
**Welding consumables — Wire and strip
electrodes, wires and rods for arc
welding of nickel and nickel alloys —
Classification**

*Produits consommables pour le soudage — Fils-électrodes et
feuillets, fils et baguettes pour le soudage à l'arc du nickel et des
alliages de nickel — Classification*



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Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 18274 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 3, *Welding consumables*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

It should be noted that, with regard to the corresponding EN standard, the designations given in Clause 9 have been adapted to the needs of international standardization.

Contents

	page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Classification	1
4 Symbols and requirements	1
4.1 Symbols for the product form	1
4.2 Symbol for the chemical composition	2
5 Mechanical properties of the weld metal	8
6 Chemical analysis	8
7 Retest	8
8 Technical delivery conditions	8
9 Designation	8
Annex A (informative) Description of consumable classes	10
Annex B (informative) System for designation of welding filler metals	16
Annex C (informative) Corresponding national classifications	17
Bibliography	19

Foreword

This document (EN ISO 18274:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

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 September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

Annexes A, B and C are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

For nickel welding consumables there is no unique relationship between the product form (solid wire, strip or rod) and the welding process used (e.g. gas-shielded metal arc welding, gas tungsten arc welding, plasma arc welding, submerged arc welding, strip overlay welding, laser welding or other welding processes). For this reason the solid wire, strip or rod may be classified on the basis of any of the above product forms and can be used as appropriate, for more than one of the above processes.

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1 Scope

This standard specifies requirements for classification of solid wires, strips and rods for fusion welding of nickel and nickel alloys. The classification of the solid wires, strips and rods is based on their chemical composition.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 544, *Welding consumables – Technical delivery conditions for welding filler metals – Type of product, dimensions, tolerances and markings* (ISO 544:2003).

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

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

3 Classification

The classification is divided into two parts:

- a) the first part indicates the product form being solid wires, strips or rods, see 4.1;
- b) the second part gives a numerical symbol indicating the chemical composition of the solid wire, strip or rod, see Table 1.

4 Symbols and requirements

4.1 Symbols for the product form

The symbol for the solid wire and rod shall be S and for the solid strip it shall be B.

NOTE One product form may be used for more than one welding process.

4.2 Symbol for the chemical composition

The numerical symbol in Table 1 indicates the chemical composition of a solid wire, strip or rod, determined under conditions given in clause 6. The first digit is an indicator of the alloy group as follows:

- 1 Significant molybdenum addition without significant chromium addition (nickel-molybdenum alloys).
- 2 No significant alloy addition.
- 4 Significant copper addition (nickel-copper alloys).
- 5 Significant copper additions with aluminium and titanium for precipitation hardening.
- 6 Significant chromium addition, with iron less than 25% (nickel-chromium-iron and nickel-chromium-molybdenum alloys).
- 7 Same as 6, but with aluminium and titanium for precipitation hardening.
- 8 Significant chromium addition, with iron more than 25% (nickel-iron-chromium alloys).

The remaining digits indicate the particular alloy deposited. The basis of the system of designation is described in annex B (informative).

NOTE In addition the chemical symbol may be used.

Table 1 — Symbols and chemical composition requirements for solid wires, strips and rods

Alloy symbols		Chemical composition in % (m/m) ^{a b}													
Numerical	Chemical	C	Mn	Fe	Si	Cu	Ni ^c	Co ^c	Al	Ti	Cr	Nb ^d	Mo	W	Others ^{e f}
NICKEL															
NICKEL – COPPER															
Ni 2061	NiTi3	0,15	1,0	1,0	0,7	0,2	Min. 92,0	–	1,5	2,0 to 3,5	–	–	–	–	–
NICKEL – CHROMIUM															
Ni 4060	NiCu30Mn3Ti	0,15	2,0 to 4,0	2,5	1,2	28,0 to 32,0	Min. 62,0	–	1,2	1,5 to 3,0	–	–	–	–	–
Ni 4061	NiCu30Mn3Nb	0,15	4,0	2,5	1,25	28,0 to 32,0	Min. 60,0	–	1,0	1,0	–	3,0	–	–	–
Ni 5504	NiCu25Al3Ti	0,25	1,5	2,0	1,0	Min. 20,0	63,0 to 70,0	–	2,0 to 4,0	0,3 to 1,0	–	–	–	–	–
NICKEL – CHROMIUM															
Ni 6072	NiCr44Ti	0,01 to 0,10	0,20	0,50	0,20	0,50	Min. 52,0	–	–	0,3 to 1,0	42,0 to 46,0	–	–	–	–
Ni 6076	NiCr20	0,08 to 0,25	1,0	2,00	0,30	0,50	Min. 75,0	–	0,4	0,5	19,0 to 21,0	–	–	–	–
Ni 6082	NiCr20Mn3Nb	0,10	2,5 to 3,5	3,0	0,5	0,5	Min. 67,0	–	–	0,7	18,0 to 22,0	2,0 to 3,0	–	–	–
NICKEL – CHROMIUM – IRON															
Ni 6002	NiCr21Fe18Mo9	0,05 to 0,15	2,0	17,0 to 20,0	1,0	0,5	Min. 44,0	0,5 to 2,5	–	–	20,5 to 23,0	–	8,0 to 10,0	0,2 to 1,0	–
Ni 6025	NiCr25Fe10AlY	0,15 to 0,25	0,5	8,0 to 11,0	0,5	0,1	Min. 59,0	–	1,8 to 2,4	0,1 to 0,2	24,0 to 26,0	–	–	–	Y 0,05 to 0,12; Zr 0,01 to 0,10
Ni 6030	NiCr30Fe15Mo5W	0,03	1,5	13,0 to 17,0	0,8	1,0 to 2,4	Min. 36,0	5,0	–	–	28,0 to 31,5	0,3 to 1,5	4,0 to 6,0	1,5 to 4,0	–
Ni 6052	NiCr30Fe9	0,04	1,0	7,0 to 11,0	0,5	0,3	Min. 54,0	–	1,1	1,0	28,0 to 31,5	0,10	0,5	–	Al + Ti < 1,5
Ni 6062	NiCr15Fe8Nb	0,08	1,0	6,0 to 10,0	0,3	0,5	Min. 70,0	–	–	–	14,0 to 17,0	1,5 to 3,0	–	–	–

Table 1 — Symbols and chemical composition requirements for solid wires, strips and rods (continued)

Alloy symbols		Chemical composition in % (m/m) ^{a b}													
Numerical	Chemical	C	Mn	Fe	Si	Cu	Ni ^c	Co ^c	Al	Ti	Cr	Nb ^d	Mo	W	Others ^{e f}
Ni 6176	NiCr16Fe6	0,05	0,5	5,5 to 7,5	0,5	0,1	Min. 76,0	0,05	—	—	15,0 to 17,0	—	—	—	—
Ni 6601	NiCr23Fe15Al	0,10	1,0	20,0	0,5	1,0	58,0 to 63,0	—	1,0 to 1,7	—	21,0 to 25,0	—	—	—	—
Ni 6701	NiCr36Fe7Nb	0,35 to 0,50	0,5 to 2,0	7,0	0,5 to 2,0	—	42,0 to 48,0	—	—	—	33,0 to 39,0	0,8 to 1,8	—	—	—
Ni 6704	NiCr25FeAl3YC	0,15 to 0,25	0,5	8,0 to 11,0	0,5	0,1	Min. 55,0	—	1,8 to 2,8	0,1 to 0,2	24,0 to 26,0	—	—	—	Y 0,05 to 0,12; Zr 0,01 to 0,10
Ni 6975	NiCr25Fe13Mo6	0,03	1,0	10,0 to 17,0	1,0	0,7 to 1,2	Min. 47,0	—	—	0,70 to 1,50	23,0 to 26,0	—	5,0 to 7,0	—	—
Ni 6985	NiCr22Fe20Mo7Cu2	0,01	1,0	18,0 to 21,0	1,0	1,5 to 2,5	Min. 40,0	5,0	—	—	21,0 to 23,5	0,50	6,0 to 8,0	1,5	—
Ni 7069	NiCr15Fe7Nb	0,08	1,0	5,0 to 9,0	0,50	0,50	Min. 70,0	—	0,4 to 1,0	2,0 to 2,7	14,0 to 17,0	0,70 to 1,20	—	—	—
Ni 7092	NiCr15Ti3Mn	0,08	2,0 to 2,7	8,0	0,3	0,5	Min. 67,0	—	—	2,5 to 3,5	14,0 to 17,0	—	—	—	—
Ni 7718	NiCr19Fe19Nb5Mo3	0,08	0,3	24,0	0,3	0,3	50,0 to 55,0	—	0,2 to 0,8	0,7 to 1,1	17,0 to 21,0	4,8 to 5,5	2,8 to 3,3	—	B 0,006, P 0,015
Ni 8025	NiFe30Cr29Mo	0,02	1,0 to 3,0	30,0	0,5	1,5 to 3,0	35,0 to 40,0	—	0,2	1,0	27,0 to 31,0	—	2,5 to 4,5	—	—
Ni 8065	NiFe30Cr21Mo3	0,05	1,0	Min. 22,0	0,5	1,5 to 3,0	38,0 to 46,0	—	0,2	0,6 to 1,2	19,5 to 23,5	—	2,5 to 3,5	—	—
Ni 8125	NiFe26Cr25Mo	0,02	1,0 to 3,0	30,0	0,5	1,5 to 3,0	37,0 to 42,0	—	0,2	1,0	23,0 to 27,0	—	3,5 to 7,5	—	—
NICKEL – MOLYBDENUM															
Ni 1001	NiMo28Fe	0,08	1,0	4,0 to 7,0	1,0	0,5	Min. 55,0	2,5	—	—	1,0	—	26,0 to 30,0	1,0	V 0,20 to 0,40
Ni 1003	NiMo17Cr7	0,04 to 0,08	1,0	5,0	1,0	0,50	Min. 65,0	0,20	—	—	6,0 to 8,0	—	15,0 to 18,0	0,50	V 0,50

Table 1 — Symbols and chemical composition requirements for solid wires, strips and rods (continued)

Alloy symbols		Chemical composition in % (m/m) ^{a b}													
Numerical	Chemical	C	Mn	Fe	Si	Cu	Ni ^c	Co ^c	Al	Ti	Cr	Nb ^d	Mo	W	Others ^{e f}
Ni 1004	NiMo25Cr5Fe5	0,12	1,0	4,0 to 7,0	1,0	0,5	Min. 62,0	2,5	–	–	4,0 to 6,0	–	23,0 to 26,0	1,0	V 0,60
Ni 1008	NiMo19WCr	0,1	1,0	10,0	0,50	0,50	Min. 60,0	–	–	–	0,5 to 3,5	–	18,0 to 21,0	2,0 to 4,0	–
Ni 1009	NiMo20WCu	0,1	1,0	5,0	0,5	0,3 to 1,3	Min. 65,0	–	1,0	–	–	–	19,0 to 22,0	2,0 to 4,0	–
Ni 1062	NiMo24Cr8Fe6	0,01	0,5	5,0 to 7,0	0,1	0,4	Min. 62,0	–	0,1 to 0,4	–	7,0 to 8,0	–	23,0 to 25,0	–	–
Ni 1066	NiMo28	0,02	1,0	2,0	0,1	0,5	Min. 64,0	1,0	–	–	1,0	–	26,0 to 30,0	1,0	–
Ni 1067	NiMo30Cr	0,01	3,0	1,0 to 3,0	0,1	0,2	Min. 52,0	3,0	0,5	0,2	1,0 to 3,0	0,2	27,0 to 32,0	3,0	V 0,20
Ni 1069	NiMo28Fe4Cr	0,01	1,0	2,0 to 5,0	0,05	0,01	Min. 65,0	1,0	0,5	–	0,5 to 1,5	–	26,0 to 30,0	–	–
NICKEL – CHROMIUM – MOLYBDENUM															
Ni 6012	NiCr22Mo9	0,05	1,0	3,0	0,5	0,5	Min. 58,0	–	0,4	0,4	20,0 to 23,0	1,5	8,0 to 10,0	–	–
Ni 6022	NiCr21Mo13Fe4W ₃	0,01	0,5	2,0 to 6,0	0,1	0,5	Min. 49,0	2,5	–	–	20,0 to 22,5	–	12,5 to 14,5	2,5 to 3,5	V 0,3
Ni 6057	NiCr30Mo11	0,02	1,0	2,0	1,0	–	Min. 53,0	–	–	–	29,0 to 31,0	–	10,0 to 12,0	–	V 0,4
Ni 6059	NiCr23Mo16	0,01	0,5	1,5	0,1	–	Min. 56,0	0,3	0,1 to 0,4	–	22,0 to 24,0	–	15,0 to 16,5	–	–
Ni 6200	NiCr23Mo16Cu2	0,01	0,5	3,0	0,08	1,3 to 1,9	Min. 52,0	2,0	–	–	22,0 to 24,0	–	15,0 to 17,0	–	–
Ni 6205	NiCr25Mo16	0,02	0,5	2,0	0,2	2,0	Min. 50,0	–	0,4	–	22,0 to 27,0	–	13,5 to 16,5	–	–
Ni 6276	NiCr15Mo16Fe6W ₄	0,02	1,0	4,0 to 7,0	0,08	0,5	Min. 50,0	2,5	–	–	14,5 to 16,5	–	15,0 to 17,0	3,0 to 4,5	V 0,3

Table 1 — Symbols and chemical composition requirements for solid wires, strips and rods (continued)

Alloy symbols		Chemical composition in % (m/m) ^{a b}													
Numerical	Chemical	C	Mn	Fe	Si	Cu	Ni ^c	Co ^c	Al	Ti	Cr	Nb ^d	Mo	W	Others ^{e f}
Ni 6452	NiCr20Mo15	0,01	1,0	1,5	0,1	0,5	Min. 56,0	–	–	–	19,0 to 21,0	0,4	14,0 to 16,0	–	V 0,4
Ni 6455	NiCr16Mo16Ti	0,01	1,0	3,0	0,08	0,5	Min. 56,0	2,0	–	0,7	14,0 to 18,0	–	14,0 to 18,0	0,5	–
Ni 6625	NiCr22Mo9Nb	0,1	0,5	5,0	0,5	0,5	Min. 58,0	–	0,4	0,4	20,0 to 23,0	3,0 to 4,2	8,0 to 10,0	–	–
Ni 6650	NiCr20Fe14Mo11 WN	0,03	0,5	12,0 to 16,0	0,5	0,3	Min. 45,0	–	0,5	–	18,0 to 21,0	0,5	9,0 to 13,0	0,5 to 2,5	N 0,05 to 0,25; S 0,010
Ni 6660	NiCr22Mo-20	0,03	0,5	2,0	0,5	0,3	Min. 58,0	0,2	0,4	0,4	21,0 to 23,0	0,2	9,0 to 11,0	2,0 to 4,0	–
Ni 6686	NiCr21Mo16W4	0,01	1,0	5,0	0,08	0,5	Min. 49,0	–	0,5	0,25	19,0 to 23,0	–	15,0 to 17,0	3,0 to 4,4	–
Ni 7725	NiCr21Mo8Nb3Ti	0,03	0,4	Min. 8,0	0,20	–	55,0 to 59,0	–	0,35	1,0 to 1,7	19,0 to 22,5	2,75 to 4,00	7,0 to 9,5	–	–
NICKEL – CHROMIUM – COBALT															
Ni 6160	NiCr28Co30Si3	0,15	1,5	3,5	2,4 to 3,0	–	Min. 30,0	27,0 to 33,0	–	0,2 to 0,8	26,0 to 30,0	1,0	1,0	1,0	–
Ni 6617	NiCr22Co12Mo9	0,05 to 0,15	1,0	3,0	1,0	0,5	Min. 44,0	10,0 to 15,0	0,8 to 1,5	0,6	20,0 to 24,0	–	8,0 to 10,0	–	–
Ni 7090	NiCr20Co18Ti3	0,13	1,0	1,5	1,0	0,2	Min. 50,0	15,0 to 21,0	1,0 to 2,0	2,0 to 3,0	18,0 to 21,0	–	–	–	^h
Ni 7263	NiCr20Co20Mo6Ti ₂	0,04 to 0,08	0,6	0,7	0,4	0,2	Min. 47,0	19,0 to 21,0	0,3 to 0,6	1,9 to 2,4	19,0 to 21,0	–	5,6 to 6,1	–	Al+Ti 2,4 to 2,8 _g

Table 1 — Symbols and chemical composition requirements for solid wires, strips and rods (concluded)

Alloy symbols		Chemical composition in % (m/m) ^{a b}													
Numerical	Chemical	C	Mn	Fe	Si	Cu	Ni ^c	Co ^c	Al	Ti	Cr	Nb ^d	Mo	W	Others ^{e f}
NICKEL – CHROMIUM – TUNGSTEN															
Ni 6231	NiCr22W14Mo2	0,05 to 0,15	0,3 to 1,0	3,0	0,25 to 75	0,50	Min. 48,0	5,0	0,2 to 0,5	–	20,0 to 24,0	–	1,0 to 3,0	13,0 to 15,0	–
^a	Single values for all elements are maximum except where marked as Min. (minimum).														
^b	The results shall be rounded to the same number of significant figures as in the specified value using the rules in accordance with annex B, Rule A of ISO 31-0:1992.														
^c	Up to 1 % of the Ni content can be Co unless otherwise specified. For certain applications lower Co levels may be required and should be agreed between contracting parties.														
^d	Up to 20 % of the Nb content can be Ta.														
^e	The total of unspecified elements shall not exceed 0,5 %.														
^f	P 0,020 % maximum and S 0,015 % maximum unless otherwise stated.														
^g	S ≤ 0,007, Ag ≤ 0,0005, B ≤ 0,005, Bi ≤ 0,0001.														
^h	Ag ≤ 0,0005, B ≤ 0,020, Bi ≤ 0,0001, Pb ≤ 0,0020, Zr ≤ 0,15.														
NOTE	Consumables not listed in the Table can be symbolised by Ni Z. Chemical symbols established by the manufacturer may be added in brackets.														

NOTE Corresponding national classifications are shown in annex C.

5 Mechanical properties of the weld metal

Mechanical properties of the weld metal are not part of the classification.

6 Chemical analysis

Chemical analysis shall be performed on specimens of the product or the stock from which it is made. Any analytical technique can be used, but in case of dispute reference shall be made to established published methods, agreed between the contracting parties.

NOTE 1 The influence of the shielding gas or flux on the chemical composition of the all-weld metal is to be considered. Differences between the chemical composition of the all-weld metal and the solid wire or rod, may occur.

NOTE 2 See annex B.

7 Retest

If any test fails to meet the requirement, that test shall be repeated twice. The results of both retests shall meet the requirement. Specimens for the retest may be taken from the original test sample or from a new test sample. For chemical analysis, retest need be only for those specific elements that failed to meet their test requirement. If the results of one or both retests fail to meet the requirement, the material under test shall be considered as not meeting the requirements of this specification for that classification.

In the event that, during preparation or after completion of any test, it is clearly determined that prescribed or proper procedures were not followed in preparing the weld test sample or test specimen(s), or in conducting the tests, the test shall be considered invalid, without regard to whether the test was actually completed, or whether the test results met, or failed to meet, the requirement. That test shall be repeated, following proper prescribed procedures. In this case, the requirement for doubling the number of test specimens does not apply.

8 Technical delivery conditions

Technical delivery conditions shall meet the requirements in EN ISO 544 and ISO 14344.

9 Designation

The designation of solid wires, strips and rods shall follow the principle given in the example below.

EXAMPLE 1 A solid wire (S) for gas-shielded metal arc welding has a chemical composition within the limits for the alloy symbol 6625 (NiCr22Mo9Nb) of Table 1, is designated:

Solid wire ISO 18274 – S Ni 6625

or alternatively

Solid wire ISO 18274 – S Ni 6625 (NiCr22Mo9Nb)

EXAMPLE 2 A solid rod (S) for tungsten inert gas welding is designated:

Solid rod ISO 18274 – S Ni 6625

or alternatively

Solid rod ISO 18274 – S Ni 6625 (NiCr22Mo9Nb)

EXAMPLE 3 A solid strip (B) for submerged arc welding is designated:

Solid strip ISO 18274 – B Ni 6625

or alternatively

Solid strip ISO 18274 – B Ni 6625 (NiCr22Mo9Nb)

where:

ISO 18274 is the standard number;

S or B is the product form (see 4.1);

Ni 6625 is the chemical composition of welding consumable (see Table 1);

NiCr22Mo9Nb is the optional chemical symbol of welding consumable (see Table 1).

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Annex A **(informative)**

Description of consumable classes

The following details which are not exhaustive, do not form part of the standard, but are included to provide an indication of the typical application for which individual classes of consumables are commonly used. More particular information on welding consumable selection, information and techniques to be applied when using consumables depositing nickel base alloys should be sought from the manufacturer.

NICKEL

Ni 2061

Consumables of this classification are used for welding wrought and cast forms of commercially pure nickel such as UNS N02200 or UNS N02201, welding the clad side of nickel-clad steel and surfacing of steel, as well as for dissimilar metal welding.

NICKEL – COPPER

Ni 4060 or Ni 4061

Consumables of these classifications are used for welding nickel-copper alloys such as UNS N04400 to themselves, welding the clad side of nickel-copper alloy-clad steel, and surfacing of steel.

Ni 5504

Consumables of this classification are used for welding age-hardening nickel-copper alloy (UNS N05500) to itself using tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding. The weld metal will age harden on heat treatment.

NICKEL – CHROMIUM

Ni 6072

Consumables of this classification are used for gas-shielded metal arc welding and tungsten inert gas welding of 50/50 nickel/chromium alloy, overlaying steel, cladding nickel-chromium alloy onto nickel-iron-chromium tubing, and casting repair. The weld metal is resistant to high-temperature corrosion, including fuel-ash corrosion in atmospheres containing sulphur and vanadium.

Ni 6076

Consumables of this classification are used for welding nickel-chromium-iron alloy such as UNS N06600 and N06075 to itself, for the clad side of joints in steel clad with nickel-chromium-iron alloy, for surfacing steel with nickel-chromium-iron weld metal, and for joining steel to nickel-base alloys using the tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding.

Ni 6082

Consumables of this classification are used for welding nickel-chromium alloys, e.g. UNS N06075, UNS N07080, and nickel-chromium-iron alloys, e.g. UNS N06600, UNS N06601, and nickel-iron-chromium alloys, e. g. UNS N08800 and UNS N08801. They are also used for cladding and for welding dissimilar metal joints. They may be used for welding nickel steels for cryogenic applications.

NICKEL – CHROMIUM – IRON**Ni 6002**

Consumables of this classification are used for welding low-carbon nickel-chromium-molybdenum alloys, especially UNS N06022, for welding the clad side in steel clad with low-carbon nickel-chromium-molybdenum alloy, and for welding low-carbon nickel-chromium-molybdenum alloys to steel and other nickel-base alloys.

Ni 6025

Consumables of these classifications are used for welding nickel-base alloys of similar composition such as UNS N06025 and UNS N06603. Welds exhibit resistance to oxidation, carburisation, and sulphidation and are used at temperatures up to 1200°C.

Ni 6030

Consumables of this classification are used for welding nickel-chromium-molybdenum alloy such as UNS N06030 to itself, to steel, to other nickel-base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal using tungsten inert gas welding, gas-shielded metal arc welding, and plasma arc welding.

Ni 6052

Consumables of this classification are used for welding high chromium-nickel base alloys such as UNS N06690. They may also be used for producing corrosion-resistant overlays on low-alloy and stainless steels and for dissimilar metal joints.

Ni 6062

Consumables of this classification are used for welding nickel-iron-chromium alloys, e.g. UNS N08800, and nickel-chromium-iron alloys, e.g. UNS N06600, and has particular application to dissimilar material welds. They may be used for applications at temperatures up to about 980 °C but their weld metal does not exhibit optimum oxidation resistance and strength above 820 °C.

Ni 6176

Consumables of this classification are used for welding nickel-chromium-iron alloys, e.g. UNS N06600, UNS N06601, for the clad side of joints in steel with nickel-chromium-iron alloy, and for surfacing steel. They have good dissimilar metal welding capability. They may be used for applications at temperatures up to 980 °C but their weld metal does not exhibit optimum oxidation resistance and strength above 820 °C.

Ni 6601

Consumables of this classification are used for welding nickel-chromium-iron-aluminium alloy such as UNS N06601 to itself and to other high-temperature compositions using tungsten inert gas welding. It is used for severe applications where the exposure temperature can exceed 1150 °C.

Ni 6701

Consumables of this classification are used for welding matching nickel-chromium-iron alloys to themselves and to high temperature alloys for application temperatures up to 1200°C.

Ni 6704

Consumables of these classifications are used for welding nickel-base alloys of similar composition such as UNS N06025 and UNS N06603. Welds exhibit resistance to oxidation, carburisation, and sulphidation and are used at temperatures up to 1200°C.

Ni 6975

Consumables of this classification are used for welding nickel-chromium-molybdenum alloy (UNS N06975) to itself, to steel, to other nickel-base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal using tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding.

Ni 985

Consumables of this classification are used for cladding steel with nickel-chromium-iron weld metal and for joining steel to nickel-base alloys using tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding. The weld metal will age harden on heat treatment. For specific information concerning age hardening, consult the supplier or the supplier's technical literature.

Ni 7069

Consumables of this classification are used for cladding steel with nickel-chromium-iron weld metal and for joining steel to nickel-base alloys using tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding. The weld metal will age harden on heat treatment.

Ni 7092

Consumables of this classification are used for welding nickel-chromium-iron alloy such as UNS N06600 to itself using tungsten inert gas welding, gas-shielded metal arc welding, submerged arc welding, and plasma arc welding. The higher niobium content of the consumables is intended to minimise cracking where high welding stresses are encountered, as in thick-section base metal.

Ni 7718

Consumables of this classification are used for welding nickel-chromium-niobium-molybdenum alloy such as UNS N07718 to itself using tungsten inert gas welding. The weld metal will age harden on heat treatment. For specific information concerning age hardening, consult the supplier or the supplier's technical literature.

Ni 8025

Consumables of this classification deposit weld metals of higher chromium content than Ni 8125 or Ni 8065 consumables. They are used for welding copper alloyed chromium-nickel-molybdenum alloys, e.g. UNS N08904 and nickel-iron-chromium molybdenum alloys, e.g. UNS N08825. They may also be used for surfacing of steel.

Ni 8065 or Ni 8125

Consumables of these classifications are used for welding copper alloyed chromium-nickel-molybdenum alloys, e.g. UNS N08904 and nickel-iron-chromium-molybdenum alloys, e.g. UNS N08825. They may also be used for surfacing of steel; a nickel alloy barrier layer is typically applied prior to weld overlay.

NICKEL – MOLYBDENUM

Ni 1001

Consumables of this classification are used for welding nickel-molybdenum alloy UNS N10001.

Ni 1003

Consumables of this classification are used for welding nickel-molybdenum alloy such as UNS N10003 to itself, to steel, to other nickel-base alloys, and for cladding steel with nickel-molybdenum weld metal using tungsten inert gas welding, and gas-shielded metal arc welding.

Ni 1004

Consumables of this classification are used for welding dissimilar metal combinations of nickel-base, cobalt-base, and iron-base alloys.

Ni 1008 or Ni 1009

Consumables of this classification are used for welding 9% nickel steel such as UNS K81340 to itself using tungsten inert gas welding, gas-shielded metal arc welding and submerged arc welding.

Ni 1062

Consumables of this classification are used for welding nickel-molybdenum alloys especially UNS N10629, for welding the clad side in steel clad with a nickel-molybdenum alloy, and for welding nickel-molybdenum alloys to steel and other nickel-base alloys.

Ni 1066

Consumables of this classification are used for welding nickel-molybdenum alloys especially UNS N10665, for welding the clad side in steel clad with a nickel-molybdenum alloy, and for welding nickel-molybdenum alloys to steel and other nickel-base alloys.

Ni 1067

Consumables of this classification are used for welding nickel-molybdenum alloy such as UNS N10675 to itself, for welding the clad side of joints in steel clad with nickel-molybdenum alloy and for welding nickel-molybdenum alloys to steel and to other nickel-base alloys using tungsten inert gas welding, gas-shielded metal arc welding, and plasma arc welding.

Ni 1069

Consumables of this classification are used for welding dissimilar metal combinations of nickel-base, cobalt-base, and iron-base alloys.

NICKEL – CHROMIUM – MOLYBDENUM**Ni 6012**

Consumable intended for welding high alloyed austenitic stainless steels of 6-Mo type. The weldments exhibit very good resistance to pitting and crevice corrosion in chloride-containing environments. The low Nb content improves weldability.

Ni 6022

Consumables of this classification are used for welding low carbon nickel-chromium-molybdenum alloys, especially UNS N06022, and chromium-nickel-molybdenum austenitic stainless steels; for welding the clad side in steel clad with low carbon-nickel-chromium-molybdenum alloy and joining low-carbon-nickel-chromium-molybdenum alloys to steel and other nickel-based alloys, and for surfacing of steel with nickel-chromium-molybdenum alloys.

Ni 6057

The nominal composition (weight %) of filler metal of this classification is 60 Ni, 30 Cr, 10 Mo. Consumables of this classification are used for corrosion-resistant (especially excellent to crevice corrosion) overlaying with tungsten inert gas welding, gas-shielded metal arc, and plasma arc welding processes.

Ni 6058 or Ni 6059

Consumables of this classification are used for welding low-carbon nickel-chromium-molybdenum alloys, especially UNS N06059 and chromium-nickel-molybdenum austenitic stainless steels, for welding the clad side in steel clad with low-carbon nickel-chromium-molybdenum alloy, and for welding low-carbon nickel-chromium-molybdenum alloys to steel and other nickel-base alloys.

Ni 6200

Consumables of this classification are used for welding the nickel-chromium-molybdenum alloy UNS N06200 to itself, to steel, to other nickel-base alloys, and for cladding steel.

Ni 6276

Consumables of this classification are used for welding low carbon nickel-chromium-molybdenum alloys, especially UNS N10276, for welding the clad side in steel clad with low carbon nickel-chromium-molybdenum alloy, and for welding low carbon nickel-chromium-molybdenum alloys to steel and other nickel-base alloys.

Ni 6452 or Ni 6455

Consumables of these classifications are used for welding low-carbon nickel-chromium-molybdenum alloys, especially UNS N06455, for welding the clad side in steel clad with low-carbon nickel-chromium-molybdenum alloy, and for welding low-carbon nickel-chromium-molybdenum alloys to steel and other nickel-base alloys.

Ni 6625

Consumables of this classification are used for welding nickel-chromium-molybdenum alloys, especially UNS N06625, to themselves and to steel, and for surfacing steel with nickel-chromium-molybdenum alloys. The weld metal is comparable with UNS N06625 in resistance to corrosion.

Ni 6650

Consumables of this classification are used for welding low-carbon nickel-chromium-molybdenum alloys and chromium-nickel-molybdenum austenitic stainless steels for offshore and chemical industry applications e.g. UNS N08926. They are also used for cladding and for welding dissimilar metal joints such as low-carbon nickel-chromium-molybdenum alloys welded to carbon steel or nickel-base alloys. They may also be used for the welding of 9% nickel steel.

Ni 6660

Consumable of this classification are used for gas-shielded metal arc welding and tungsten inert gas welding of superduplex, superaustenites, cryogenic 9 % Ni steels and for coating of low alloyed steels. Compared to Ni 6625, the weld metal shows a good or better corrosion resistance, no hot cracking problem and a good toughness at low temperature for cryogenic applications.

Ni 6686

Consumables of this classification are used for welding low-carbon nickel-chromium-molybdenum alloys, especially UNS N06686 and chromium-nickel-molybdenum austenitic steels, for welding the clad side in steel clad with low-carbon nickel-chromium-molybdenum alloy, and for welding low-carbon nickel-chromium-molybdenum alloys to steel and other nickel-base alloys and for surfacing of steel with nickel-chromium-molybdenum-tungsten alloys.

Ni 7725

Consumables of this classification are used for welding high strength corrosion resistant nickel alloys especially UNS N07725 and UNS N09925, to themselves and to steel, and for surfacing with high strength nickel-chromium-molybdenum alloy. Post weld precipitation hardening is required to develop maximum strength; a variety of heat treatments can be used.

NICKEL – CHROMIUM – COBALT

Ni 6160

Consumables of this classification are used for welding the nickel-cobalt-chromium-silicon alloy (UNS N12160) to itself using the tungsten inert gas, gas-shielded metal arc, and plasma arc welding processes. This alloy is sensitive to iron pickup. Alternative filler metals are required to weld the base alloy to iron bearing alloys. The weld metal has excellent resistance to sulphidation and chloride attack in both reducing and oxidising environments, and can withstand temperatures up to 1200°C.