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**DIVISION 2300  
TIMBER, LUMBER, PILING AND POSTS**

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## 2301 - WOOD POSTS

### SECTION 2301

#### WOOD POSTS

##### 2301.1 DESCRIPTION

This specification governs wood posts and spacer blocks for guardrail, and wood sign support posts. This specification does not cover wood fence posts. It establishes a quality control/quality assurance (QC/QA) and prequalified plant system for producers of wood products.

##### 2301.2 REQUIREMENTS

###### a. General.

(1) Any plant producing wood posts and spacer blocks for guardrail, and wood sign support posts through this specification must be currently prequalified. A plant is any facility that produces the posts as the final treated product. Prequalification requires a thorough inspection by KDOT and comparison testing to verify the plant has the capability to comply with this specification. Procedures for prequalification are outlined in **subsection 2301.4**.

(2) Unless shown otherwise in the Contract Documents, produce all posts provided under this specification to meet the applicable subsections.

(3) Quality Assurance inspection of wood posts and spacer blocks for guardrail; and wood sign support posts will be done at the job site on a random, project by project basis as outlined in **subsection 2301.4e**.

(4) Wood species not listed but meeting or exceeding these specifications will be considered by the Bureau Chief of Construction and Materials upon written request.

(5) Unless shown otherwise in the Contract Documents, treat material listed under this section with a preservative treatment in accordance with **subsection 2301.2e**.

###### b. Material Specifications and Grading Rules. Comply with the applicable parts of the following:

(1) ASTM D 245.

(2) Standard grading rules as set forth by Southern Pine Inspection Bureau.

(3) Standard grading rules as set forth by Western Wood Products Association.

(4) Product Standard 20 American Softwood Lumber Standard as set forth by the U. S. Department of Commerce.

(5) Any commercial grading rules that will provide material of equal or greater stress value may also be used. The burden of proof regarding the equality of the proposed rules lies with the supplier.

(6) Provide materials that are free of decayed wood, rot, red heart, and detrimental compression wood.

(7) **F<sub>b</sub> defined.** F<sub>b</sub> is the minimum extreme fiber strength in bending under dry conditions (from grading rules tables). Specific requirements for each type of product supplied are outlined in the paragraphs below.

###### c. Guardrail Posts and Spacer Blocks.

(1) Posts and spacer blocks provided under this specification are surfaced on four sides (S4S) and complies with the dimensions and details shown in the Contract Documents.

(2) Unless shown otherwise in the Contract Documents, provide posts and spacer blocks graded No. 1 (posts and timbers – 5 inch X 5 inch and larger), with a minimum extreme fiber strength in bending, F<sub>b</sub>, of 1200 psi, regardless of species. Sterilize posts and spacer blocks by kiln drying.

###### d. Sign Support Posts.

(1) Posts provided under this specification are S4S and comply with the dimensions and details shown in the Contract Documents.

(2) Unless shown otherwise in the Contract Documents, provide posts graded as follows:

Southern Pine:

4 inch X 4 inch, No. 1 Dense, F<sub>b</sub> = 2000 psi

4 inch X 6 inch, No. 1 Dense, F<sub>b</sub> = 1750 psi

Douglas Fir:

4 inch X 4 inch and 4 inch X 6 inch

Select Structural, Base Value F<sub>b</sub> = 1450 psi

Note: Douglas Fir base value does not include size factors.

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### e. Preservative Treatment and Handling of Wood Products.

- (1) General. Treat all wood products with a wood preservative registered by the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act.
  - (a) Unless shown otherwise in the Contract Documents, treat all wood products provided under this section to meet the applicable subsections in American Wood Protection Association (AWPA) Standard C14, "Wood for Highway Construction—Preservative Treatment by Pressure Processes".
  - (b) Treatment processes not listed but meeting or exceeding this section will be considered by the Bureau Chief, Construction and Materials, upon written request.
- (2) Preservative Types. Use preservatives that comply with AWPA Standard U1, Commodity Section A: Sawn Products or Commodity Section B: Posts, or AASHTO M 133.
- (3) Fabrication. No field fabrication will be permitted, unless shown otherwise in the Contract Documents. Complete all adzing, boring, chamfering, framing, gaining, incising, surfacing, and trimming prior to treatment.
- (4) Treatment Processes.
  - (a) Use preservative treatments that comply with the latest requirements of AWPA Standard U1, Commodity Section B: Posts, or AASHTO M 133.
  - (b) Stamp or tag each treated piece with the plant identification and minimum specified treatment recorded in pounds per cubic foot (PCF).
- (5) Handling. Load, unload or transfer treated posts and blocks using procedures specified in AWPA M4, "Standard for the Care of Preservative-Treated Wood Products".
- (6) Shipments. Do not ship treated material while still dripping. Unless kiln dried, retain it in the treatment yard for a minimum of 3 days. Retain the material in the treatment yard a minimum of 7 days when the ambient temperature remains below 60°F.
- (7) Storage.
  - (a) Place treated wood products on treated or non-decaying skids or cribbing, that are positioned to support the material to minimize distortion.
  - (b) Sign Support Posts. Stack and tightly band with spaced layers to permit air flow between each layer and minimize warping. Banding consists of 1 band for each 4 feet of bundle length, with a maximum spacing of four feet between bands, end bands being not more than 1 foot from the end of the bundles. Place spacers (stickers), a minimum of 1/8 inch in thickness, between each horizontal layer of posts at each banding location.
  - (c) Others. Tightly band all other wood products to minimize warping.
  - (d) Place the material in an area free of debris, decayed wood, and dry vegetation, and with sufficient drainage to prevent material from being subjected to standing water.
- (8) Damage During Shipment. Damage affecting the structural integrity or utility of the item is cause for rejection.

### 2301.3 TEST METHODS

Conduct all measurements, visual inspection, and grading for the wood products according to the procedures specified in **subsection 2301.2b**. For preservative treatment, analysis will be performed as set forth in AWPA Standard A9, "Standard Method for Analysis of Treated Wood and Treating Solutions by X-Ray Spectroscopy".

### 2301.4 PREQUALIFICATION

#### a. General.

- (1) Contact the Bureau Chief of Construction and Materials to arrange for the required sampling, observation of testing procedures and review of the plant quality control program.
- (2) The plant is to absorb all expenses associated with the inspection by the Engineer's representative. This includes travel, subsistence and lodging, and the expenses of shipping any selected specimens to KDOT.
- (3) It is the option of the Bureau Chief of Construction and Materials to grant prequalified status to a plant based upon the qualification test and inspection results of transportation agencies of other states.
- (4) A plant will be notified in writing in the event of any change in their prequalified status. The Bureau of Construction and Materials will maintain a list of all plants that are prequalified to provide wood guardrail posts and spacer blocks, and wood sign support posts to KDOT projects.

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**b. Plant Quality Control Requirements.** The plant must have a quality control section identified within its organization that is adequately staffed to perform the required lot-by-lot testing. The plant laboratory must have proper equipment, calibrated annually according to the requirements of the equipment manufacturer's recommendations, with which to adequately perform all measurements, visual inspection, and testing related to **subsections 2301.2b.** and **2301.2e.** Provide a copy of the plant quality control plan to the Engineer's representative during the plant inspection. As a minimum, the plan will include 1) grading procedures and personnel qualifications, 2) treatment procedures and personnel qualifications, 3) record keeping procedures and personnel, 4) copy of plant identification stamp or tag, and 5) notification and resubmittal in the event of any changes to procedures and personnel, or the quality control plan.

**c. Sampling and Testing Procedure.** The Engineer's representative will select the test samples, at random, at the plant. Provide access to all facilities necessary for the Engineer's representative to randomly select samples from all bundles/charges as defined below. Samples for grading comparisons will be selected from material "in the white", and samples for comparison of treatment testing will be selected from the finished product. Provide plant personnel to handle and label necessary bundles/charges from the randomly selected samples.

(1) Lot size. All stock within a lot is subject to sampling unless exceptions are authorized by the Bureau Chief of Construction and Materials. Lots are defined separately for "in the white" and finished products:

(a) "In the white." The lot of wood that is subject to sampling for grading comparison includes all sizes and grades of material described in this specification that are in stock.

(b) Treated. The lot of wood that is subject to sampling for treatment comparison includes all finished products of material described in this specification that are in stock.

(2) The lot sample size will be:

(a) 10 bundles of "in the white", and

(b) 10 charges of finished product.

(3) Sample preparation. Storage and handling of the products will be evaluated during this phase.

(a) Transport the "in the white" bundles selected by the Engineer's representative to an area of the plant that will be suitable for breaking, re-grading, and re-bundling. Provide plant personnel to handle, break and re-bundle the randomly selected samples.

(b) Take borings from the finished product bundles where they are stored. They may need to be broken open and moved around for sampling access. Take borings of the finished product as described in the AWP Standard M2, "Standard for Inspection of Wood Products Treated with Preservatives". Take 20 borings from each of the 10 selected charges of finished product. Assign each sample, consisting of the 20 borings, a unique identification number. Trim all 20 cores and grind as required by the test method. Place each sample in a sealed container and durably affix the sample identification number to each container. The sample, or a portion thereof, is tested by the plant. After plant testing is completed, combine the tested and untested portions of the sample so that comparison testing can be performed by KDOT. Conduct all sample preparation operations in the presence of the Engineer's representative.

(4) Testing.

(a) All items in each bundle "in the white" will be graded for comparison. Provide the Engineer's representative with the plant's grading for each "in the white" lot sampled for use in this comparison. The Engineer's representative will grade the test bundles according to the procedures and requirements of the applicable specifications and grading rules as referenced in **subsection 2301.2b.**

(b) Test each sample according to the procedures and requirements of the applicable AWP Standard A9. For the purpose of comparing the plant and KDOT testing laboratories, each of the 10 samples is to be tested by each laboratory. Provide all the necessary facilities and test records required by the Engineer's representative to witness the tests. Record the plant test results onto a KDOT form and sign the form. Provide these results and the remaining companion samples to the Engineer's representative.

(5) Comparison of Test Results.

(a) KDOT grading results will be compared with the producer's results for the total of the sampled lot. The differences between KDOT and producer results may not exceed 5% of the sample total.

(b) KDOT's treatment testing results will be compared to the producer's results for each sample, taking into consideration the reproducibility expressed in the precision table in AWP Standard A9. None of the samples may fall outside the acceptable range.

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(c) A sample that fails the comparison requirements may be re-sampled 1 time only, and on a 2-for-1 basis (both samples must pass or the entire lot fails). It is preferable that the resample be removed from the same lot that failed if it is still available. The results of the resample specimens will replace the initial test results.

### d. Plant Status.

(1) Attainment of prequalified status. In order for a plant to be prequalified to provide wood guardrail posts and spacer blocks, and wood sign support posts to KDOT projects, comply with the requirements referenced in **subsection 2301.4c. (5)**.

(2) Renewal of prequalified status. The following schedule will apply to plants that have attained their initial prequalification status:

(a) One year after the initial prequalification, the plant will again be evaluated according to **subsection 2301.4**.

(b) For plants that retain prequalification after the second evaluation, the next evaluation will be required after a 2-year time interval.

(c) For plants that retain prequalification after the third evaluation, the required evaluation time interval will be extended to 3 years thereafter provided the plant maintains continuous prequalification and is not disqualified.

(d) A prequalified plant that becomes disqualified may regain prequalified status at the next annual renewal inspection, but must comply with all the requirements that apply to initial prequalification including the re-inspection schedule outlined above. The disqualified plant may petition for an immediate re-evaluation provided it can be demonstrated that the disqualifying deficiencies have been corrected.

(e) A plant that chooses not to renew its prequalified status, but then later chooses to again prequalify must comply with all the requirements that apply to initial prequalification, including the re-inspection schedule outlined above.

(3) Disqualification. All prequalified plants that are currently providing wood posts for KDOT projects will have their product quality monitored through the use of verification inspections as described in **subsection 2301.4e**. Failure of 2 verification samples within 1 year of each other will result in disqualification of the plant and removal from the prequalified source list. In the event of disqualification, the plant is subject to the requirements of **subsection 2301.4d.(2)(d)**. A plant that fails to comply with these requirements 2 times, consecutive or otherwise, will be permanently disqualified unless an exception is granted by the Bureau Chief of Construction and Materials due to change in ownership, plant management or other significant reorganization.

### e. Quality Assurance.

(1) Verification Inspections. During the course of each year, the Wichita Regional Materials Laboratory will randomly select a minimum of 1 project or contract containing wood posts provided by each of the prequalified plants. The Wichita Regional Materials Laboratory will contact the District administering these projects or contracts for scheduling of the field verification testing. Upon notification of a verification inspection, the Contractor is required to store materials in a manner allowing easy access for inspection and, upon arrival of the Engineer's representative, provide adequate manpower for the handling and re-stacking of the product.

(2) Verification Testing.

(a) All materials used on the project are considered to be 1 lot and will be subject to both grade and treatment verification testing. A minimum of 20 randomly selected pieces will be graded. In addition, a single sample, consisting of a single boring from each of the same graded pieces will be treatment tested. Borings will be taken as described in AWPAS Standard M2 and tested in accordance with AWPAS Standard A9. If the sample fails to meet the specifications for grading or treatment, it is cause for rejecting the entire lot.

(b) In the event that the verification samples fail to comply with the preceding, the Engineer's representative may randomly resample the lot 1 time only on a 2 to 1 basis, or reject the lot. If the lot is re-sampled, then both samples must pass, or the entire lot is rejected. The results of the resample specimens will replace the initial test results.

(c) The Contractor is to replace the rejected lot at no additional cost to KDOT. Remove the rejected lot from the job storage site.

(3) Verification Related Costs. KDOT costs for verification inspection and testing will be borne by KDOT. Excessive inspections for replacement of rejected material may be charged to the Contractor.

## 2301 - WOOD POSTS

### 2301.5 BASIS OF ACCEPTANCE

- a. The plant must be currently prequalified.
- b. Provide the Engineer's representative of the project with a copy of plant test reports that govern the analysis of the wood post and block lots delivered to the project. Include a report of the preservative treatment analysis for each lot. Mail a copy of the reports to the Wichita Regional Materials Laboratory, Bldg. 1, 3200 E 45<sup>th</sup> N, Wichita, KS 67220. Verify that the project number and/or the contract number appear on each report.
- c. Provide the Engineer's representative of the project with shipping orders, an invoice, or cover letter that documents the project number, wood post and block sizes, job, or producer order numbers, and the total number of each lot of the represented wood posts and blocks delivered to the project.
- d. Provide the Engineer's representative of the project with a certification stating that the wood posts and blocks delivered to the project comply with this specification, and that the preservative treatment complies with the applicable AWWPA standards. This documentation must bear the signature and title of an official of the plant with contract binding authority, and must be notarized. This requirement may be included on the test reports referenced in **subsection 2301.5b**.
- e. As a minimum, wood posts and blocks must be legibly stamped with the lumber grade, producers' identification, and minimum specified treatment recorded in PCF.
- f. The final disposition of the wood posts and blocks will be completed at the final destination as the result of inspection for the quality of workmanship and the delivery condition and approval of the associated required documentation.

## 2302 - WOOD FENCE POSTS

### SECTION 2302

#### WOOD FENCE POSTS

##### 2302.1 DESCRIPTION

This specification governs wood fence posts.

##### 2302.2 REQUIREMENTS

###### a. General

(1) Unless shown otherwise in the Contract Documents, produce all posts provided under this specification to meet the applicable subsections.

(2) Quality Assurance inspection of wood fence posts will be done at the job site on a random, project by project basis as outlined in **subsection 2302.2d**.

(3) Wood species not listed but meeting or exceeding these specifications will be considered by the Bureau Chief of Construction and Materials upon written request.

(4) Unless shown otherwise in the Contract Documents, treat material listed under this section with a preservative treatment according to **subsection 2302.2c**.

###### b. Material Specifications and Grading Rules.

(1) General. Comply with the applicable parts of the following:

(a) Standard grading rules as set forth by Southern Pine Inspection Bureau.

(b) Standard grading rules as set forth by Western Wood Products Association.

(c) Product Standard 20 American Softwood Lumber Standard as set forth by the U. S. Department of Commerce.

(d) Any commercial grading rules that provide material of equal or greater quality may also be used. The burden of proof regarding the equality of the proposed rules lies with the supplier.

(2) Additional Requirements

(a) Provide round posts that comply with the dimensions and details shown in the Contract Documents.

(b) Cut the posts from round, live, sound, and solid trees, free of decayed wood, rot, red heart, and detrimental compression wood. Unsound knots are not permitted. Sound knots will be permitted provided the diameter of the knot does not exceed one-third of the diameter of the post where it occurs.

(c) Groups of knots, or any combination of defects which impair the strength more than the maximum knot size, will not be allowed.

(d) When measured over the outer 2 inch of a radial line from the pith, display the following results:

- Douglas Fir with less than 5 annual rings per inch.
- Southern Pine with less than 4 annual rings per inch.
- None with less than 30% of summer wood.

(e) Provide straight posts such that a line drawn from the center of the top to the center of the bottom does not fall outside the center of the post by more than 1 ½ inch.

(f) Do not permit the diameter of the bottom of the post to exceed the diameter of the top of the post by more than ¼ inch per linear foot of post. The diameter of the post must vary uniformly from top to bottom.

(g) Cleanly peel the posts with by mechanical process or by hand. Follow the natural taper of the post in machine peeling operations. Keep the post free from the glazed surface left by dried sap. Trim all protruding knots flush with the sided of the posts and remove all spurs and splinters. Saw both ends of each post square with the longitudinal axis of the post.

###### c. Preservative Treatment and Handling of Wood Products

(1) General. Treat all wood products with a wood preservative registered by the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act.

## 2302 - WOOD FENCE POSTS

- (a) Unless shown otherwise in the Contract Documents, treat all wood products provided under this specification to meet the applicable subsections in American Wood Protection Association (AWPA) Standard U1, Commodity Section B: Posts, or AASHTO M 133.
- (b) Treatment processes not listed but meeting or exceeding these specifications will be considered by the Bureau Chief, Construction and Materials, upon written request.
- (2) Preservative Types. Use preservatives that comply with AWPA Standard U1, Commodity Specification A: Sawn Products or Commodity Specification B: Posts, or AASHTO M 133.
- (3) Fabrication. Complete all adzing, boring, chamfering, framing, gaining, incising, surfacing, and trimming prior to treatment.
- (4) Treatment Processes.
  - (a) Use preservative treatments that comply with the latest requirements of AWPA Standard U1 or AASHTO M 133.
  - (b) Stamp or tag each treated piece with the plant identification and minimum specified treatment recorded in pounds per cubic foot (PCF).
- (5) Handling. Load, unload or transfer treated posts and blocks using procedures specified in AWPA M4, "Standard for the Care of Preservative-Treated Wood Products".
- (6) Shipments. Do not ship treated material while still dripping. Unless kiln dried, retain it in the treatment yard for a minimum of 3 days. Retain the material in the treatment yard a minimum of 7 days when the ambient temperature remains below 60°F.
- (7) Storage.
  - (a) Place treated wood products on treated or non-decaying skids or cribbing, that are positioned to support the material to minimize distortion.
  - (b) Stack and tightly band with spaced layers to permit air flow between each layer and minimize warping.
  - (c) Place the material in an area free of debris, decayed wood, and dry vegetation, and with sufficient drainage to prevent material from being subjected to standing water.
- (8) Damage During Shipment. Damage affecting the utility of the item is cause for rejection.

### **d. Quality Assurance.**

- (1) Verification Inspections. During the course of each year, the Wichita Regional Materials Laboratory will randomly select a minimum of 1 project or contract containing wood fence posts provided by each of the supplying plants. The Wichita Regional Materials Laboratory will contact the District administering these projects or contracts for scheduling of the field verification testing. Upon notification of a verification inspection, the Contractor is required to store materials in a manner allowing easy access for inspection and, upon arrival of the Engineer's representative, provide adequate manpower for the handling and re-stacking of the product.
- (2) Verification Testing.
  - (a) All materials used on the project are considered to be 1 lot and will be subject to both grade and treatment verification testing. A minimum of 20 randomly selected pieces will be graded. In addition, a single sample, consisting of a single boring from each of the same graded pieces, will be treatment tested. Borings will be taken as described in AWPA Standard M2, "Standard for Inspection of Wood Products treated with Preservatives" and tested in accordance with AWPA Standard A9, "Standard Method for Analysis of treated Wood and Treating Solutions by X-Ray Spectroscopy". If the sample fails to meet the specifications for grading, including additional requirements, or treatment, it is cause for rejecting the entire lot.
  - (b) In the event that the verification samples fail to comply with the preceding, the Engineer's representative may randomly resample the lot 1 time only on a 2 to 1 basis, or reject the lot. If the lot is re-sampled, then both samples must pass, or the entire lot is rejected. The results of the resample specimens will replace the initial test results.
  - (c) The Contractor is to replace the rejected lot at no additional cost to KDOT. Remove the rejected lot from the job storage site.
- (3) Verification Related Costs. KDOT's costs for verification inspection and testing will be borne by KDOT. Excessive inspections for replacement of rejected material may be charged to the Contractor.



## 2302 - WOOD FENCE POSTS

### 2302.3 BASIS OF ACCEPTANCE

**a.** Provide the Engineer's representative of the project with a copy of plant test reports that govern the analysis of the wood fence posts delivered to the project. Include a report of the preservative treatment analysis. Mail a copy of the reports to the Wichita Regional Materials Laboratory, Bldg. 1, 3200 E 45th N, Wichita, KS 67220. Verify that the project number and/or the contract number are on each report.

**b.** Provide the Engineer's representative of the project with shipping orders, an invoice, or cover letter that documents the project number, wood fence post sizes, job, or producer order numbers, and the total number of wood fence posts delivered to the project.

**c.** Provide the Engineer's representative of the project with a certification stating that the wood fence posts delivered to the project comply with this specification, and that the preservative treatment complies with the applicable AWWA standards. The documentation must bear the signature and title of an official of the plant with contract binding authority. This requirement may be included on the test reports referenced in **subsection 2302.3 a.**

**d.** As a minimum, wood fence posts must be legibly stamped with the producers' identification, and minimum specified treatment recorded in PCF.

**e.** The final disposition of the wood fence posts will be completed at the final destination as the result of inspection for the quality of workmanship and the delivery condition and approval of the associated required documentation.

## 2303 - FIELD HANDLING AND PRESERVATIVE TREATMENT OF WOOD PRODUCTS

### SECTION 2303

#### FIELD HANDLING AND PRESERVATIVE TREATMENT OF WOOD PRODUCTS

##### 2303.1 DESCRIPTION

This specification governs the field handling and preservative treatment of treated wood products.

##### 2303.2 REQUIREMENTS

###### a. General.

(1) Apply preservative treatment to areas of field fabrication or minor injuries, cuts, abrasions, nail and spike holes sustained during shipment and handling, using procedures outlined below. Shipping damage affecting the structural integrity or utility of the item is cause for rejection.

(2) Apply the same type of treatment solution as that used in the original treatment. Use preservatives that comply with American Wood Protection Association (AWPA) Standard M4, "Standard for the Care of Preservative-Treated Wood Products".

(3) A Copper Naphthenate complying with AWPA Standard P36, "Standard for Copper Naphthenate (CuN)" may be used in lieu of original treatment solution for field treatment only. With solvent, provide a Copper Naphthenate solution that contains a minimum of 2% copper metal.

###### b. Field Treatment.

(1) Protect field cuts, holes, framing, and injuries of treated materials by brushing, spraying, dipping, soaking, or coating the materials with the approved wood preservative solution.

(2) Take care to verify that all injuries, cuts, abrasions, nail and spike holes, and other damaged areas are thoroughly saturated with wood preservative solution according to AWPA Standard M4.

**c. Field Handling.** Load, unload or transfer treated wood products using procedures specified in AWPA M4. Use slings, padding, or any method to prevent or minimize damage to treated wood products. Treat any damage sustained during handling as specified above.

##### 2303.3 TEST METHODS

None specified.

##### 2303.4 PREQUALIFICATION

None required.

##### 2303.5 BASIS OF ACCEPTANCE

Field treatment solutions will be accepted on the basis of receipt and approval of a Type A certification that includes a detailed formulation of the solution, including all ingredients and their percentages, and a material safety data sheet (MSDS) for the solution. Treatment will be accepted on the basis of visual inspection of the completed work.