

# SVENSK STANDARD

## SS-EN ISO 14172:2015



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**Tillsatsmaterial för svetsning – Belagda elektroder för manuell metallbågsvetsning av nickel och nickellegeringar – Indelning (ISO 14172:2015)**

**Welding consumables – Covered electrodes for manual metal arc welding of nickel and nickel alloys – Classification (ISO 14172:2015)**

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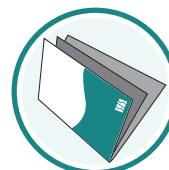
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Denna standard ersätter SS-EN ISO 14172:2008, utgåva 2.

The European Standard EN ISO 14172:2015 has the status of a Swedish Standard. This document contains the official English version of EN ISO 14172:2015.

This standard supersedes the Swedish Standard SS-EN ISO 14172:2008, edition 2.

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EUROPEAN STANDARD

**EN ISO 14172**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2015

ICS 25.160.20

Supersedes EN ISO 14172:2008

English Version

## Welding consumables - Covered electrodes for manual metal arc welding of nickel and nickel alloys - Classification (ISO 14172:2015)

Produits consommables pour le soudage - Électrodes enrobées pour le soudage manuel à l'arc du nickel et des alliages de nickel - Classification (ISO 14172:2015)

Schweißzusätze - Umhüllte Stabelektroden zum Lichtbogenhandschweißen von Nickel und Nickellegierungen - Einteilung (ISO 14172:2015)

This European Standard was approved by CEN on 10 July 2015.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## **European foreword**

This document (EN ISO 14172:2015) 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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

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### **Endorsement notice**

The text of ISO 14172:2015 has been approved by CEN as EN ISO 14172:2015 without any modification.





# Welding consumables — Covered electrodes for manual metal arc welding of nickel and nickel alloys — Classification

## 1 Scope

This International Standard prescribes requirements for the classification of nickel and nickel-alloy covered electrodes for manual metal arc welding and overlaying. It includes those compositions in which the nickel content exceeds that of any other element.

## 2 Normative references

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

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

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

ISO 14344, *Welding consumables — Procurement of filler materials and fluxes*

ISO 15792-1:2000, *Welding consumables — Test methods — Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*. Amended by ISO 15792-1:2000/Amd 1:2011.

ISO 80000-1:2009, *Quantities and units — Part 1: General*

## 3 Classification

A covered electrode shall be classified in accordance with the chemical composition of the all-weld metal as given in [Table 1](#) and the mechanical properties listed in [Table 2](#). The symbol for the classification is divided into two parts:

- a) the first part gives a symbol indicating the product/process to be used;
- b) the second part gives a symbol indicating the chemical composition of the all-weld metal.

## 4 Symbols and requirements

### 4.1 Symbol for the product/process

The symbol for covered electrodes used for manual metal arc welding shall be the letter “E”.

## 4.2 Symbol for the chemical composition of the all-weld metal

The symbol for the chemical composition of the all-weld metal shall comprise “Ni” plus four digits, as shown in [Table 1](#). The first digit is an indicator of the class of alloy deposited, where

- 2 indicates no significant alloy addition,
- 4 indicates significant copper addition (nickel-copper alloys),
- 6 indicates significant chromium addition, with iron less than 25 % (nickel-chromium-iron and nickel-chromium-molybdenum alloys),
- 8 indicates significant chromium addition, with iron more than 25 % (nickel-iron-chromium alloys),
- 10 indicates significant molybdenum addition without significant chromium addition (nickel-molybdenum alloys).

The remaining digits indicate the particular alloy deposited. The basis of the system of designation is described in [Annex A](#).

NOTE In addition, the chemical symbol can be used.

## 4.3 Rounding procedure

For purposes of determining compliance with the requirements of this International Standard, the actual test values obtained shall be subject to ISO 80000-1:2009, B.3, Rule A. If the measured values are obtained by equipment calibrated in units other than those of this International Standard, the measured values shall be converted to the units of this International Standard before rounding. If an arithmetic average value is to be compared to the requirements of this International Standard, rounding shall be done only after calculating the arithmetic average. If the test method cited in [Clause 2](#) contains instructions for rounding that conflict with the instructions of this International Standard, the rounding requirements of the test method standard shall apply. The rounded results shall fulfil the requirements of the appropriate table for the classification under test.

## 5 Chemical analysis

Chemical analysis shall be performed on any suitable all-weld metal test specimen. In case of dispute, the test specimen specified in ISO 6847 shall be used. The test results shall meet the requirements of [Table 1](#) for the classification under test. Any analytical technique can be used; but, in case of dispute, reference shall be made to established published methods.

## 6 Mechanical properties of the all-weld metal

Mechanical properties are not part of the designation, but they are required for classification. The mechanical properties of the all-weld metal, deposited using covered electrodes in accordance with [Table 1](#), shall be determined using a test assembly type 1.3 in accordance with ISO 15792-1:2000 with 4,0 mm electrodes. The minimum tensile properties shall be in accordance with [Table 2](#).

Table 1 — Symbols and all-weld metal chemical composition requirements

Alloy symbol		Chemical composition % (by mass) <sup>a</sup>											Notes <sup>d, e</sup>			
Numerical symbol	Chemical symbol	C	Mn	Fe	Si	Cu	Ni <sub>jb</sub>	Co	Al	Ti	Cr	Nb <sup>c</sup>	Mo	V	W	
<b>Nickel</b>																
Ni 2061	NiTi3	0,10	0,7	0,7	1,2	0,2	min. 92,0	—	1,0	1,0 to 4,0	—	—	—	—	—	
<b>Nickel-Copper</b>																
Ni 4060	NiCu30Mn3Ti	0,15	4,0	2,5	1,5	27,0 to 34,0	min. 62,0	—	1,0	1,0	—	—	—	—	—	
Ni 4061	NiCu27Mn3NbTi	0,15	4,0	2,5	1,3	24,0 to 31,0	min. 62,0	—	1,0	1,5	—	3,0	—	—	—	
<b>Nickel-Chromium</b>																
Ni 6082	NiCr20Mn3Nb	0,10	2,0 to 6,0	4,0	0,8	0,5	min. 63,0	—	—	0,5	18,0 to 22,0	1,5 to 3,0	2,0	—	—	
Ni 6172	NiCr50Nb	0,10	1,5	1,0	1,0	0,25	min. 41,0	—	—	—	48,0 to 52,0	1,0 to 2,5	—	—	—	0,02P 0,02S
Ni 6231	NiCr22W14Mo	0,05 to 0,10	0,3 to 1,0	3,0	0,3 to 0,7	0,5	min. 45,0	5,0	0,5	0,1	20,0 to 24,0	—	1,0 to 3,0	—	13,0 to 15,0	
<b>Nickel-Chromium-Iron</b>																
Ni 6025	NiCr25Fe10AlY	0,10 to 0,25	0,5	8,0 to 11,0	0,8	—	min. 55,0	—	1,5 to 2,2	0,3	24,0 to 26,0	—	—	—	—	0,15Y
Ni 6045	NiCr27Fe23Si	0,05 to 0,20	2,5	21,0 to 025,0	2,5 to 3,0	0,30	min. 38,0	1,0	0,30	—	26,0 to 29,0	—	—	—	—	0,04P 0,03S
Ni 6062	NiCr15Fe8Nb	0,08	3,5	11,0	0,8	0,5	min. 62,0	—	—	—	13,0 to 17,0	0,5 to 4,0	—	—	—	
Ni 6093	NiCr15Fe8NbMo	0,20	1,0 to 5,0	12,0	1,0	0,5	min. 60,0	—	—	—	13,0 to 17,0	1,0 to 3,5	1,0 to 3,5	—	—	
Ni 6094	NiCr14Fe4NbMo	0,15	1,0 to 4,5	12,0	0,8	0,5	min. 55,0	—	—	—	12,0 to 17,0	0,5 to 3,0	2,5 to 5,5	—	1,5	
Ni 6095	NiCr15Fe8NbMoW	0,20	1,0 to 3,5	12,0	0,8	0,5	min. 55,0	—	—	—	13,0 to 17,0	1,0 to 3,5	1,0 to 3,5	—	1,5 to 3,5	
Ni 6132	NiCr15Fe9Nb	0,08	3,5	11,0	0,75	0,50	min. 62,0	—	—	—	13,0 to 17,0	1,5 to 4,0	—	—	—	0,03P 0,015S