



Designation: A 1011/A 1011M – 02

Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High- Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability¹

This standard is issued under the fixed designation A 1011/A 1011M; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope *

1.1 This specification covers hot-rolled structural, high-strength low-alloy, and high-strength low-alloy with improved formability steel sheet and strip, in coils and cut lengths.

1.2 Hot rolled steel sheet and strip is available in the designations as listed in 4.1.

1.3 This specification is not applicable to the steel covered by Specification A 635/A 635M.

1.4 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other.

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

A 568/A 568M Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for²

A 569/A 569M Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial³

A 622/A 622M Specification for Drawing Steel (DS), Sheet and Strip, Carbon, Hot-Rolled³

A 635/A 635M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled²

A 749/A 749M Specification for Steel, Strip, Carbon and High-Strength, Low-Alloy, Hot-Rolled, General Requirements for²

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys⁴

3. Terminology

3.1 *Definitions*—For definitions of other terms used in this specification refer to Terminology A 941.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *aging*—loss of ductility with an increase in hardness, yield strength, and tensile strength that occurs when steel, which has been slightly cold worked (such as by temper rolling) is stored for some time.

3.2.1.1 *Discussion*—Aging also increases the tendency toward stretcher strains and fluting.

3.2.2 *stabilization*—the addition of one or more nitride or carbide forming elements, or both, such as titanium and columbium, to control the level of the interstitial elements carbon and nitrogen in the steel.

3.2.2.1 *Discussion*—Stabilization improves formability and increases resistance to aging.

3.2.3 *vacuum degassing*—a process of refining liquid steel in which the liquid is exposed to a vacuum as part of a special technique for removing impurities or for decarburizing the steel.

4. Classification

4.1 Hot-rolled steel sheet and steel strip is available in the following designations:

4.1.1 Commercial Steel (CS Types A, B, and C),

4.1.2 Drawing Steel (DS Types A and B),

NOTE 1—CS Type B and DS Type B describe the most common product previously included, respectively, in Specifications A 569/A 569M and A 622/A 622M.

4.1.3 Structural Steel (SS grades 30[205], 33[230], 36[250] Types 1 and 2, 40[275], 45[310], 50[340], and 55[380]),

4.1.4 High-Strength Low-Alloy Steel (HSLAS, classes 1 and 2, in grades 45[310], 50[340], 55[380], 60[410], 65[450], and 70[480].

4.1.5 High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F grades 50[340], 60[410], 70[480], and 80[550]).

4.1.5.1 HSLAS-F steel has improved formability when compared to HSLAS. The steel is fully deoxidized, made to a fine grain practice, and includes microalloying elements such

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² *Annual Book of ASTM Standards*, Vol 01.03.

³ Discontinued; see 2000 *Annual Book of ASTM Standards*, Vol 01.03. Replaced by A 1011/A 1011M.

⁴ *Annual Book of ASTM Standards*, Vol 01.01.

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