

AWS A5.13/A5.13M:2024
An American National Standard

Specification for Surfacing Electrodes for Shielded Metal Arc Welding



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An American National Standard**

**Approved by the
American National Standards Institute
May 14, 2024**

Specification for Surfacing Electrodes for Shielded Metal Arc Welding

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Revises AWS A5.13/A5.13M:2021

Prepared by the
American Welding Society (AWS) A5 Committee on Filler Metals and Allied Materials

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification prescribes the requirements for classification of surfacing electrodes for shielded metal arc welding. Classification is based upon the chemical composition of the deposited weld metal except for tungsten carbide electrodes, where classification is based on the mesh range, quantity, and composition of the tungsten carbide granules. A guide is appended to the specification as a source of information concerning the classification system employed and intended use of the classified electrodes.

This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.



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This standard is subject to revision at any time by the AWS A5 Committee on Filler Metals and Allied Materials. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are requested and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS A5 Committee on Filler Metals and Allied Materials and the author of the comments will be informed of the Committee's response to the comments. Guests are invited to attend all meetings of the AWS A5 Committee on Filler Metals and Allied Materials to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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AWS A5G Advisors to the Subcommittee on Hardfacing Filler Metals

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W. E. Layo	<i>Midalloy</i>
B. Malinowski	<i>Select-Arc Inc.</i>
R. Menon	<i>Stoody Company (a division of ESAB)</i>

Foreword

This foreword is not part of this standard but is included for informational purposes only.

The current document is the 6th revision of the initial joint ASTM/AWS document issued in 1956. It was the first of what would later become a two-set series, A5.13 and A5.21. The evolution took place as follows:

The composite electrodes and rods classifications were removed from the 1970 revision of A5.13 and placed into a new specification, A5.21. A5.13-70 specification contained requirements for both covered and bare electrodes or rods employing solid core only. This distinction was maintained for the 1980 revision of A5.13.

The revisions of both A5.13:2000 and A5.21:2001 incorporated a totally different scope. The method of manufacture of the core of the electrode or rod was no longer a factor in determining placement of a classification. Instead, the covered electrode products were classified under AWS A5.13:2000 and the bare electrode products under AWS A5.21:2001.

The historical background for the document itself is as follows:

ASTM A399-56T	<i>Tentative Specification for Surfacing Welding Rods and Electrodes</i>
AWS A5.13-56T	
AWS A5.13-70	<i>Specification for Surfacing Welding Rods and Electrodes</i>
ANSI W3.13-73	
ANSI/AWS A5.13-80	<i>Specification for Solid Surfacing Welding Rods and Electrodes</i>
AWS A5.13:2000	<i>Specification for Surfacing Electrodes for Shielded Metal Arc Welding</i>
AWS A5.13/A5.13M:2010	<i>Specification for Surfacing Electrodes for Shielded Metal Arc Welding</i>
AWS A5.13/A5.13M:2021	<i>Specification for Surfacing Electrodes for Shielded metal Arc Welding</i>

Substantive changes in this revision include the addition of new classifications as well as modifications to many iron base classifications to better reflect current filler metal practice. These substantive changes are shown in *italic* font or a vertical line in the margin:

Modification of the composition ranges for the following classifications: EFe-1, EFe-2, EFe-3, EFe-6, EFeMn-D, EFeMn-F, EFeMnCr, EFeCr-A3, EFeCr-A4, EFeCr-A5, EFeCr-A6, EFeCr-A7, EFeCr-A8, EFeCr-E3, and EFeCr-E4.

Addition of new iron-based covered electrode classifications (see Table 1): EFe-8, EFe-RBU, EFeMn-G, EFeMn-RBU, EFeCr-A9, and EFeV.

Addition of a new tungsten carbide covered electrode classification (see Table 4): ENiWCX-30/230.

The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

Comments and suggestions for the improvement of this specification are welcome. They should be sent to the Secretary, Committee on Filler Metals and Allied Materials, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

All errata to a standard shall be published in the *Welding Journal* and posted on the AWS website.

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Specification for Surfacing Electrodes for Shielded Metal Arc Welding

1. Scope

1.1 This specification prescribes requirements for the classification of surfacing electrodes for shielded metal arc welding. Solid bare electrodes and rods for surfacing are classified in AWS A5.21/A5.21M, *Specification for Bare Electrodes and Rods for Surfacing*.

1.2 This standard makes use of both U.S. Customary Units and the International System of Units (SI). The measurements are not exact equivalents; therefore, each system must be used independently when referring to material properties. The specification with the designation A5.13 uses U.S. Customary Units. The specification A5.13M uses SI Units. The latter are shown within brackets [] or in appropriate columns in tables and figures. Standard dimensions based on either system may be used for sizing filler metal or packaging or both under A5.13 or A5.13M specifications.

1.3 Safety and health issues and concerns are beyond the scope of this standard; some safety and health information is provided, but such issues are not fully addressed herein. Some safety and health information can be found in Annex A, Clauses A5 and A9.

Safety and health information is available from the following sources:

American Welding Society:

- (1) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*
- (2) AWS Safety and Health Fact Sheets
- (3) Other safety and health information on the AWS website

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies

Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

2. Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this AWS standard. For dated references, subsequent amendments to or revisions of any of these publications do not apply.

American Welding Society (AWS) documents:

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*