

Welding consumables — Covered electrodes for manual metal arc welding of creep-resisting steels — Classification

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National foreword

This British Standard is the UK implementation of EN ISO 3580:2008. It is identical to ISO 3580:2004. It supersedes BS EN 1599:1997 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee WEE/39, Welding consumables.

A list of organizations represented on this committee can be obtained on request to its secretary.

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résistant au fluage - Classification (ISO 3580:2004)

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Foreword

The text of ISO 3580:2004 has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 3580:2008 by Technical Committee CEN/TC 121 "Welding" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2008, and conflicting national standards shall be withdrawn at the latest by November 2008.

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The text of ISO 3580:2004 has been approved by CEN as EN ISO 3580:2008 without any modification.

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Introduction

This International Standard proposes a classification aimed at designating covered electrodes, primarily in terms of the chemical composition of the all-weld metal.

It should be noted that the mechanical properties of all-weld metal test specimens used to classify the electrodes will vary from those obtained in production joints because of differences in welding procedure such as electrode diameter, width of weave, welding position and material composition.

The classification according to system A is mainly based on EN 1599. The classification according to system B is mainly based upon standards used around the Pacific Rim.

Requests for official interpretations of any aspect of this standard should be directed to the Secretariat of ISO/TC 44/SC 3 via your national standards body, a complete listing of which can be found at www.iso.org

Welding consumables — Covered electrodes for manual metal arc welding of creep-resisting steels — Classification

1 Scope

This International Standard specifies requirements for classification of covered electrodes, based on the all-weld metal in the heat-treated condition, for manual metal arc welding of ferritic and martensitic creep-resisting and low alloy elevated temperature steels.

This document is a combined specification for classification utilizing a system based upon the chemical composition of the all-weld metal, with requirements for the yield strength and the average impact energy of 47 J of all-weld metal, or utilizing a system based upon the tensile strength and the chemical composition of all-weld metal.

- 1) Paragraphs and tables which carry the suffix letter “A” are applicable only to electrodes classified to the system based upon chemical composition, with requirements for the yield strength and the average impact energy of 47 J of all-weld metal under this International Standard.
- 2) Paragraphs and tables which carry the suffix letter “B” are applicable only to electrodes classified to the system based upon the tensile strength and the chemical composition of all-weld metal under this International Standard.
- 3) Paragraphs and tables which do not have either the suffix letter “A” or the suffix letter “B” are applicable to all covered electrodes classified under this International Standard.

For comparison purposes, some tables include requirements for electrodes classified according to both systems, placing individual electrodes from the two systems, which are similar in composition and properties, on adjacent lines in the particular table. In a particular line of the table that is mandatory in one system, the symbol for the similar electrode from the other system is indicated in parentheses. By appropriate restriction of the formulation of a particular electrode, it is often, but not always, possible to produce an electrode that can be classified in both systems, in which case the electrode, and/or its packaging, may be marked with the classification in either or both systems.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 31-0:1992, *Quantities and units — Part 0: General principles*

ISO 544, *Welding consumables — Technical delivery conditions for welding filler materials — Type of product, dimensions, tolerances and markings*

ISO 2401, *Covered electrodes — Determination of the efficiency, metal recovery and deposition coefficient*

ISO 3690, *Welding and allied processes — Determination of hydrogen content in ferritic steel arc weld metal*

ISO 6847, *Welding consumables — Deposition of a weld metal pad for chemical analysis*

ISO 6947, *Welds — Working positions — Definitions of angles of slope and rotation*

ISO 13916, *Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

ISO 14344, *Welding and allied processes — Flux and gas shielded electrical welding processes — Procurement guidelines for consumables*

ISO 15792-1, *Welding consumables — Test methods — Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*

ISO 15792-3, *Welding consumables — Test methods — Part 3: Classification testing of positional capacity and root penetration of welding consumables in a fillet weld*

3 Classification

Classification designations are based upon two approaches to indicate the composition and properties of the all-weld metal obtained using a given electrode. The two designation approaches include additional designators for some other classification requirements, but not all. In most cases, a given commercial product can be classified in both systems. Then either or both classification designations can be used for the product.

The classification includes all-weld metal properties obtained with a covered electrode as given in 3A and 3B. The classification is based on the electrode size 4,0 mm with the exception of the symbol for welding position which is based on ISO 15792-3.

3A Classification by chemical composition

The classification is divided into six parts:

- 1) the first part gives a symbol indicating the product/process to be identified;
- 2) the second part gives a symbol indicating the chemical composition of the all-weld metal (see Table 1);
- 3) the third part gives a symbol indicating the type of electrode covering (see 4.4A);
- 4) the fourth part gives a symbol indicating the nominal electrode efficiency and the type of current (see Table 4A);
- 5) the fifth part gives a symbol indicating the welding position (see Table 5A);
- 6) the sixth part gives a symbol indicating the hydrogen content of the deposited metal (see Table 6).

3B Classification by tensile strength and chemical composition

The classification is divided into five parts:

- 1) the first part gives a symbol indicating the product/process to be identified;
- 2) the second part gives a symbol indicating the strength of the all-weld metal (see Table 2);
- 3) the third part gives a symbol indicating the type of electrode covering, the type of current, and the welding position (see Table 3B);
- 4) the fourth part gives a symbol indicating the chemical composition of all-weld metal (see Table 1);
- 5) the fifth part gives a symbol indicating the hydrogen content of deposited metal (see Table 6).

In order to facilitate the use of this International Standard, the classification is split into two sections:

a) Compulsory section

This section includes the symbols for the type of product, the chemical composition and the type of covering, i.e., the symbols defined in 4.1, 4.2 and 4.4A;

b) Optional section

This section includes the symbols for the nominal electrode efficiency, the type of current and the welding positions for which the electrode is suitable, and the symbol for hydrogen content, i.e., the symbols defined in 4.5A, 4.6A and 4.7.

In order to promote the use of this International Standard, the classification is split into two sections:

a) Compulsory section

This section includes the symbols for the type of product, the strength, the type of covering, the type of current, the welding position and the chemical composition, i.e., the symbols defined in 4.1, 4.2, 4.3B, 4.4B and 4.6B.

b) Optional section

This section includes the symbol for the hydrogen content, i.e., the symbol defined in 4.7.

The full designation (see Clause 10) shall be used on packages and in the manufacturer's literature and data sheets. The designation system is shown in Annex A for both systems.

4 Symbols and requirements

4.1 Symbol for the product/process

The symbol for the covered electrode used in the manual metal arc welding process shall be the letter E.

4.2 Symbol for the chemical composition of all-weld metal

The symbols in Table 1 indicate the chemical composition of all-weld metal determined in accordance with Clause 6. See Annexes B and C for descriptions of the symbols used for chemical composition in system A and in system B, respectively.

4.3 Symbol for the mechanical properties of all-weld metal

4.3A Classification by chemical composition

No symbol shall be used for the mechanical properties of the all-weld metal. The all-weld metal obtained using the covered electrodes listed in Table 1 in accordance with Clause 5 shall also fulfil the mechanical property requirements specified in Table 2.

4.3B Classification by tensile strength and chemical composition

The symbol for tensile strength shall be 49 for 490 MPa minimum tensile strength, 52 for 520 MPa minimum tensile strength, 55 for 550 MPa minimum tensile strength or 62 for 620 MPa minimum tensile strength. The complete mechanical property requirements that shall be fulfilled by the various compositions are specified in Table 2.