



Designation: A 427 – 02

## Standard Specification for Wrought Alloy Steel Rolls for Cold and Hot Reduction<sup>1</sup>

This standard is issued under the fixed designation A 427; 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 reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This specification covers homogeneous wrought hardened alloy steel rolls for use in cold or hot reduction of flat rolled ferrous and nonferrous products.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- A 788 Steel Forgings, General Requirements<sup>2</sup>
- A 956 Leeb Hardness Testing of Steel Products<sup>2</sup>
- E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials<sup>3</sup>
- E 92 Test Method for Vickers Hardness of Metallic Materials<sup>3</sup>
- E 140 Hardness Conversion Tables for Metals<sup>3</sup>
- E 448 Practice for Scleroscope Hardness Testing of Metallic Materials<sup>3</sup>

### 3. Ordering Information

3.1 The purchaser shall specify in the inquiry, contract, or order the complete dimensions, hardness range, surface finish, and use. Any other requirements shall also be specified.

3.2 Material supplied to this specification shall conform to the requirements of Specification A 788, which outlines additional ordering information, manufacturing requirements, testing and retesting methods and procedures, marking, certification, product analysis variations, and additional supplementary requirements.

### 4. Process

4.1 The steel shall be made by the electric-furnace process. Additional refining by vacuum arc remelt or electroslag is permitted.

### 5. Manufacture

5.1 The forged rolls shall receive their hot mechanical work under a press or hammer of ample capacity to work the metal throughout its section. However, 6-in. (152-mm) diameter or less rolls may be produced from rolled bars.

### 6. Discard

6.1 Sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

### 7. Chemical Requirements

7.1 Unless specified by the purchaser, the chemical requirements shall be at the discretion of the manufacturer.

### 8. Heat Treatment

8.1 The method of heat treatment and hardening shall be at the option of the manufacturer.

### 9. Hardness Requirements

9.1 The manufacturer shall supply rolls to the hardness ranges agreed upon by the purchaser and the manufacturer.

9.2 A hardness range of either 5 points Shore scleroscope or 100 numbers Vickers hardness is permissible.

### 10. Hardness Testing

10.1 Each roll shall be tested for hardness and shall be within limits specified on the order. The Shore forged roll scleroscope (HFRS<sub>C</sub> or HFRS<sub>D</sub>), Rockwell hardness tester, Vickers hardness penetrator, or Leeb hardness tester (in accordance with Test Method A 956) may be used to determine compliance with the hardness range specified. The approximate relationship between Shore HFRS<sub>C</sub> scleroscope and diamond pyramid hardness is shown in Table 1.

10.2 The stage of processing at which hardness testing is conducted and the number and location of tests may be agreed upon by the purchaser and the manufacturer.

10.3 A sufficient number of hardness tests shall be made to ensure the required uniformity, both longitudinally and circumferentially.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.06 on Steel Forgings and Billets.

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

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 03.01.

\*A Summary of Changes section appears at the end of this standard.