

FF-S-611A
June 26, 1972

SUPERSEDING
Fed. Spec. FF-S-611
April 26, 1954

FEDERAL SPECIFICATION

SPIKES, TRACK, SQUARE-SHANK

This specification was approved by the Commissioner, Federal Supply Services, General Services Administration, for use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers square-shank, cut-steel track spikes.

1.2 Classification.

1.2.1 Grades. Spikes shall be of the following grades, as specified (see 6.2).

Grade A - High-carbon steel.

Grade B - Soft steel.

1.2.2 Sizes. Spikes shall be of the sizes as specified, (see Table IV and 6.2).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications

NN-K-231 - Kegs: Wood, Slack

PPP-D-705 - Drum: Metal Shipping, Steel (Over 12 and Under 55 Gallon)

FSC 2250

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Federal Standards

Fed. Test Method Std. No. 151 - Metals: Test Methods

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles and Seattle, Washington.

Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-D-6054 - Drum, Metal-Shipping and Storage
MIL-D-6055 - Drums, Metal, Reusable Shipping and Storage (Cap. From 88 to 510 Cubic Inches)

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

Uniform Classification Committee, Agent:

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Tariff Publishing Officer, Room 202 Union Station, 516 W. Jackson Blvd., Chicago, Ill. 60606.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Application for copies should be addressed to National Motor Freight Traffic Association, Inc., 1616 P. Street, N.W., Washington, D.C. 20036.)

3. REQUIREMENTS

3.1 Material. Spikes shall be of steel manufactured by the open-hearth, acid-bessemer, electric-furnace or basic-oxygen processes. The chemical composition shall be as specified in Table I.

3.1.1 Chemical Analysis. A chemical Analysis of the steel used in the spikes shall be furnished by the manufacturer and shall show the carbon content and the copper content when copper-bearing steel is specified.

Table I - Chemical Composition

Material	Carbon Content % Min		Copper* Content % Min
	Acid-Bessemer	Other	
Grade A	.20	.30	.20
Grade B	.06	.12	.20

*When copper-bearing steel is specified (see 6.2).

3.2 Tensile properties. The manufacturer may, at his option, substitute tension tests for the chemical analysis specified in 3.1.1. Tensile properties of the spikes shall be as specified in Table II.

Table II - Tensile Properties

Material	Tensile Strength PSI Min	Yield Point PSI Min	Elongation in 2 inches % Min
Grade A	70,000	35,000	25
Grade B	55,000	27,500	25

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3.3 Bending properties.3.3.1 Grade A.

3.3.1.1 Stem (body). The body of a finished spike shall withstand being bent cold through 120° around a pin having a diameter not greater than the thickness of the spike, without cracking on the outside of the bent portion.

3.3.1.2 Head. The head of a finished spike shall withstand being bent backwards to an angle of 55° with the line of the face of the spike, without cracking on the outside of the bent portion.

3.3.2 Grade B.

3.3.2.1 Stem (body). The body of a finished spike shall withstand being bent cold through 180°, flat on itself, without cracking on the outside of the bent portion.

3.3.2.2 Head. The head of a finished spike shall withstand being bent backward to the line of the face of the spike, without cracking on the outside of the bent portion and without showing evidence of forging laps on the surface of the bent portion.

3.4 Dimensions. Head shape and dimensions for spikes 5 inches or less in length shall be as commercially manufactured, unless otherwise specified (see 6.2 and Table IV). Spikes more than 5 inches in length shall conform to figures 1, 2 and 3, as applicable. Tolerances shall be as specified in Table III. All dimensions are in inches, unless otherwise specified.

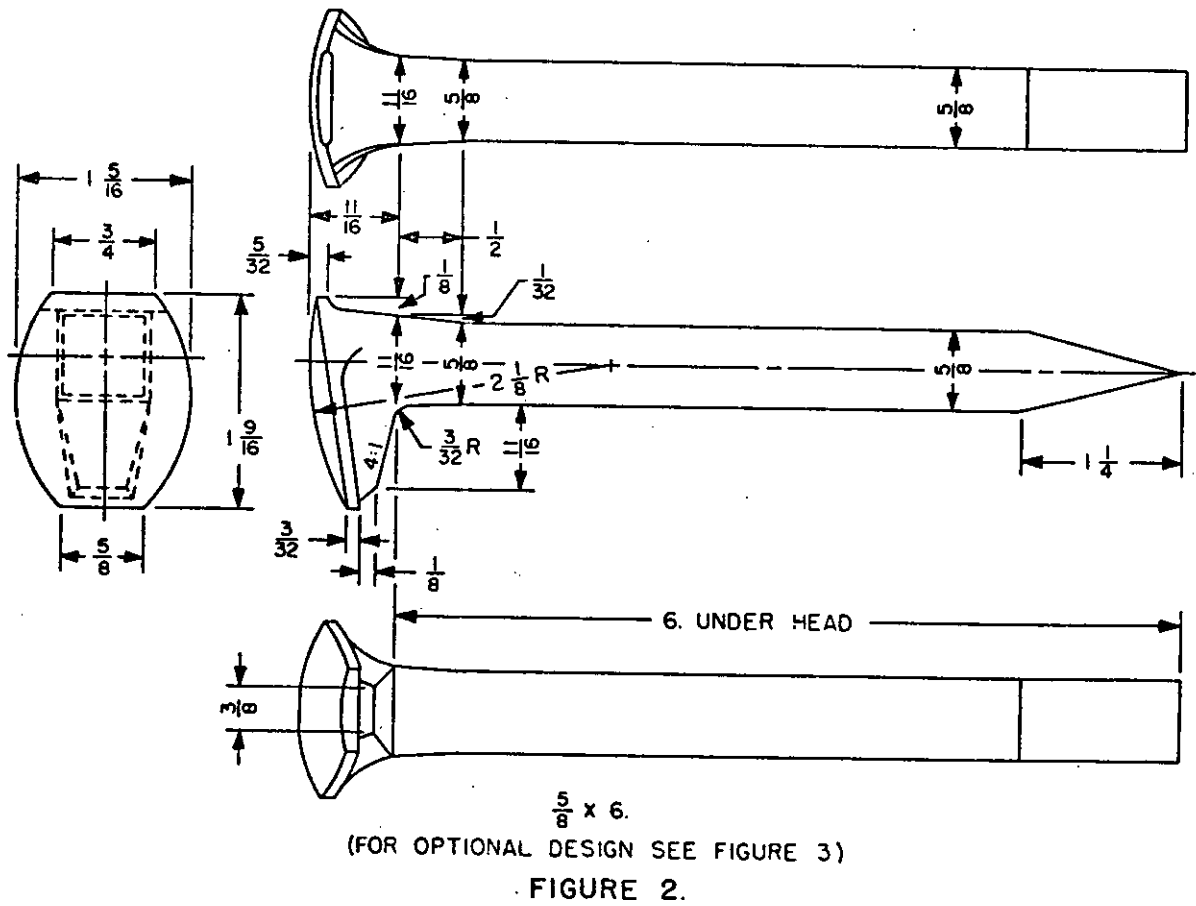
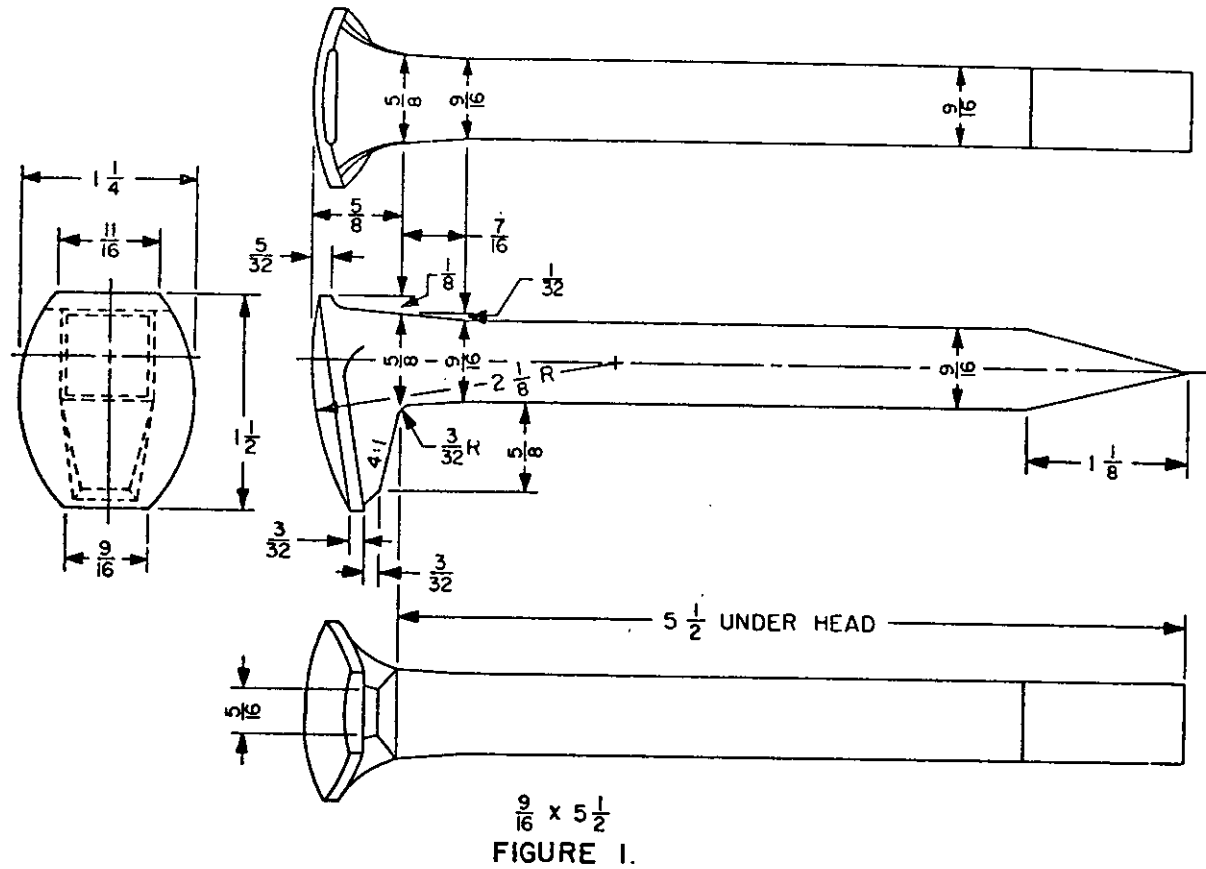
Table III - Tolerances

Cross-section	+1/32	-1/64
Head	+3/32	-1/32
Length, under head to point	+1/8	-1/8
Angle, under side of head	+1 deg.	-1 deg.

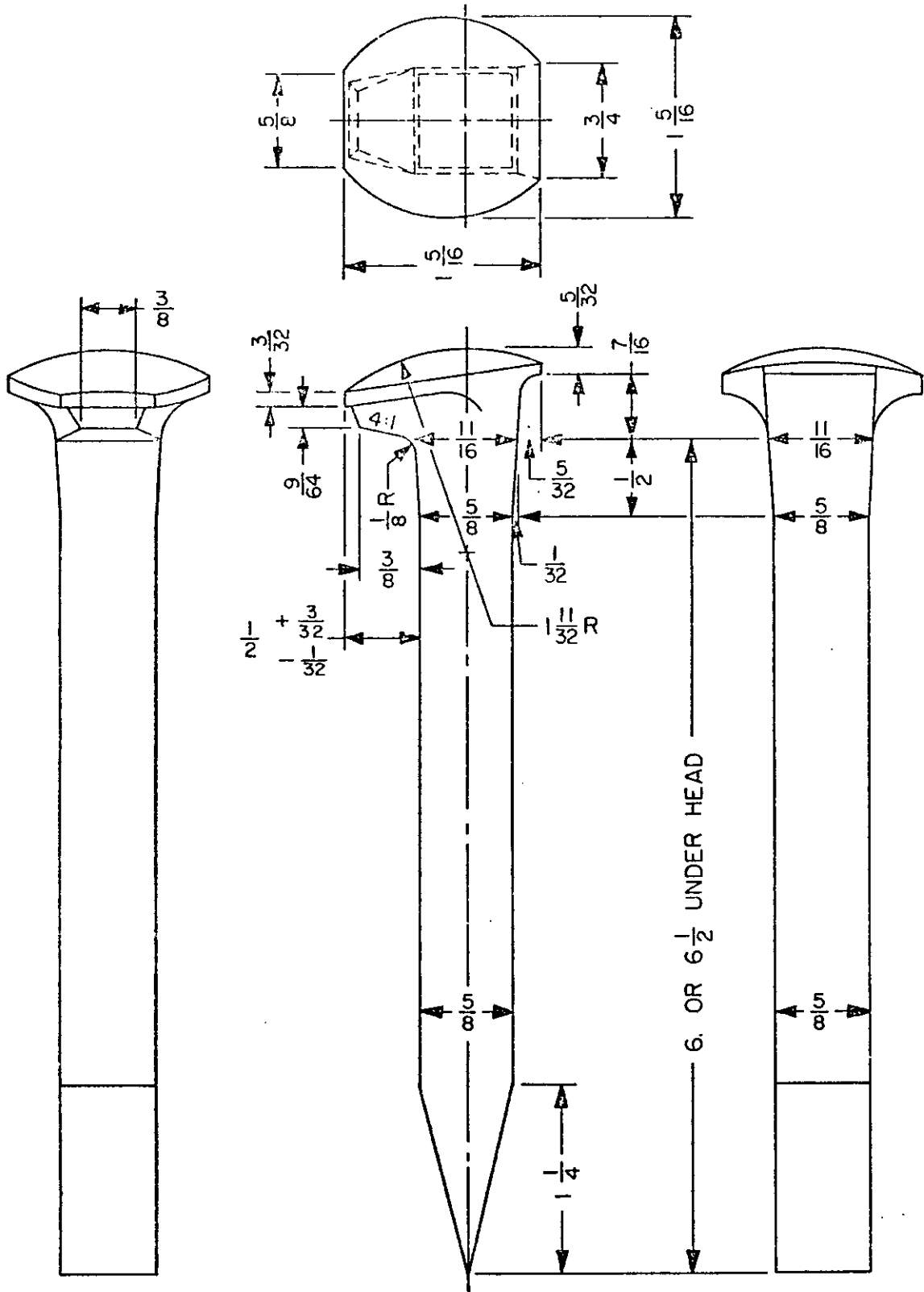
3.5 Marking. The heads of all spikes shall carry brand marks or letters so that the manufacturer may be readily determined.

3.5.1 High-carbon steel (grade A) spikes shall be marked with the letters "HC".

3.5.2 Spikes specified to be of copper-bearing steel shall be marked with the letters "CU".



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$\frac{5}{8} \times 6.$
 (OPTION FOR FIGURE 2.)
 $\frac{5}{8} \times 6\frac{1}{2}$
FIGURE 3.

Table IV - Sizes and Weights

Size		Nominal Number of Spikes Per 200- Pounds	Size		Nominal Number of Spikes Per 200- Pounds
Cross Section	Length Under Head		Cross Section	Length Under Head	
1/4	1-1/4	6,800	3/8	5	885
1/4	1-1/2	5,735	7/16	2-1/2	1,105
1/4	2	4,350	7/16	3	1,055
1/4	2-1/4	3,850	7/16	3-1/2	875
1/4	2-1/2	3,500	7/16	4	775
1/4	3	3,070	7/16	4-1/2	710
5/16	1-1/2	3,440	7/16	5	650
5/16	2	2,875	1/2	2-1/2	890
5/16	2-1/4	2,760	1/2	3	780
5/16	2-1/2	2,460	1/2	3-1/2	690
5/16	3	2,165	1/2	4	595
5/16	3-1/2	1,970	1/2	4-1/2	545
5/16	4	1,775	1/2	5	515
3/8	2	1,880	9/16**	4-1/2	410
3/8	2-1/4	1,720	9/16**	5	365
3/8	2-1/2	1,560	9/16	5-1/2	*335
3/8	3	1,365	5/8**	4-1/2	310
3/8	3-1/2	1,210	5/8**	5	285
3/8	4	1,080	5/8	6	*245
3/8	4-1/2	975	5/8	6-1/2	*230

NOTE: The number of finished spikes varies as much as $\pm 15\%$, except for those marked with an (*), which vary about $\pm 5\%$.

** Heads are similar to the designs shown in figures 1 and 2.

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3.6 Workmanship. Finished spikes shall be smooth and straight with well-formed heads, sharp points, and be free from nicks, checks, cracks and ragged edges.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot. Unless otherwise specified (see 6.2), a lot shall consist of not more than 10 tons of spikes of the same heat and size manufactured by the same process and offered for acceptance at any one time. When specified (see 6.2), a number of lots may be offered simultaneously for acceptance.

4.3 Sampling.

4.3.1 Sampling for examination. A random sample of spikes shall be taken from each lot in accordance with MIL-STD-105, Inspection Level S-1. The Acceptable Quality Level (AQL) shall be 6.5 percent defective.

4.3.2 Sampling for chemical analysis.

4.3.2.1 Melt known. Samples shall consist of one test ingot cast during the pouring of each heat of steel.

4.3.2.2 Melt unknown. Sample drillings shall be taken from three sample spikes selected at random from each 10 ton lot of spikes offered for acceptance.

4.3.3 Sampling for tension test. When the manufacturer requests to conduct a tension test instead of chemical analysis, one sample spike shall be selected from each 10 ton lot or fraction thereof for the tension test.

4.3.4 Sampling for bend test. One sample spike shall be selected from each 5 tons or fraction thereof in a lot for the stem (body) bend test and another sample spike for the head bend test.

4.4 Examination. Samples selected as specified in 4.3.1 shall be subjected to visual inspection for marking (3.5) and workmanship (3.6), and to measurements (using standard inspection equipment) for dimensional requirements (3.4).

4.5 Tests.

4.5.1 Chemical analysis. Samples selected as specified in 4.3.2 shall be subjected to a chemical analysis to verify conformance to 3.1.1 and Table I. The analysis shall be conducted in accordance with Methods 111.2 or 112.2 of Fed. Test Method Std. No. 151. In case of dispute, Method 111.2 shall be the basis for acceptance.

4.5.2 Tension test. When requested by the manufacturer, samples selected as specified in 4.3.3 shall be subjected to a tension test to verify conformance to 3.2 and Table II.

4.5.3 Bend test. The bend test may be made by pressure or hammer blows.

4.5.3.1 Stem (body). Samples selected as specified in 4.3.4 shall be subjected to a bend test to verify conformance with 3.3.1.1 and 3.3.2.1, as applicable.

4.5.3.2 Head. Samples selected as specified in 4.3.4 shall be subjected to a bend test to verify conformance with 3.3.1.2 and 3.3.2.2, as applicable.

4.6 Rejection, re-examination and retest.

4.6.1 Rejection. Failure of any sample to meet the chemical or mechanical requirements of this specification shall be cause for the rejection of the lot.

4.6.2 Re-examination. A lot rejected for failing to meet the marking, workmanship or dimensional requirements may be resubmitted for examination provided the manufacturer has examined all the spikes in the lot for the defect noted and has removed and replaced, reworked or repaired all non-conforming spikes.

4.6.3 Retest. A lot rejected for failing to meet any test requirements may be resubmitted for retest in accordance with the requirements of MIL-STD-105.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Spikes separated by grade and size shall be packed in kegs conforming to NN-K-231 or steel drums conforming to MIL-D-6054, Class S of MIL-D-6055, PPP-D-705 or equal. Each container shall contain approximately 200 pounds of the nominal number of finished spikes listed in Table IV.

5.1.2 Level C. Approximately 200 pounds of spikes separated by grade and size, and consisting of the nominal number listed in Table IV, shall be packed to afford adequate protection against damage during direct shipment

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from supply source to first receiving activity at the lowest applicable rate. Containers and packing shall comply with Uniform Freight Classification rules or National Motor Freight Classification rules.

5.2 Marking. Each container shall be marked in accordance with MIL-STD-129 and tagged as follows:

- (a) Name of the item.
- (b) Grade, and if copper-bearing steel (CU).
- (c) Size: cross-sectional size and length.
- (d) Federal Specification Number and/or Federal Stock Number.
- (e) Quantity contained (by weight).
- (f) Contract or order number.
- (g) Manufacturer's name or trade mark.
- (h) Contractor's name (if not the same as manufacturer's).

6. NOTES

6.1 Intended use. The larger spikes covered by this specification are intended to hold down railroad rails to the tie and tie plate. Smaller spikes are intended for general purpose use wherever an offset head is required.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Grade, and if copper-bearing steel is required. If grade is not specified, either grade may be furnished (1.2.1).
- (c) Size: cross-section and length (1.2.2 and Table IV).
- (d) Dimensions, if other than specified (3.4).
- (e) Lot size and number, if other than specified (4.2).
- (f) Level of packing required (see 5.1).

Military Custodians:

Army - WC
Navy - YD
Air Force - 84

Reviewer Activities:

Army - ME
Navy - None
Air Force - None

User Activities:

Army - CE
Navy - None
Air Force - None

Preparing Activity:

Army - WC

Civil Agencies Interest:

GSA

Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 15 cents each.