td> <p><b><u>For a concrete paving batch plant:</u></b></p> <p>Take initial sample for microwave oven verification testing within the first 175 m<sup>3</sup> (250 yd<sup>3</sup>).</p> <p>At least one additional verification test should be taken if more than 750 m<sup>3</sup> (1000 yd<sup>3</sup>) is produced in a day.</p> </td> <td> <p><b><u>For a certified ready-mix plant:</u></b></p> <p>Take initial sample for microwave oven verification testing within the first 100 m<sup>3</sup> (yd<sup>3</sup>).</p> <p>At least one additional verification test should be taken if more than 400 m<sup>3</sup> (yd<sup>3</sup>) is produced in a day.</p> </td> </tr> </table>	
	<p><b><u>For a concrete paving batch plant:</u></b></p> <p>Take initial sample for microwave oven verification testing within the first 175 m<sup>3</sup> (250 yd<sup>3</sup>).</p> <p>At least one additional verification test should be taken if more than 750 m<sup>3</sup> (1000 yd<sup>3</sup>) is produced in a day.</p>	<p><b><u>For a certified ready-mix plant:</u></b></p> <p>Take initial sample for microwave oven verification testing within the first 100 m<sup>3</sup> (yd<sup>3</sup>).</p> <p>At least one additional verification test should be taken if more than 400 m<sup>3</sup> (yd<sup>3</sup>) is produced in a day.</p>			
Unit Weight (QC) (5-694.542)		Test one load of concrete per day at the plant.	None		
	Air Content (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](http://www.dot.state.mn.us/materials/concrete.html))

Concrete Pavement - Concrete Plant Production																			
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.														
2301	Quality Testing including Coarse Aggregate Testing on -75 µm (#200)	3126 3137	<p><b>Prior to concrete production:</b> Test the Agency’s pre-production sample at the Contractor’s discretion</p> <p><b>During concrete production:</b> Test the -75µm (#200) on the Quality companion sample the day it was sampled.</p> <p>All other testing is at the Contractor’s discretion</p>	<p><b>Prior to concrete production:</b> Obtain pre-production samples for quality testing at least 16 hours prior to concrete production. Samples may be taken from the stockpile and the -75µm (#200) test may be performed at the lab instead of at the plant at the discretion of the Engineer.</p> <p><b>During concrete production:</b> 1 randomly selected test each fraction every 17,500 m<sup>3</sup> (20,000 yd<sup>3</sup>) of production.</p> <p>Split the Quality sample 4 ways:</p> <ol style="list-style-type: none"> <li>1) Provide 2 quarters of the sample to the Producer/Contractor.</li> <li>2) Test the -75µm (#200) on the quality sample <u>at the plant</u> the day it was sampled.</li> <li>3) Submit the remaining sample to the lab for quality testing including testing on the -75µm (#200) sieve.</li> </ol> <p>Identify quality samples with a “Q” and record the QC and QA -75µm (#200) test results on the Sample ID Card.</p> <p>Identify the Quality Companion samples with a “Q”..</p>	2410 Sample ID Card														
2301	Coarse Aggregate Quality Testing for Incentive/Disincentive	3137	Test at Contractor’s discretion	<p><b>If coarse aggregate quality incentives apply:</b> Test the Class B aggregates for % absorption and Class C aggregates for % carbonate including any other tests necessary to make those determinations.</p> <p>Sample the 2 largest fractions in accordance with the following table and 2301:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Coarse Aggregate Quality Incentive/Disincentive Sampling Rates</th> </tr> <tr> <th>Plan Concrete m<sup>3</sup> [cubic yards]</th> <th>Samples per fraction (n)</th> </tr> </thead> <tbody> <tr> <td>2,900 – 6,250 [3,500 – 7,500]</td> <td>3</td> </tr> <tr> <td>6,251 – 8,500 [7,501 – 10,000]</td> <td>5</td> </tr> <tr> <td>8,501 – 21,000 [10,001 – 25,000]</td> <td>10</td> </tr> <tr> <td>21,001 – 42,000 [25,001 – 50,000]</td> <td>15</td> </tr> <tr> <td>42,001+ [50,001+]</td> <td>20</td> </tr> </tbody> </table> <p>Identify incentive samples on the Sample ID Card with “I/D”</p>	Coarse Aggregate Quality Incentive/Disincentive Sampling Rates		Plan Concrete m <sup>3</sup> [cubic yards]	Samples per fraction (n)	2,900 – 6,250 [3,500 – 7,500]	3	6,251 – 8,500 [7,501 – 10,000]	5	8,501 – 21,000 [10,001 – 25,000]	10	21,001 – 42,000 [25,001 – 50,000]	15	42,001+ [50,001+]	20	2410 Sample ID Card  Coarse Aggregate Quality Incentive/Disincentive Worksheet
Coarse Aggregate Quality Incentive/Disincentive Sampling Rates																			
Plan Concrete m <sup>3</sup> [cubic yards]	Samples per fraction (n)																		
2,900 – 6,250 [3,500 – 7,500]	3																		
6,251 – 8,500 [7,501 – 10,000]	5																		
8,501 – 21,000 [10,001 – 25,000]	10																		
21,001 – 42,000 [25,001 – 50,000]	15																		
42,001+ [50,001+]	20																		

**IV. Concrete Construction Items (cont.) ([www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html))**

<b>Concrete Field Materials (Refer to Metallic Materials and Metal Products for sampling requirements for concrete reinforcement.)</b>				
<b>Sample Sizes:</b>				
<b>Joint Materials:</b>				
Hot Poured Elastomeric:	2.26 kg (5 lb)	Take samples from application wand, store in steel container.	Preformed Elastomeric:	2 m (6 ft)
Silicone Joint Sealer:	0.5 liter (1 pt)	Store sample in steel container.	Preformed:	0.25 m <sup>2</sup> (2 ft <sup>2</sup> )
<b>Curing Materials:</b>				
Burlap:	1 m <sup>2</sup> (yd <sup>2</sup> )	If sampling is required, materials must be thoroughly stirred or agitated immediately prior to taking sample. Store sample in steel container and cover immediately.		
Paper and Plastic:	0.25 m <sup>2</sup> (2 ft <sup>2</sup> )			
Membrane Compound	1 liter (1 qt)			
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	
	Silicone Joint Sealer	3722	Only joint materials from qualified sources are allowed. The most current lists can be found at <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>	
	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 <b>pre-approved</b> lots at <a href="http://www.mrrapps.dot.state.mn.us/CuringCompoundProducts/curingcompounds.aspx">http://www.mrrapps.dot.state.mn.us/CuringCompoundProducts/curingcompounds.aspx</a>	
	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](http://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.	
2401 2405 2411 2412 2422 2452 2461 2506 2511 2514 2520	Air Content (Verification) (5-694.541)	2461	1 per 100 m <sup>3</sup> (yd <sup>3</sup> ) 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 m <sup>3</sup> (yd <sup>3</sup> ), document the test results Weekly Concrete Report or on Form 02415 or Form 2403 Inspection Report for Small Quantities.	
2521 2531 2533 2545	Slump (Verification) (5-694.531)	2461	1 per 100 m <sup>3</sup> (yd <sup>3</sup> ) Test first load each day per mix  Test as necessary to verify passing slump  No slump testing required for slipform placement		
2550 2554 2557 2564 2565	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 m <sup>3</sup> (yd <sup>3</sup> ) 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. Mn/DOT standard cylinder mold size is 100 x 200 mm (4 x 8 inch). If aggregate has a maximum size greater than 31.5 mm (1-1/4 inch), use 150 x 300 mm (6 x 12 inch) 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  100 x 200 mm (4 x 8 inch) 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](http://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 (QC/QA) (5-694.541)	2461	1 per 300 m <sup>3</sup> (300 yd <sup>3</sup> ) 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 (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	<b><u>For fixed form placement:</u></b> 1 per 300 m <sup>3</sup> (300 yd <sup>3</sup> ) and as directed by the Engineer Test first load each day per mix <b><u>For slipform placement:</u></b> No slump testing is required	<b><u>For fixed form placement:</u></b> 1 slump test per day <b><u>For slipform placement:</u></b> 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 <u>within the last hour</u> 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
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	

**IV. Concrete Construction Items (cont.)** ([www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html))

<b>Concrete Field Testing – Concrete Pavement</b>					
<b>Pay Item No.</b>	<b>Test Type</b>	<b>Spec. No.</b>	<b>Contractor Testing</b>	<b>Agency Testing</b>	<b>Form No.</b>
2301	Surface Smoothness	2301	Contractor provides Mn/DOT 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](http://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 Mn/DOT 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      2.5 kg (6 lb.)  
 Sand      500 g (1.1 lb)

**Quality Sample Size for Lab Submittal:**

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

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2404	Gradation and Quality Testing <u>including</u> Coarse Aggregate Testing on -75µm (#200) (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: <ul style="list-style-type: none"> <li>• Aggregate pit numbers</li> <li>• 1 passing gradation result per fraction per source</li> </ul> No quality test results are required.  Test companion samples at Contractor’s discretion.	1 per 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 (Verification) (5-694.541)	2461	None	1 per 15 m <sup>3</sup> (yd <sup>3</sup> ) Test at beginning of pour each day	
	Slump (Verification) (5-694.531)	2461	None	1 per 15 m <sup>3</sup> (yd <sup>3</sup> ) 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 m <sup>3</sup> (yd <sup>3</sup> )	2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) ([www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html))**Concrete Field Testing – Concrete Pavement Repair (CPR)****Remarks:**

- (1) Mix design is provided by Mn/DOT 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:**

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

**Quality Sample Size for Lab Submittal:**

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

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and Quality Testing <u>including</u> Coarse Aggregate Testing on -75µm (#200) (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: <ul style="list-style-type: none"> <li>• Aggregate pit numbers</li> <li>• 1 passing gradation result per fraction per source.</li> </ul> No quality test results are required.  Test companion samples at Contractor's discretion.	1 per 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
	Air Content (Verification) (5-694.541)	2461	None	1 per 15 m <sup>3</sup> (yd <sup>3</sup> ) Test at beginning of pour each day.	2448 Weekly Concrete Report
	Slump (Verification) (5-694.531)	2461	None	1 per 15 m <sup>3</sup> (yd <sup>3</sup> ) 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 m <sup>3</sup> (yd <sup>3</sup> )	2409 ID Card Concrete Test Cylinder

**IV. Concrete Construction Items (cont.) ([www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html))**

**Concrete Field Testing –Dowel Bar Retrofit (DBR)**

**Remarks:**

- (1) Mix Design is Contractor's responsibility with review by Mn/DOT 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 2.5 kg (6 lb.)  
 Sand 500 g (1.1 lb)

**Quality Sample Size for Lab Submittal:**

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

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and Quality Testing including Coarse Aggregate Testing on -75µm (#200) (QC/Verification) (5-694.145, 5-694.146) and 5-694.148)	3126 3137	<p>Prior to concrete production, the Contractor shall provide the Agency with:</p> <ul style="list-style-type: none"> <li>• Aggregate pit numbers</li> <li>• 1 passing gradation result per fraction per source.</li> </ul> <p>No quality test results are required.</p> <p>Test companion samples at Contractor's discretion.</p>	<p>1 per fraction prior to concrete production and each time aggregate is delivered to the site.</p> <p>Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.</p>	2410 Sample ID Card
	Dowel Bar Retrofit Material Compressive Strength (Verification) (5-694.511)	2301 2302	None	<p>During the pre-production test operations: 1 set of 3 cylinders tested at a rate as directed by the Engineer.</p> <p>Testing may need to be repeated if any problems with the dowel bar retrofit material are encountered.</p> <p>First day of production: 1 set of 3 cylinders tested at a rate as directed by the Concrete Engineer.</p> <p>After the first day of production: 1 cylinder per day during production tested at rate determined by Engineer to determine opening to traffic strength.</p>	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 <sup>a</sup>  Salvaged Topsoil (stockpiled)	3877.2	None	From each source: One composite sample for the first 765 m <sup>3</sup> (1,000 Cu yd). One composite sample for each additional 2,300 m <sup>3</sup> (3,000 Cu yd).  Small quantities under 75 m <sup>3</sup> (100 Cu yd.), no sample required.  One composite sample for each stockpiled topsoil, test for fertility.	10 kg (20 lb.)	<sup>a</sup> Test results showing meets specifications. Testing for all topsoil for fertility send directly to Maplewood Laboratory from project.  Testing takes about four weeks after delivery of the sample to the Department Laboratory. Sampling shall be done once source is identified or existing topsoil is stockpiled.
2571 2575 2577	2. Plant Stock & Landscape Materials <sup>b</sup>	3861 and 2571.2A1	Field Inspection at Job Site, submit itemized report for each shipment <sup>c</sup> .			<sup>b</sup> Preliminary inspection will not be done at the source. Material must be in accordance with the Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects. <sup>c</sup> Utilize "Inspection and Contract Administration Guidelines for Mn/DOT Landscape Projects" to determine and measure minimum and maximum criteria thresholds. The following documentation must be provided: 1. A Mn/DOT Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment 2. A valid copy of a nursery stock (dealer or grower) certificate registered with the MN Dept. of 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 <sup>d</sup>	3885	Visual Inspection	Random - See Footnote <sup>d</sup>	1 m <sup>2</sup> (1 Sq yd)	<sup>d</sup> Check Web site for list of approved products.. <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>

## 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 <sup>e</sup>	3885	Visual Inspection		1 m <sup>2</sup> (1 Sq yd)	<sup>e</sup> Check Web site for list of approved products. <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2573	5. Silt Fence <sup>f</sup>	3886	Check Product Label. Obtain Certificate of Compliance with MARV values		1 m <sup>2</sup> (1 Sq yd)	<sup>f</sup> Check Approved/Qualified Products List (A/QPL) of accepted geotextiles <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2573	6. Flotation Silt Curtain <sup>g</sup>	3887	Visual Inspection			<sup>g</sup> Accepted, based on manufacturers' certification of compliance. Check weight of fabric.
2573 2575	7. Erosion Stabilization Mat <sup>h</sup>	3885	Visual Inspection		1 m <sup>2</sup> (1 Sq yd)	<sup>h</sup> Check Web site for list of approved products. <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2573	8. Filter Logs	3897	Visual Inspection	None		
2573	9. Flocculants <sup>i</sup>	3898	Visual Inspection	None		<sup>i</sup> Certificate of Compliance and MSDS to the Engineer.
2571 2575	10. Fertilizer <sup>j</sup>	3881	Visual Inspection			<sup>j</sup> 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 <sup>k</sup>	3879	One gradation test for each 180 Metric Ton (200 ton)			<sup>k</sup> 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) <sup>l</sup>	3882	Visual Inspection, Check if from Certified Vendor by Minnesota Crop Improvement Association. Must be tagged, grain straw only.			<sup>l</sup> 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 <sup>3</sup> 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) <sup>m</sup>	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.		0.5 L (1 pint)	<sup>m</sup> 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 <sup>n</sup>	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.			<sup>n</sup> 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 <sup>o</sup>	3878	A certified tag by Minnesota Crop Improvement Association for Salt tolerant sod. Final Visual Inspection at site.			<sup>o</sup> 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 <sup>p</sup>	3890	Visual Inspection			<sup>p</sup> Check Approved/Qualified Products List (A/QPL), retain Certificate of Compliance.
2571 2575	17. Compost B. Compost Non-Certified Source <sup>q</sup>	3890	Inspection of source 6 weeks prior to delivery.			<sup>q</sup> Retain Certificate of Compliance, 6 weeks prior to delivery.
2575	18. Hydraulic Soil Stabilizer <sup>r</sup>	3884	Slump Test for Type 8	None		<sup>r</sup> Check Approved/Qualified Products List (A/QPL).

## 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.	
2481	Waterproofing Materials Membrane Waterproofing System	3757	Visual Inspection	1 per shipment (Membrane Only)	0.1 m <sup>2</sup> (1 Sq Ft)	Only waterproofing systems from qualified sources are allowed for use. The most current list can be found at <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a> 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 <sup>2</sup> (1 Sq yd)	
2582	Waterborne Latex Traffic Marking Paint.	3591	Visual Inspection	1 per lot	0.5 L (1 pint)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2582	Epoxy Traffic Paint	3590	Visual Inspection	1 Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2582	Traffic Marking Paint	Special Provisions	Visual Inspection	1 Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a> 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)	<b>Form 02415</b> 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 Mn/DOT Chemical Laboratory for verification of the finish coat color		<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
	Exterior Masonry Paint	3584	Visual Inspection	1 per lot  Provide a color "Draw Down" sample to the Mn/DOT Chemical Laboratory for verification of the finish coat color.	0.5 L (1 pint)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
	Noise Wall Stain	Special Provisions	Visual Inspection	Certificate of Compliance for each batch/lot of paint. Provide a color "Draw Down" sample to the Mn/DOT Chemical Laboratory for verification of the finish coat color.		<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/">www.dot.state.mn.us/</a>
2582	Drop-on Glass Beads	3592	Visual Inspection	1 per lot	1 L (qt.)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2502 2581 2582	Pavement Marking Tape	3354 3355 Special Provisions	Visual Inspection	1 clean sample of each color per lot	3 m (3 yds.)	<b>Form 02415</b> 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 <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>

## 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		<b>Form 02415</b> Only Signs and Markers from Qualified Products List are allowed for use. The most current Qualified Products List can be found at <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>

## 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.		<b>Form 02415 or 2403</b> To be approved before use. Materials from H&R may be pre-sampled and tested. Call the MN/DOT 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)	<b>Form 02415 or 2403</b> See VII.1.A.
2554	1. B.ii. High Tension Guard Rail Cable	Special Provisions	Visual Inspection	1 sample per 50,000 feet	1.2 m (4 ft)	
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")	<b>Form 02415 or 2403</b> See VII.1.A.

## 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	<b>Form 02415 or 2403</b> Check domestic steel requirement under 1601
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.		<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>
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.		<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>
2557	3. Fence C. Gates	3379	Visual Inspection	No sample required. See notes.		<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>
2557	3. Fence D. Barbed Wire	3376	Visual Inspection.	One full height sample per 50 rolls	1 m (3 ft)	<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>

## 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)	<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>
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)	<b>Form 02415 or 2403</b> 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, <a href="http://www.dot.state.mn.us/materials/lab.html">www.dot.state.mn.us/materials/lab.html</a>
2402	4. Water Pipe and other Piping Materials	3364, 3365, 3366 & Special Provisions				<b>Form 02415 or 2403</b> 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		<b>Form 02415 or 2403</b> 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)	<b>Form 02415 or 2403</b> For Epoxy-Coated bars, steel will be tagged "Inspected" when it has been sampled and tested by Mn/DOT 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)	<b>Same as 5.B</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 <b>Notes</b> )	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.		<b>Form 02415 or 2403</b> 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) and Structural Fasteners	3385 3391	Visual Inspection and Material verification testing.	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 or fastener type. Test results of sample must verify compliance to product specifications. Supplier shall retain copy of passing test results for one year and supply with subsequent jobs. When no previous test results are available, one complete anchor rod assembly with all required nuts and washers shall be sampled and tested from each type on the project. Prior to installation, field to obtain copy of passing test report(s).
2401 2411 2433	8. Anchorages (Drilled In)	Special Provisions	Visual Inspection	No laboratory samples required		Note: Before installation, verify that anchorages are on the qualified products list <a href="http://www.dot.state.mn.us/products">www.dot.state.mn.us/products</a>
2402	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>

## 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 2405	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2402	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2402	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2402	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>

## 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	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2402	9. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2564	10. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>

## 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	11. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>
2565	12. 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: <a href="http://www.dot.state.mn.us/bridge/">http://www.dot.state.mn.us/bridge/</a>

**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			<b>Form 02415 or 2403</b> 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.	<b>Form 02415 or 2403</b> Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected".
2504	3. Insulation Board	3760	Visual Inspection	None		<b>Form 02415 or 2403</b>
2402	4. Elastomeric Bearing Pads	3741 and Special Provisions	Check dimensions Check repair of tested pad	One sample, with one or more internal plates annually from each manufacturer.	Full size pad	Submit copy of Certificate of Compliance with pad. Do not use any pads that are not certified.

**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			<b>Form 02415 or 2403</b> 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			<b>Same as 1.A</b>

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

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2501	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	<b>Form 02415 or 2403</b>
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.		<b>Form 02415 or 2403</b> 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
2503 2506	3. Concrete Pipe B. Non-Reinforced Concrete Pipe	3253	Field Inspection: Check for damage and defects. Check dimensions as required. Check for producer's "Certified" stamp and signature on the certification document.		Full Size Pipe	<b>See 3.A</b>
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 <sup>3</sup> (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 <sup>3</sup> (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.		<b>Form 02415 or 2403</b> 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.			<b>Form 02415 or 2403</b> 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		<b>Form 02415 or 2403</b>
2503	9. Sewer Joint Sealing Compound	3724		One per shipment	0.5 liter (1 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 Geofam	Special Provisions	Visual Inspection Check for yellow aged material, uniformity and dimensions. Weigh 1'x1'x1' cut coupon to verify density every 200 m <sup>3</sup> (250 yd <sup>3</sup> )			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 <u>yearly</u> 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. <a href="http://data.ntpep.org/Module/PIPE/StatusReport.aspx">http://data.ntpep.org/Module/PIPE/StatusReport.aspx</a> 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	<p>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</p> <p>If using adhesive for seams, see Approved/Qualified Product List available at the Department's website</p>	<p>(a) 1 per project for pipe wrap or trench lining for Permeable base designs.</p> <p>(b) 1 per 50,000 yd<sup>2</sup> (40,000 m<sup>2</sup>) or fraction thereof of each type fabric or geogrid for all other uses.</p> <p>(c) Seam, if required, 1 per project minimum, additional as appropriate.</p> <p><b>Small Quantity Acceptance</b></p> <ul style="list-style-type: none"> <li>• For fabric totals less than 200 yd<sup>2</sup> (170 m<sup>2</sup>)</li> <li>• For pipe wrap totals less than 1000 Lin. Ft</li> <li>• No sampling required</li> <li>• Use Inspection Report for Small Quantities (Form 2403)</li> <li>• Check:                             <ul style="list-style-type: none"> <li>○ Certificate of Compliance</li> <li>○ Identifying label on product</li> <li>○ Geotextile Small Quantity Acceptance List at <a href="http://www.dot.state.mn.us/materials/aggregatedocs/gtxlist.pdf">http://www.dot.state.mn.us/materials/aggregatedocs/gtxlist.pdf</a></li> </ul> </li> </ul>	<p>(a) 10 Lin. Ft. (3 m)</p> <p>(b) 4 yd<sup>2</sup> (3 m<sup>2</sup>)*</p> <p>(c) 10 Lin. Ft. (3 m)**</p>	<p>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.</p> <p>Submit additional sample(s), if the manufacturer or model of geotextile or geogrid used changes during construction.</p> <p>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.</p> <p>* 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).</p>

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 Mn/DOT 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 <sup>3</sup> (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 Mn/DOT 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)	<b>Form 02415 or 2403</b> Usually inspected at the distributor. Documentation showing project number, reel number(s), & Mn/DOT 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. <u>Do not</u> use if <u>not</u> tested. Pre-inspected materials will <u>not</u> be tagged; an inspection report will be sent by the Mn/DOT 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		<b>Form 02415 or 2403</b> Fiber optic cables shall be listed on the Mn/DOT 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.		<b>Form 02415 or 2403</b> 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				<b>Form 02415 or 2403</b> Traffic signal and street lighting projects require luminaires and lamps to be listed on the Mn/DOT 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.