



# Standard Specification for Heat-Treated Carbon Steel Joint Bars, Microalloyed Joint Bars, and Forged Carbon Steel Compromise Joint Bars<sup>1</sup>

This standard is issued under the fixed designation A 49; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.*

## 1. Scope

1.1 This specification covers heat-treated carbon steel joint bars, microalloyed joint bars, and forged compromise joint bars for general use in standard railroad track.

1.2 The joint bars may be used for the production of insulated joints.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

## 2. Referenced Documents

### 2.1 ASTM Standards:

A 29/A29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for<sup>2</sup>

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products<sup>3</sup>

2.2 *American Railway Engineering Association Manual*.<sup>4</sup> Recommended Head Easement Joint Bars

### 2.3 Military Standards:

MIL-STD-129 Marking for Shipment and Storage<sup>5</sup>

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage<sup>5</sup>

### 2.4 Federal Standards:

Federal Standard No. 123

Marking for Shipments (Civil Agencies)<sup>5</sup>

## 3. Ordering Information

3.1 Orders for joint bars under this specification shall include the following information as appropriate:

3.1.1 *Quantity*—number of pairs of bars,

3.1.2 *Type*—design or type bar along with section designa-

tion and weight of rails being joined,

3.1.3 *Dimension*—overall length,

3.1.4 *Punching*—type (elliptical, oval, round, or combinations), size, number, location, spacing and elevation of punched holes, with dimensional drawing if necessary,

3.1.5 *Head Easement*—if required, and

3.1.6 *Certification* (see 11.1).

## 4. Manufacture

4.1 The steel shall be made by one or more of the following processes: open-hearth, basic-oxygen, or electric-furnace.

4.1.1 The steel may be cast by a continuous process, or in ingots.

4.2 *Heating and Quenching*—Quenched carbon-steel joint bars and forged compromise joint bars shall be uniformly heated for punching, slotting, shaping, and forging and subsequently quenched. Maximum depth of decarburized layer of forged bars shall not exceed 0.040 in.

4.3 Microalloyed joint bars shall be produced from hot rolled steel sections. Bars shall be sheared or sawed cold, and holes shall be drilled. No reheating and quenching is required.

## 5. Chemical Requirements

5.1 The chemical composition of the quenched carbon-steel joint bars and forged compromise joint bars determined as prescribed in 5.3 shall be within the limits shown in Table 1.

5.2 The chemical composition of the microalloyed joint bars shall be agreed upon by the purchaser and the manufacturer. Microalloying shall be accomplished with columbium, vanadium, and nitrogen, or combinations thereof.

5.3 *Heat or Cast Analysis*—Separate analysis shall be made from test samples representing one of the first three and one of the last three ingots or continuously cast blooms preferably taken during the pouring of the heat. Determinations may be made chemically or spectrographically. Any portion of the heat meeting the chemical analysis requirements of Table 1 may be applied. The first heat analysis shall be recorded as the official heat analysis, but the purchaser shall have access to all ladle analyses. Additionally, any material meeting the product analysis limits shown in Table 2 may be applied after testing such material in accordance with Specification A 29/A 29M.

5.4 *Product Analysis*—When ladle tests are not available, finished material representing the heat may be product tested.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel and Related Alloys, and is the direct responsibility of Subcommittee A01.01 on Steel Rails and Accessories.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.05.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 01.03.

<sup>4</sup> Available from American Railway Engineering Assn., 50 F St., NW, Washington, DC 20036.

<sup>5</sup> Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.