

# SVENSK STANDARD

## SS-EN ISO 14174:2019



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### **Tillsatsmaterial för svetsning – Pulver för pulverbågs svetsning och elektroslag svetsning – Indelning**

### **Welding consumables – Fluxes for submerged arc welding and electroslag welding – Classification**

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Denna standard ersätter SS-EN ISO 14174:2012, utgåva 1.

The European Standard EN ISO 14174 has the status of a Swedish Standard. This document contains the official version of EN ISO 14174.

This standard supersedes the SS-EN ISO 14174:2012, edition 1.

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EUROPEAN STANDARD

**EN ISO 14174**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2019

ICS 25.160.20

Supersedes EN ISO 14174:2012

English Version

## Welding consumables - Fluxes for submerged arc welding and electroslag welding - Classification (ISO 14174:2019)

Produits consommables pour le soudage - Flux pour le  
soudage à l'arc sous flux et le soudage sous laitier -  
Classification (ISO 14174:2019)

Schweißzusätze - Pulver zum Unterpulverschweißen  
und Elektroschlackeschweißen - Einteilung (ISO  
14174:2019)

This European Standard was approved by CEN on 8 May 2019.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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**SS-EN ISO 14174:2019 (E)**

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## **European foreword**

This document (EN ISO 14174:2019) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes" 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of an identical text or by endorsement, at the latest by November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 14174:2012.

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## **Endorsement notice**

The text of ISO 14174:2019 has been approved by CEN as EN ISO 14174:2019 without any modification.





# Welding consumables — Fluxes for submerged arc welding and electroslag welding — Classification

## 1 Scope

This document specifies requirements for classification of fluxes for submerged arc welding and electroslag welding for joining and overlay welding using wire electrodes, tubular cored electrodes, and strip electrodes.

NOTE This document was based on EN 760:1996.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3690, *Welding and allied processes — Determination of hydrogen content in arc weld metal*

ISO 14171, *Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels — Classification*

ISO 14343, *Welding consumables — Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels — Classification*

ISO 18274, *Welding consumables — Solid wire electrodes, solid strip electrodes, solid wires and solid rods for fusion welding of nickel and nickel alloys — Classification*

ISO 80000-1:2009, *Quantities and units — Part 1: General* Corrected by ISO 80000-1:2009/Cor 1:2011

## 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Classification

Fluxes for submerged arc welding and electroslag welding for joining and overlay welding are granular, fusible products of mainly mineral origin, which are manufactured by various methods. Fluxes influence the chemical composition and the mechanical properties of the weld metal.

The classification of the fluxes is divided into seven parts:

- 1) the first part gives a symbol indicating the product/process (see [5.1](#));
- 2) the second part gives a symbol indicating the method of manufacture (see [5.2](#));
- 3) the third part gives a symbol indicating the type of flux, characteristic chemical constituents (see [Table 1](#));

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- 4) the fourth part gives a symbol indicating the applications, flux class (see [5.4](#));
- 5) the fifth part gives a symbol indicating the metallurgical behaviour (see [5.5](#));
- 6) the sixth part gives a symbol indicating the type of current (see [5.6](#));
- 7) the seventh part gives a symbol indicating the diffusible hydrogen content of deposited weld metal (see [Table 6](#)) — only applicable for class 1 fluxes.

The classification is divided into two sections.

- a) the compulsory section, which includes the symbols for process, method of manufacture, characteristic chemical constituents, and applications, i.e. the symbols defined in [5.1](#), [5.2](#), [5.3](#) and [5.4](#).
- b) the optional section, which includes the symbols for the metallurgical behaviour, type of current, and diffusible hydrogen, i.e. the symbols defined in [5.5](#), [5.6](#) and [5.7](#).

## 5 Symbols

### 5.1 Symbol for the product/process

The symbol for the flux used in submerged arc welding for joining and overlay welding shall be the letter S and for the flux used in electroslag welding for joining and overlay welding shall be the letters ES.

### 5.2 Symbol for method of manufacture

The symbol below indicates the method of manufacture:

- F: fused flux;
- A: agglomerated flux;
- M: mixed flux.

Fused fluxes are made by melting and granulating. Agglomerated fluxes are bound, granular mixtures of finer raw materials. Mixed fluxes comprise all fluxes which, after fusing or agglomerating, are mixed with one or more additional components or fluxes.

For particle size requirements in marking, see [Clause 6](#).

### 5.3 Symbol for type of flux, characteristic chemical constituents

The symbols in [Table 1](#) indicate the type of flux in accordance with the characteristic chemical constituents. Elemental analysis shall be performed on representative samples of the flux. Any suitable analytical technique may be used, but in cases of dispute reference shall be made to established methods. Based on the elemental analysis of the flux, the characteristic chemical constituents of the flux can be determined.

Examples of such determinations are shown in [Annex A](#) and descriptions of flux types are given in [Annex B](#).

### 5.4 Symbol for applications, flux class

#### 5.4.1 General

A given flux may carry more than one class as specified in [5.4.2](#) to [5.4.5](#).

#### 5.4.2 Flux class 1

These are fluxes for submerged arc welding of non-alloy and fine grain steels, high-strength steels, creep-resisting steels, and atmospheric corrosion-resisting steels.

In general, the fluxes do not contain alloying elements, other than Mn and Si, thus the weld metal analysis is predominantly influenced by the composition of the wire/strip electrode and metallurgical reactions. The fluxes are suitable for joint welding and/or overlay welding. In the case of joint welding, some fluxes can be applied for both multi-run and single-run and/or two-run technique.

In the flux designation, the digit 1 indicates class 1.

#### 5.4.3 Flux classes 2 and 2B

These are fluxes for joint welding of stainless and heat-resisting steels and/or nickel and nickel alloys and corrosion-resistant overlay welding<sup>1)</sup>. Fluxes of these classes can contain alloying elements compensating for the burn-out (elements lost to the slag).

In the flux designation, the digit 2 is used to indicate class 2 fluxes mainly suited for joint welding, but which can also be used for strip cladding. 2B is used for fluxes especially designed for strip cladding.

#### 5.4.4 Flux class 3

These are fluxes mainly for hard-facing overlay welding by transfer of alloying elements from the flux, such as C, Cr or Mo.

In the flux designation, the digit 3 indicates class 3.

#### 5.4.5 Flux class 4

These are other fluxes for which classes 1 to 3 are not applicable, e.g. fluxes for copper alloys.

In the flux designation, the digit 4 indicates class 4.

**Table 1 — Symbol for type of flux, characteristic chemical constituents<sup>a,b</sup>**

| Symbol (description)            | Characteristic chemical constituents | Limit of constituent % (by mass) |
|---------------------------------|--------------------------------------|----------------------------------|
| MS<br>(Manganese-silicate)      | MnO + SiO <sub>2</sub>               | ≥50                              |
|                                 | CaO                                  | ≤15                              |
| CS<br>(Calcium-silicate)        | CaO + MgO + SiO <sub>2</sub>         | ≥55                              |
|                                 | CaO + MgO                            | ≥15                              |
| CG<br>(Calcium-magnesium)       | CaO + MgO                            | 5 to 50                          |
|                                 | CO <sub>2</sub>                      | ≥2                               |
|                                 | Fe                                   | ≤10                              |
| CB<br>(Calcium-magnesium basic) | CaO + MgO                            | 30 to 80                         |
|                                 | CO <sub>2</sub>                      | ≥2                               |
|                                 | Fe                                   | ≤10                              |

<sup>a</sup> Calculations can be made as shown in [Annex A](#).

<sup>b</sup> A description of the characteristics of each of the types of flux is given in [Annex B](#).

<sup>c</sup> Fluxes for which the chemical composition is not listed shall be symbolized by the letter Z. The chemical composition ranges are not specified and it is possible that two fluxes with the same Z classification are not interchangeable.

1) Not all fluxes suitable for use with stainless steel filler metal are also suitable for nickel and nickel alloy filler metal.