

106 Control of Materials

106.1 General

106.1.1 Materials

- (1) Provide materials conforming to the contract. Use new products and materials for items permanently incorporated into the work unless the contract specifies or allows otherwise. Use materials the contract specifies unless the engineer authorizes substitutes under [108.8](#). Monitor construction operations to identify potential nonconforming materials and prevent their incorporation into the work.
- (2) All materials are subject to the engineer's approval before incorporation into the work. The engineer may inspect or test all materials at any time during their preparation, storage, and use. Notify the engineer of the proposed source of materials before delivering those materials to the project site. If the engineer requests, provide samples of material and access to facilities that the engineer needs to assess the acceptability of all materials. The department will, on request, share with the contractor available information on a source or material. The department will maintain a web-based list of approved aggregate sources. Aggregate producers must provide test results as required in the department policy for aggregate source approval to have their source approved and to keep that approval over time.
- (3) For fabricated components, the materials and the fabricator are subject to the department's approval before delivery of those components to the project site. The engineer may require the contractor to obtain components from another department-approved source if the department determines a fabricator's product does not conform to the contract.
- (4) Do not incorporate materials into the work until the engineer approves those materials. However, the contractor may request permission to incorporate materials not already approved. The engineer will grant this permission only if the contractor can provide convincing evidence that the engineer will subsequently find those materials conforming. Incorporation of materials before approval is at the contractor's risk and permission to do so does not imply that the department will subsequently approve those materials.
- (5) Except as required under the contract, ensure that products incorporated into the work, either temporarily or permanently, do not display advertising or messages not directly related to the manufacturer, properties, or function of those products; or advertising or messages in violation of state statutes.

106.1.2 Project Materials Coordinator

- (1) Designate one person, either a member of the contractor's own organization or acting as an agent for the contractor, to act as the contractor's materials coordinator for the project. Ensure that this person is certified, before assuming the role of project materials coordinator, by successfully completing the HTCP online materials coordinator training available at:
<https://campus.uwplatt.edu/ems/highway-technician-certification-program>
- (2) The contractor's project materials coordinator is responsible for the following:
 - Communicating contract sampling and testing requirements to subcontractors at all tiers.
 - Reporting out-of-specification test results to the department as soon as the information is available.
 - Providing certified reports of test or analysis and manufacturers' certificates of compliance from subcontractors at all tiers and maintaining certification records as specified in [106.3.3.2](#).
- (3) Ensure that the contractor's project materials coordinator submits materials information required under the contract to a person the engineer designates. Also ensure that the contractor-designated materials person participates in scheduled weekly construction meetings or meets with their department counterpart as requested.

106.2 Supply Source and Quality

106.2.1 Waste Materials

- (1) The department encourages the contractor to incorporate material from the WDNR list of special wastes, cited in section 895.58 of the Wisconsin statutes, into the work. The department encourages maximizing use of special waste consistent with the contract and standard engineering practice.
<http://docs.legis.wi.gov/statutes/statutes/895>
- (2) For materials used during construction but not incorporated into the work, use multiple-use or biodegradable products, if practicable, to minimize the quantity of solid waste generated during construction operations.

106.2.2 Preference for US-Made Materials

- (1) Furnish materials manufactured to the greatest extent in the United States as provided in Wisconsin statute 16.754.

<http://docs.legis.wi.gov/statutes/statutes/16>

106.2.3 Product Substitution

- (1) Provide US standard or SI metric system products as the contract specifies. The department will allow substitutions for the specified product if both of the following conditions are met:
 1. The substitute product is made from the same material as the original product, and complies with the corresponding specification requirements for the substitute product.
 2. Dimensions of the substitute product are essentially equal to dimensions of the original product. The department will allow established manufacturing and fabrication tolerances unless the contract specifies absolute maximum or minimum dimensions.
- (2) Certify to the engineer, in writing, that the substitute product complies with the requirements of [106.2.3\(1\)](#). Do not furnish the substitute product until the engineer approves the substitution in writing. The department will pay for the installed quantity of the substitute product at the contract price for the original product.

106.2.4 Conditional Approval of Materials

- (1) The department may require, by contract or at the discretion of the engineer, inspection of materials at the point of manufacture or source of supply. The department may conditionally approve materials found to be in compliance at the point of manufacture or source of supply.
- (2) If inspection is required at a manufacturing or source plant, do the following:
 1. Provide the engineer with the results of relevant tests the contractor or producer performs.
 2. Cooperate with and assist the engineer.
 3. Secure for the engineer full access to parts of the plant used to manufacture or produce materials when contract work is in progress.
 4. If the engineer requires, secure acceptable working space in or near the plant.
 5. Provide advance notice of production schedules as the engineer requests.
 6. Provide and maintain adequate safety measures at the plant for the engineer.
- (3) The engineer may prohibit project site delivery of materials requiring inspection at the point of manufacture or source of supply until the engineer grants conditional approval.

106.3 Approval of Materials

106.3.1 General

- (1) The department will approve materials or components demonstrated to conform to the contract. The department will base its approval on conformance with the contract as close as practicable to the point of incorporation into the work. The department approves materials based primarily on the engineer's tests, tests the contractor performs under the quality management program, or tests the manufacturer performs and certifies. For materials conditionally approved at the point of manufacture or source of supply, the engineer may:
 1. Retest or re-inspect materials after delivery to the project site.
 2. Reject material subsequently found to be non-complying.
- (2) Material sampling, testing, and documentation requirements are specified in [CMM 800](#). The department may augment test results with documented performance history or inspection of processing, storage, handling, and construction operations. If the contract requires or the engineer requests, provide written documentation of the origin, composition, or process of manufacture of a material.
- (3) Conform to manufacturer-recommended procedures for products incorporated into the work unless the contract specifies otherwise. Provide copies of those procedures if the engineer requests. The contractor may request that the department approve alternate procedures.
- (4) The department's approval of materials or components does not constitute acceptance of the work incorporating those materials or components.

106.3.2 Approved Product Lists (APL)

- (1) The department maintains lists of approved products and approved manufacturers or suppliers. The department includes products on these lists based on the results of prior testing and a satisfactory performance history on department projects. The department may retest or re-inspect products after

delivery to the project site to verify that they conform to the contract. A product is nonconforming if verification test results indicate the product does not meet the requirements for inclusion in the [APL](#).

106.3.3 Approval by Certification

106.3.3.1 General

- (1) For manufactured products or assemblies, the department may base approval on a product certification or require both a product certification and production plant certification.

106.3.3.2 Product Certifications

- (1) For manufactured products or assemblies, the engineer may accept a certified report of test or analysis, or a certificate of compliance instead of performing tests on samples. If not designated in the contract for the specific material involved, the engineer will determine the form, content, and distribution of the required documents. Submit the number of copies of each document that the engineer specifies.
- (2) For testing documented by certificate, all sampling and testing procedures and testing facilities are subject to the review and approval of the department. The department may sample and test products to verify the certified test results. Provide samples as the department directs.
- (3) Create a file of manufacturers' certificates of compliance for the contract. Maintain these certifications on file for a period of 5 years after completing the contract work. If the department requests, provide the requested certification within 5 business days.
- (4) Products are nonconforming if one or more of the following apply:
 1. Certifications are not provided within the specified time or in the specified form.
 2. Certified properties do not conform to the contract.
 3. Verification test results indicate the products do not conform to the contract.

106.3.3.3 Plant Certifications

106.3.3.3.1 Precast Concrete Products

- (1) The department specifies precast concrete components and will allow precast alternates for cast-in-place concrete components. Ensure that precast concrete conforms to all of the following:
 1. All specific contract requirements for individual components.
 2. Components are manufactured in a plant certified, at the time of the letting and during production of components provided under the contract, by the department to produce those specific components. Department's approved vendors list for precast concrete products is available at:
<https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnsit-rsrcs/tools/appr-prod/default.aspx>
 3. Submit design and construction details to the engineer for approval before installation.

106.3.3.3.2 Prestressed Concrete Products

- (1) Conform to the prestress plant certification requirements specified in [503.2.4](#).

106.3.4 Approval By Sampling and Testing

106.3.4.1 General

- (1) Except as specifically provided in the contract, the engineer will determine sampling and testing frequencies and sample locations, both on and off the project site.
- (2) The department will determine the sampling and testing methodology using the following order of precedence. The department will:
 1. Use specific methods the contract references.
 2. Use CMM specified methods if the contract does not reference specific methods.
 3. Use department standard practices if the contract does not reference specific methods and the CMM does not specify a method.
- (3) All department and contractor personnel engaged in sampling and testing of materials incorporated into the work must be qualified under a department-accepted program for the specific tasks they are performing.
- (4) All laboratory facilities sampling and testing materials incorporated into the work must be qualified, for the specific tests they are performing, by the department under its laboratory qualification program.

106.3.4.2 Department's Material Testing Program

106.3.4.2.1 General

- (1) Furnish without charge all samples that the engineer requires and provide the facilities and staff required for collecting and forwarding them to the department. The department will, on request, share with the contractor test results obtained on contractor-furnished samples of materials.

106.3.4.2.2 Department-Approved Aggregate Sources

106.3.4.2.2.1 General

- (1) Coordinate with the department to collect sample coarse aggregates. The department and contractor will jointly obtain and split samples with the department taking immediate possession of the department's splits. The department will collect sample fine aggregates. Ensure that samplers are HTCP certified to sample aggregates. Costs associated with the required aggregate quality sampling and testing are incidental to the work.
- (2) Test coarse aggregate sources a minimum of every 5 years for pits and a minimum of every 3 years for quarries. The department will test fine aggregate sources a minimum of every 5 years for pits and a minimum of 3 years for quarries. Source approval begins January 1 of the sampling year. If a source is sampled after October 15 and is not incorporated into a project the same year, source approval begins January 1 of the following year. Marginal coarse aggregate sources; those with LA wear loss within 4.0 percent, sodium sulfate loss within 3.0 percent, or freeze-thaw soundness loss within 3.0 percent of a specification limit, may require annual testing. The department and contractor will jointly obtain and split samples to test marginal sources. The department maintains a list of current approved aggregate sources at:

<http://www.atwoodsystems.com/>

- (3) Ensure that testing is performed at a facility conforming to the department's laboratory qualification program by a HTCP-certified technician certified to test aggregate quality and that testing is performed.
- (4) Test the split of the coarse aggregate sample conforming to the following:

LA Wear (100 & 500 revolutions).....	AASHTO T96
Sodium sulfate soundness (R-4, 5 cycles).....	AASHTO T104
Fracture	ASTM D5821 as modified in CMM 860
Liquid limit ^[1]	AASHTO T89
Plasticity ^[1]	AASHTO T90
Coarse aggregate specific gravity and absorption.....	AASHTO T85
Lightweight Pieces in aggregate ^[2]	AASHTO T113

^[1] Prepare samples according to AASHTO R74, Method A for the P-4 fracture.

^[2] Required for aggregate sources used in concrete.
- (5) The department will test the fine aggregate sample conforming to the following:

Organic Impurities.....	AASHTO T21
Effect of organic impurities in fine aggregate.....	AASHTO T71
Fine aggregate specific gravity and absorption	AASHTO T84
- (6) Provide test results to the department's laboratory. The department may perform verification testing on their split of the sample.

106.3.4.2.2.2 Freeze-Thaw Soundness

- (1) Perform freeze-thaw soundness testing according to AASHTO T103 as modified in [CMM 860.2](#). Provide freeze/thaw soundness test results based on the fraction retained on the No. 4 sieve as follows:
 1. Using virgin crushed stone aggregates produced from limestone/dolomite sources in one or more of the following counties or from out of state:

Brown	Columbia	Crawford	Dane	Dodge
Fond du Lac	Grant	Green	Green Lake	Iowa
Jefferson	Lafayette	Marinette	Oconto	Outagamie
Rock	Shawano	Walworth	Winnebago	
 2. Using gravel aggregates produced from pit sources in one or more of the following counties or from out of state:

Dodge	Washington	Waukesha		
-------	------------	----------	--	--
- (2) The department may waive freeze/thaw testing for existing quarries determined to be in either the Silurian system or the Prairie du Chien group of the Ordovician system of rocks.

106.3.4.2.2.3 Quality Assurance

- (1) The department will approve an aggregate source and post contractor test results if either of the following conditions are met:
 - Both contractor and department results for split sample testing are within specifications.

- Contractor results are within specifications and department split sample results are within tolerances.

- (2) The department will accept the contractor's test results if department split sample results are within specified tolerances as follows:

TEST METHOD	TOLERANCE
LA wear (500 revolutions)	+/- 4.0%
Sodium sulfate soundness (R-4, 5 cycles)	+/- 3.0%
Coarse aggregate specific gravity	+/- 0.04
Coarse aggregate absorption	+/- 0.4%
Freeze-thaw soundness	+/- 3.0%
Lightweight Pieces	+/- 1.0%

- (3) The contractor may request re-sampling and re-testing by both the contractor and department. If requesting a second re-test, submit a written description of corrective action and additional process control measures taken during production to change the resulting material properties. A passing test result must be included with the corrective action documentation. If a third re-test is requested, communicate with the BTS concrete materials laboratory before sampling.
- (4) If the contractor disputes the department's test results, the department will initiate the dispute resolution process.

106.3.4.2.4 Dispute Resolution

- (1) The department and contractor will investigate discrepancies between department and contractor split sample test results.
- (2) If the department and contractor cannot resolve a discrepancy that could result in incorporating nonconforming work, the department and the contractor will use third-party tests by a mutually agreed on independent laboratory. The department will obtain, maintain custody of, and send samples to a third party for testing. The department and contractor will abide by a third-party test result if within either the department's or the contractor's test result by the tolerance specified in [106.3.4.2.2.3\(2\)](#). The party in error will pay independent laboratory costs.
- (3) For non-conforming material placed before acceptance testing or completion of the dispute resolution process, the engineer will do one of the following:
1. Reject that material subject to the provisions of [105.3.2.2](#) for unacceptable work.
 2. Approve those materials and adjust the contract price as provided in [105.3.2.1](#) for engineer-accepted nonconforming work.

106.3.4.3 Quality Management Program

106.3.4.3.1 General

- (1) Under the contract QMP provisions, the department will base approval of the covered materials on a combination of the results of the following:
1. Contractor quality control testing.
 2. Departmental verification testing.
 3. Inspections of the materials production, storage, handling, and construction processes.
 4. Dispute resolution procedures.
- (2) If disputed, approval of materials and components, as well as acceptance of the work incorporating those materials or components, is subject to review under the QMP dispute resolution process.

106.3.4.3.2 Process Control

- (1) Process control is the contractor's responsibility. Perform and document inspections, additional testing, and corrective action required to ensure materials incorporated into the work conform to the contract.

106.3.4.3.3 Department Verification

- (1) The department will periodically conduct independent verification tests to validate the quality of the materials incorporated into the work.

106.3.4.3.4 Independent Assurance

- (1) The department may evaluate all personnel engaged in sampling and testing of materials incorporated into the work. The department will base its evaluation on observation of procedures, required documentation, and split-sample testing.
- (2) The department may evaluate the contractor's sampling and testing equipment. The department will base its evaluation on visual inspection, calibration checks, or split sample or proficiency testing.

106.3.4.3.5 QMP Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict by investigating substantive discrepancies in their respective test results.
- (2) For potentially nonconforming materials, the department and contractor will thoroughly investigate to determine the quality and extent of material at risk. The department and contractor will review contract required data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and may perform additional testing. Use [ASTM E178](#) to evaluate potential statistically outlying data.
- (3) If project personnel cannot resolve a dispute that affects payment or could result in incorporating nonconforming work, the department will resolve the dispute using third-party testing by the department's central office laboratory or a mutually agreed on independent laboratory. The engineer and contractor will abide by third-party test results. The party in error will pay independent laboratory costs. The department may use third-party tests to evaluate questionable materials and determine appropriate payment. The department will determine the final disposition of nonconforming material as specified in [106.5](#).

106.4 Storing and Handling Materials

- (1) Store and handle materials to preserve their quality and fitness for the work. Provide easy access for the department to inspect and test stored materials. Even if approved before storage, the engineer may find materials nonconforming based on re-inspection before incorporation into the work.
- (2) Provide the engineer with the storage locations of materials intended for the work. If the engineer allows, the contractor may store materials on portions of the right-of-way not required for public travel. Provide additional off-site storage space at no additional expense to the department. Off-site storage areas for approved or conditionally approved materials are subject to the department's inspection and approval.

106.5 Nonconforming Materials

- (1) For nonconforming materials identified before incorporation into the work, the engineer will do one of the following:
 1. Reject those materials. Unless the engineer allows otherwise, remove rejected materials from the project site at no cost to the department. The engineer may allow the contractor to correct rejected materials. Obtain the engineer's approval for previously rejected, but subsequently corrected, materials before incorporating those materials into the work.
 2. Approve those materials subject to potential reduced payment. The engineer will determine the circumstances under which those nonconforming materials may be approved for incorporation into the work. The engineer will document the basis of approval and may execute a change order to adjust the contract unit prices for the nonconforming materials. If the contract does not specify a price adjustment, the engineer may adjust the price.
- (2) For materials incorporated in the work and later found to be nonconforming, the engineer will do one of the following:
 1. Reject those materials subject to the provisions of [105.3.2.2](#) for unacceptable work.
 2. Approve those materials and adjust the contract price as provided in [105.3.2.1](#) for engineer-accepted nonconforming work.