



**TREATED & UNTREATED
TIMBER & LUMBER**

GENERAL

Wood products consist of untreated and treated timber, lumber, piles, posts, and signposts. Treated and untreated wood products shall conform to the requirements of the Iowa DOT Specifications (4160–4165), and as described herein. Acceptance of untreated wood products shall be based on a visible/legible quality grade mark on material requiring a grade. Acceptance of treated wood products shall be on the basis of certification from an approved treatment plant, and through approved suppliers. The approved treated wood material shall be subject to acceptance and/or monitoring testing secured at destination, or from stockpiles as outlined herein. Approval to furnish treated wood products on a certification basis may be withdrawn for deficient test results, inadequate documentation, and/or lack of identification of materials. Approved Treated Timber and Lumber Suppliers and Treatment Plants are listed in Appendix A of this IM. **Any wood material furnished from an unapproved source shall not be accepted.**

The treater shall be responsible for conducting the required inspection before and after treatment on each charge of material intended for use on Iowa DOT Projects. A charge is defined as the entirety of all wood products treated in a cylinder container at one time. The treater shall record the test results for each charge of material tested on the quality control records. A shipment is defined as the entirety of all wood products in each delivery to a supplier's stock or to the project site. The treatment plant shall be considered the source for treated wood material. The Iowa DOT reserves the right to conduct acceptance inspection and/or monitor testing of wood products at the project site or from an approved supplier's stored stock (warehouse stock) destined for Iowa DOT Projects.

Each treatment plant shall have a Treatment Quality Control (QC) Program and qualified personnel to perform the treatment service. The Treatment Quality Control Program shall include testing of wood products and preservatives through the use of x-ray fluorescence spectroscopy. Quality control reports shall be maintained for two years by the treater. Quality control reports shall be made available to the Iowa DOT upon request. Each supplier shall have a Material Handling Quality Control Program to maintain record of approved stock of treated wood material.

APPROVAL OF TREATMENT PLANT

Prior to furnishing treated wood products on a certification basis, the treater shall request approval by performing the following:

1. Submit a signed & dated written application to the Structural Materials Engineer requesting approval to treat timber, lumber, piles, posts and sign posts for contracts in which the Iowa DOT Specifications are specified. In addition, the application shall contain the following:

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- a. A copy of the Treater's Quality Control Plan
 - b. A copy of certification documents
 - c. A sample of the treater's Identification Stamp. The minimum information contained in the stamp shall be the name of the treater, the year of treatment, the species of wood, the treatment type, the retention level, and the charge number. Refer to the Product Markings Section of this IM for more information.
2. Each treatment plant shall use a fully equipped laboratory to test, analyze, perform, and conduct all required testing.
 3. Each treatment plant shall staff and maintain qualified personnel to conduct inspection in the area of sampling and testing of treated wood
 4. Each approved treatment plant shall provide the Iowa DOT Office of Materials a notarized yearly application certifying that all treated timber and lumber supplied will meet all of the applicable Iowa DOT Specification requirements.
 5. Continued approval will be based on the following:
 - a. Satisfactory acceptance inspection and/or monitor samples test results.
 - b. Strict adherence to quality control procedures.
 - c. Compliance with all Iowa DOT Standard Specifications.
 6. Upon satisfactory review of the application and satisfactory treatment plant inspection of the facilities for compliance with quality control procedures submitted, the treater will be placed on the approved list in Appendix A.
 7. Treater's that have been approved on a project-by-project basis shall supply all necessary documentation for each shipment as described above. An acceptance sample shall be secured and tested for retention and penetration prior to incorporation into the project.

APPROVAL OF WOOD SUPPLIERS

Prior to furnishing untreated or treated wood products, the supplier shall submit the following:

1. A signed and dated application shall be submitted requesting approval to supply untreated or treated timber, lumber, piles, posts and signposts. In addition, the application shall contain the following:
 - a. A copy of the Material Handling Quality Control Procedure the supplier has established to maintain record of approved stock of wood material.

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- b. Sources of treated wood that will be handled by the company and supplied to Iowa DOT projects.
 - c. Provide traceability of shipments, lots, and charges of each treatment.
2. The Office of Materials of the Iowa DOT and the appropriate District Materials Office will schedule an initial inspection of the supplier's facilities and review material handling procedures.
 3. Upon satisfactory review of the application and satisfactory inspection of the facilities for compliance with material handling and stockpiling procedures submitted, the supplier will be placed on the approved list in Appendix A.
 4. The District Materials Engineer shall monitor untreated and treated wood material at a supplier's yard.

UNTREATED TIMBER & LUMBER REQUIREMENTS

- Unless otherwise stated, untreated timber and lumber shall conform to the requirements of Section 4162 of the Standard Specifications.
- All untreated wood that requires a grade shall bear a legible quality grade mark. A list of typical quality grade marks of grade inspection agencies approved by the American Lumber Standards Committee is included in Appendix B of this IM.
- Material less than three (3) feet in length will not require a grade mark; however, a certification statement shall be required certifying the grade of the material.
- Round wood posts, round woodpiles, and round wood poles do not require a grade mark.
- All sawn material shall be of the grade specified under the Iowa DOT Specifications.

TREATED TIMBER & LUMBER REQUIREMENTS

Unless otherwise stated, treated timber and lumber shall conform to the requirements of Sections 4160, 4161, and 4163 of the Standard Specifications. Treated wood posts shall conform to the requirements of Section 4164, and treated timber piles shall conform to the requirements of Section 4165. All treated timber and lumber products that require a grade, shall be made from untreated wood that has been graded in accordance with the specification requirements.

- Lumber material that lacks the visible quality grade mark shall not be treated nor shall be accepted.
- Material less than three (3) feet in length will not require a grade mark, but a certification statement will be required certifying the grade of the material.

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- Round wood posts, round woodpiles, and round wood poles do not require a grade.
 - All sawn material shall be of the grade specified under the Iowa DOT Specifications.

INSPECTION OF TREATED WOOD PRODUCTS BY THE TREATER

Inspection of treated wood products shall be conducted before and after treatment. The treater's quality control (QC) personnel shall be responsible for conducting before-and-after treatment inspection at a minimum rate of once per charge.

The treater shall be responsible for maintaining all records of quality control and verifying data, and types of treatments, and meeting the requirements of the appropriate American Wood Preservers Association (AWPA) Specifications as well as those of the Iowa DOT. The treater shall furnish treatment test results for each charge of inspected and accepted material. The treatment test results shall contain the information as prescribed in the Documentation Section and Appendix C of this IM.

When timber is processed at a lumber mill and shipped to another location for preservative treatment, the inspection prior to, and after treatment shall be performed at the preservative treatment plant and by the treater's personnel.

Before Treatment Inspection:

The treater's QC personnel shall conduct the *before-treatment inspection* in accordance with AWPA M2 Part A, Section 2. The inspection prior to treatment (i.e., untreated wood inspection) shall be made after the products are completely processed and ready for treatment. The inspection prior to treatment shall ensure that all wood products are free of incipient decay and conform to the species, grade, quality, nominal dimensions, straightness, and other requirements under which it was specified. The treater shall have the responsibility to verify that all sawn wood material contains a visible quality grade mark prior to treatment.

The treatment plant's QC personnel shall perform the following prior to treatment:

1. Quality of Material: The plant's QC personnel shall inspect the material for evidence of decay, damage, and processing defects. Wood posts shall be inspected for species, size, length, quality and straightness prior to treatment according to Section 4164.
2. Seasoning of Material: When sawed material is to be treated with waterborne preservatives, the moisture content prior to treatment, as determined by resistant type moisture meter, shall not be more than 20% if kiln-dried, or more than 23% if air-dried. The moisture content shall be measured from a depth equivalent to the required penetration up to a maximum of 1.5 inches (38 mm). Moisture reading data shall be incorporated into the QC records.

3. Quality Grade Mark: Treated wood products that require a grade shall have a legible and visible quality grade mark from an American Lumber Standards Committee accredited agency. Refer to the Wood Product Markings Section of this IM. In addition, the QC personnel shall verify that the grade of lumber is appropriate for the intended use of the product as described in Table 1.

TABLE 1: Grades for Treated Timber & Lumber

Material	Species	Nominal Size	Grade	Moisture Content Prior to Treatment	Notes
Sawed Wood Posts	Southern Pine	Per contract documents	No. 1 or better	See Section 4161	1, 3
	Douglas Fir	Per contract documents	No. 1 or better	See Section 4161	1, 2, 3
Wood Sign Posts	Southern Pine	4"x4"	No. 2 Dense	See Section 4161	
		4"x 6"	No. 1 Dense	See Section 4161	
	Douglas Fir	4"x 4"	No. 2	See Section 4161	2
		4"x 6"	Dense No. 2	See Section 4161	2
All other	Douglas Fir	Per contract documents	See Section 4162	See Section 4161	1, 2
	Southern Pine	Per contract documents	See Section 4162	See Section 4161	1

1. Material less than 3 ft. in length does not require a grade mark; however, a certification of grade must be provided. Round material does not require a grade.
2. Douglas Fir (Coastal Region) shall be incised.
3. Terminal posts that are 45 inches in length used for guardrails shall be stamped **MFG No. 1** to indicate that the terminal posts were cut from an original piece graded as a No. 1. Wane requirements shall be waived.

Any wood products not conforming to the Iowa DOT requirements shall not be accepted for treatment.

After Treatment Inspection:

Inspection *after treatment* shall be conducted by the treater's quality control personnel in accordance with AWPA M2 Part A, Section 4. The treater shall be responsible for obtaining representative samples and testing for penetration and retention. Penetration testing for colorless or waterborne solutions shall be determined in accordance with AWPA A3 and M2 using reagents. Penetration test results of preservatives shall be in conformance with the appropriate AWPA standard for the commodity and species being considered.

Retention shall be determined by x-ray fluorescence spectroscopy in accordance with AWPA A9 for waterborne preservatives and pentachlorophenol. For creosote, retention shall be determined in accordance with AWPA A6. Retention levels of preservatives shall be in conformance with the minimum preservative retention requirements table in Section 4161.03 of the Standard Specifications for the species and preservative being treated.

A sample for treatment testing shall be in accordance with the appropriate AWPA Standard for the commodity and species being treated. All borings shall be taken approximately midway between ends, and from the edge containing the largest amount of sapwood. See Appendix D of this IM for an illustration.

The treater shall perform the following after-treatment inspection:

1. Quality of Material: Material shall be inspected for any evidence of decay, processing requirements and defects, in addition to any damage to the material due to the treatment process. Wood posts shall be inspected after treatment for straightness. (Section 4164.)
2. Moisture Content: Lumber 2 inches (50 mm) or less in nominal thickness that is treated with a waterborne preservative shall be dried after treatment to a moisture content of not more than 20% if kiln-dried, or not more than 23% if air-dried unless otherwise specified.
3. Penetration & Retention Tests: Core samples shall be obtained to perform penetration and retention tests in accordance with the applicable Iowa DOT and AWPA Specifications. See Appendix D for additional information
4. Treatment Plant Identification Stamp: The treater shall ensure that all treated wood products bear a legible brand/stamp/tag as prescribed in the Wood Products Markings Section of this IM.
5. It is the treater's responsibility to verify that all required product markings are on the material at the end of the inspection. Refer to the Wood Product Markings Section of this IM.
6. The treater shall furnish a treatment test report according to the guidelines as described in the Documentation Section and Appendix C of this IM.

QUALITY CONTROL OF TREATMENT PROCESS

The treater shall be responsible for conducting and documenting all quality control procedures. Quality control shall be conducted before, during, and after treatment in accordance with AWPA Standard M3 Part A, and M2 Part A. The treater shall ensure that all quality control data has been properly documented and shall make quality control reports available for review.

Quality Control Before Treatment:

The treater shall perform quality control checks before treatment in accordance with AWPA M2 Part A Section 2, and M3 Part A, Section 2. The treater shall be responsible to ensure all wood products are free of incipient decay and conform to the species, grade, quality, nominal dimensions, straightness, and any other requirements under which it was specified. Unless otherwise noted elsewhere, the treater shall determine moisture content required for every charge on the required minimum number of pieces, using a resistance-type moisture meter. The moisture content shall be measured at a depth equivalent to the required penetration up to a maximum of 1.5 inches (38 mm).

Quality Control During Treatment:

The treater shall perform quality control checks during treatment in accordance with AWPA M2 Part A, Section 3, and AWPA M3 Part A, Sections 3, 4, and 5. Preservatives and treatment conditions shall meet the requirements of the appropriate AWPA Standards for the commodity, species being treated, and preservatives used.

Quality Control After Treatment:

The treater in accordance with AWPA M2 Part A, Section 4, and AWPA M3 Part A, Section 6 shall perform quality control checks after treatment. The treater shall be responsible for obtaining representative samples and testing them for penetration and retention for their Quality Control Program. Penetration of preservatives shall be in conformance with the appropriate AWPA Standard for the commodity and species being treated. Retention results shall be in conformance with the minimum preservative retention requirements table in Section 4161.03 of the Standard Specifications for the species and preservative being treated.

A quality control sample shall be taken in accordance with AWPA M2 and the appropriate AWPA standard for the commodity and species being treated. All borings shall be taken approximately midway between ends, and from the edge containing the largest amount of sapwood. See Appendix D of this IM for an illustration.

WOOD PRODUCT MARKINGS

1. Identification Mark or Brand

The treater shall mark all treated material with a permanent, legible identification brand or mark. Acceptable brands or marks shall be similar to brands listed in AWPA Standard M6. A guideline for this brand is provided in Appendix F of this IM. The identification information may be heat branded, hammer stamped, or metal tagged. If metal tags are used, they shall be 19-gauge or thicker, Grade 40, G60 galvanized steel. The information on the metal tag shall be stamped or engraved with a minimum character size of 1/8 inch. The identification brand/stamp/tag shall be placed permanently on each piece of treated material of 3 feet in length or larger per charge. The minimum information contained in the brand/mark/tag shall be the name of the treatment plant, the year of treatment, the species of timber, the preservative treatment type used, and the retention level treated. This brand/stamp/tag may be placed on the material before or after treatment depending on the applicable industry practice.

2. Grade Mark

All untreated and treated wood material that requires a grade, with the exception of 45-inch terminal posts, shall contain a quality grade mark of an accredited grade monitoring and inspection agency approved under the American Lumber Standards Committee (ALSC). A list of typical quality grade marks of grade inspection agencies approved by the ALSC is included in Appendix B of this IM.

NOTE: In the event that terminal posts that are 45 inches in length to be used for guardrails can not be stamped with a quality grade mark due to sizing of material, terminal post shall then be stamped **MFG No. 1** to indicate that the terminal posts were cut from an original piece graded as a No. 1. Wane requirements shall be waived.

Material less than three (3) feet in length does not require a grade mark; however, a certification statement from the mill/processor certifying the grade of the material shall be provided. See Documentation Section of this IM. Round wood posts, round woodpiles, and round wood poles do not require a grade, since the grading rules apply only to sawn material.

3. Additional Stamps or Marks

In addition to the required product markings, the contractor shall be responsible to ensure that any additional marks required (7-foot length mark on guardrail posts) are placed on the material prior to incorporation into the project.

DOCUMENTATION

- **Certification of Grade**

A quality grade mark is required on each piece of material over three (3) feet in length. Material less than three (3) feet in length shall not require a grade mark; however, a certification statement shall be required from the lumber mill that re-sized the material. The certification statement shall be as follows:

“This material of size _____ has been processed from _____ (Fill in Species of Wood) _____ originally graded as _____ (Fill in Grade No.), and it meets the applicable Iowa DOT Specifications and IM requirements.”

- **Certification of Treatment**

The treatment plant shall furnish an inspection/treatment test report for each charge of material inspected. The report shall include a certification statement in which the treatment plant certifies that the material has been inspected according to the appropriate AWWA Standards. In addition, the certification statement from the treater shall clearly express that the material has been inspected and it complies with the applicable Iowa DOT Specifications.

The treatment inspection report shall contain the minimum information required under the Inspection Report Guidelines as outlined in Appendix C of this IM.

A copy of all treatment inspection reports and any grade certification statements shall accompany all direct shipments from the treatment plant to a project site, and shipments to suppliers. Suppliers who furnish material from stock shall retain copies of all inspection reports for a period of three years.

The contractor, either directly or through their supplier, shall be responsible to furnish a copy of all treatment inspection reports and any grade certification statements to the Project Engineer and the appropriate District Materials Engineer prior to the incorporation into the project. It shall be the contractor's responsibility to ensure the project number is provided on all inspection reports and certification statements.

- **Invoice or Bill of Materials**

Each shipment to a project site shall be accompanied by a detailed identification list, invoice or bill of materials. It shall show the project number, the treater, the type and quantity of material, and the charge number(s) of pieces in the shipment.

MONITORING, ACCEPTANCE, & INSPECTION BY IOWA DOT

Treated wood products will be monitored at the supplier's yard. The District Materials personnel will be responsible for collecting monitoring samples, and performing inspections of the treated wood products at the supplier's yard.

The inspection rate for acceptance of material at an approved supplier's warehouse stock shall be once per new shipment of treated material per source arriving at the supplier's yard. The appropriate District Materials Inspector assigned to monitor a supplier shall inspect the shipments to ensure all required marks and stamps are on the material, as well as ensure all proper documentation is in order. Upon satisfactory inspection, the District Materials Inspector shall stamp and/or sign the inspection reports as approved. The material shall be then considered approved stock.

In addition, random examinations and inspections of treated and untreated wood shall be conducted at the supplier's yard to ensure conformity to the specification requirements for damage or defects.

Contractors who purchase material directly from the source shall schedule an inspection of the shipment(s) of wood with the appropriate District Materials Engineer prior to incorporating wood products into the project. The District Materials Inspector shall then inspect the shipment(s) to ensure all required marks and stamps are on the material, as well as ensure all proper documentation is in order. Upon satisfactory inspection, the District Materials Inspector shall stamp and/or sign the inspection reports as approved. The material shall be then considered approved stock.

The minimum monitor-sampling rate shall be four samples per source per year. (A treater shall be considered the source) A sample shall consist of a minimum of ten cores per charge/treatment type sampled. All borings shall be taken approximately midway between ends. All borings shall also be taken from the edge that contains the largest amount of sapwood and towards the heart of the lumber. Abnormalities such as knots, shakes, splits, etc., shall be avoided. Refer to Appendix D of this IM for Wood Sampling Instructions.

All borings obtained shall be stored in protective containers. Each container shall indicate the outer edge of the core. An "Identification of Wood Boring Sample" Form shall accompany each sample, as well as any additional forms required. Wood sampling forms can be found in Appendix E of this IM. Refer to Appendix D (Wood Sampling Instructions) for additional information on forms. Samples will be processed and tested by the Central Materials Laboratory.

ACCEPTANCE OF WOOD PRODUCTS

For wood products to be accepted for incorporation into Iowa DOT projects the following conditions shall be met:

1. **Approved Sources:** treated wood products shall be furnished from approved treatment plants and through approved wood suppliers. Untreated wood products shall be furnished through approved suppliers.
2. **Identification Brand:**
 - a. The treater shall mark all treated material with a permanent, legible identification brand or mark. The identification brand/mark may be heat branded, hammer stamped, or metal tagged. For material treated with waterborne preservatives, the identification brand may be ink stamped, provided the information is clearly visible and legible. The minimum information contained in the brand/mark/tag shall be the *name of the treatment plant, the year of treatment, the species of timber, the preservative treatment type used, and the retention level treated.*
 - b. The identification mark shall be placed on each piece of treated material of 3 feet in length or larger per charge. This brand/stamp/tag may be placed on the material before or after treatment depending on the applicable industry practice.
 - c. Refer to Wood Product Markings Section of this IM and Appendix F for complete details
3. **Grade Stamp:** All material over three (3) feet in length, with the exception of 45 inch terminal posts, that requires a grade shall have a visible quality grade mark on at least one side of each piece of material. Refer to Wood Product Markings Section of this IM. Appendix B lists the acceptable typical grade marks.

NOTE: In the event that terminal posts that are 45 inches in length to be used for guardrails can not be stamped with a quality grade mark due to sizing of material, terminal post shall then be stamped **MFG No. 1** to indicate that the terminal posts were cut from an original piece graded as a No. 1. Wane requirements shall be waived.

4. For material less than three (3) feet in length that requires a grade, a grade certification statement from the lumber mill/producer shall be provided. Refer to Product Markings and Documentation Sections of this IM.
5. In addition to the product markings as stated above, any other marks (such as size, lumber mill name, etc.) that are required in the contract documents shall be placed on the material prior to incorporation of the project. Refer to Product Markings Section of this IM.

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6. The contractor, either directly or through their supplier, shall provide the Project Engineer and appropriate District Materials Engineer with all certification documents and any grade certification statements prior to the incorporation of wood products into the project. Inspection reports shall bear a stamp and/or signature from an Iowa DOT inspector who inspected the material. Refer to the Documentation Section of this IM.
 7. In addition, each shipment to a project site shall be accompanied by a detailed identification list, invoice or bill of materials. It shall show the project number, the treater, the type and quantity of material, and the charge number(s) of pieces in the shipment.
 8. Iowa DOT inspection and monitor testing shall indicate that all specifications and commodity standards have been met.
 9. Inspection reports and any requested quality control documentation shall indicate that all specifications and commodity standards have been met.

Should there be any discrepancies between the Iowa DOT monitor test results and the treater's test results or treater quality control; the Iowa DOT results shall be conclusive and binding. Before rescinding approval of a shipment based on test result discrepancies, the Iowa DOT shall collect one additional penetration and retention sample on the same shipment for re-testing. A noncompliant result from any additional re-tests shall be considered sufficient cause to rescind approval of a shipment.