SLOVENSKI STANDARD
SIST ISO 9722:1996

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Nikelj in nikljeve zlitine - Sestava in oblika gnetenih izdelkov

Nickel and nickel alloys -- Composition and forms of wrought products

Nickel et alliages de nickel -- Composition chimique et formes des produits corroyés

Ta slovenski standard je istoveten z: ISO 9722:1992

ICS:

77.150.40	Nikljevi in kromovi izdelki	Nickel and chromium products

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INTERNATIONAL STANDARD

ISO 9722

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Nickel and nickel alloys — Composition and forms of wrought products

Nickel et alliages de nickel — Composition chimique et formes des produits corroyés

Reference number
ISO 9722:1992(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 9722 was prepared by Technical Committee ISO/TC 155, *Nickel and nickel alloys*, Sub-Committee SC 2, *Wrought and cast nickel and nickel alloys*.

Annex A forms an integral part of this International Standard.

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Nickel and nickel alloys — Composition and forms of wrought products

1 Scope

This International Standard lists the chemical composition of wrought nickel and nickel alloys and the forms of wrought products in which they are commercially available.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6207:1992, *Seamless nickel and nickel alloy tube.*

ISO 6208:1992, *Nickel and nickel alloy plate, sheet and strip.*

ISO 6372-1:1989, *Nickel and nickel alloys — Terms and definitions — Part 1: Materials.*

ISO 6372-3:1989, *Nickel and nickel alloys — Terms and definitions — Part 3: Wrought products and castings.*

ISO/TR 7003:1990, *Unified format for the designation of metals.*

ISO/TR 9721:—[1], *Nickel and nickel alloys — Code of designation based on chemical symbols.*

ISO 9723:1992, *Nickel and nickel alloy bars.*

ISO 9724:1992, *Nickel and nickel alloy wire and drawing stock.*

ISO 9725:1992, *Nickel and nickel alloy forgings.*

3 Definitions

For the purposes of this International Standard, the definitions for nickel and nickel alloys in ISO 6372-1 and for wrought products in ISO 6372-3 apply.

4 Alloy identification

For the purposes of this International Standard, the principles for alloy identification in ISO/TR 7003 and ISO/TR 9721 apply.

1) To be published.

5 Composition

5.1 The compositions of nickel and nickel alloys are shown in table 1.

The composition limits do not preclude the possible presence of other elements that are not specified. If the purchaser's requirements necessitate limits for any other element that is not specified, these shall be agreed upon between the purchaser and the supplier. The percentage content of elements shown as "remainder" shall be calculated by difference from 100 %.

5.2 For a list of ISO analytical standards, see annex A.

6 Forms of wrought products

The forms of wrought products in which nickel and nickel alloys are available are indicated in table 2 by an "X" in the appropriate column.

Table 1 — Composition and density of wrought nickel and nickel alloys

Alloy identification[1]		Composition % (m/m)[2]																Density[3]
Number	Description	Al	B	C	Co[4]	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	Ti	W	Others[5]	g/cm³
NW2200	Ni99,0			0,15			0,2	0,4	0,3		99,0		0,010	0,3				8,9
NW2201	Ni99,0-LC			0,02			0,2	0,4	0,3		99,0		0,010	0,3				8,9
NW3021	NiCo20Cr15Mo5Al4Ti	4,5 4,9	0,003 0,010	0,12 0,17	18,0 22,0	14,0 15,7	0,2	1,0	1,0	4,5 5,5	Remainder		0,015	1,0	0,9 1,5		Ag: 0,0005(5) Bi: 0,0001(1) Pb: 0,0015(15)	8,4
NW7263	NiCo20Cr20Mo5Ti2Al	0,3 0,6	0,005	0,04 0,08	19,0 21,0	19,0 21,0	0,2	0,7	0,6	5,6 6,1	Remainder		0,007	0,4	1,9 2,4		Ag: 0,0005(5) Bi: 0,0001(1) Pb: 0,0020(20) Ti+Al: 2,4 to 2,8	8,4
NW7001	NiCr20Co13Mo4Ti3Al	1,2 1,6	0,003 0,010	0,02 0,10	12,0 15,0	18,0 21,0	0,10	2,0	1,0	3,5 5,0	Remainder	0,015	0,015	0,1	2,8 3,3		Ag: 0,0005(5) Bi: 0,0005(0,5) Pb: 0,0010(10) Zr: 0,02 to 0,08	8,4
NW7090	NiCr20Co18Ti3	1,0 2,0	0,020	0,13	15,0 21,0	18,0 21,0	0,2	1,5	1,0		Remainder		0,015	1,0	2,0 3,0		Zr: 0,15	8,2
NW6617	NiCr22Co12Mo9	0,8 1,5	0,006	0,05 0,15	10,0 15,0	20,0 24,0	0,5	3,0	1,0	8,0 10,0	Remainder		0,015	1,0	0,6			8,4
NW7750	NiCr15Fe7Ti2Al	0,4 1,0		0,08		14,0 17,0	0,5	5,0 9,0	1,0		70,0		0,015	0,5	2,2 2,8		Nb+Ta: 0,7 to 1,2	8,3
NW6600	NiCr15Fe8			0,15		14,0 17,0	0,5	6,0 10,0	1,0		72,0		0,015	0,5				8,4
NW6602	NiCr15Fe8-LC			0,02		14,0 17,0	0,5	6,0 10,0	1,0		72,0		0,015	0,5				8,4
NW7718	NiCr19Fe19Nb5Mo3	0,2 0,8	0,006	0,08		17,0 21,0	0,3	Remainder	0,4	2,8 3,3	50,0 55,0	0,015	0,015	0,4	0,6 1,2		Nb+Ta: 4,7 to 5,5	8,0
NW6002	NiCr21Fe18Mo9		0,010	0,05 0,15	0,5 2,5	20,5 23,0		17,0 20,0	1,0	8,0 10,0	Remainder	0,040	0,030	1,0		0,2 1,0		8,2
NW6007	NiCr22Fe20Mo6Cu2Nb			0,05	2,5	21,0 23,5	1,5 2,5	18,0 21,0	1,0 2,0	5,5 7,5	Remainder	0,040	0,030	1,0			Nb+Ta: 1,7 to 2,5	8,3
NW6985	NiCr22Fe20Mo7Cu2			0,015	5,0	21,0 23,5	1,5 2,5	18,0 21,0	1,0	6,0 8,0	Remainder	0,040	0,030	1,0		1,5	Nb+Ta: 0,5	8,3
NW6601	NiCr23Fe15Al	1,0 1,7		0,10		21,0 25,0	1,0	Remainder	1,0		58,0 63,0		0,015	0,5				8,0
NW6333	NiCr26Fe20Co3Mo3W3			0,10	2,5 4,0	24,0 27,0		Remainder	2,0	2,5 4,0	44,0 48,0	0,030	0,030	1,5		2,5 4,0		
NW6690	NiCr29Fe9			0,05		27,0 31,0	0,5	7,0 11,0	0,5		Remainder		0,015	0,5				8,2

Alloy identification[1]		Composition % (m/m)[2]																Density[3]
Number	Description	Al	B	C	Co[4]	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	Ti	W	Others[5]	g/cm³
NW6455	NiCr16Mo16Ti			0,015	2,0	14,0 18,0		3,0	1,0	14,0 17,0	Remainder	0,040	0,030	0,08	0,7			8,6
NW6022	NiCr21Mo13Fe4W3			0,015	2,5	20,0 22,5		2,0 6,0	0,5	12,5 14,5	Remainder	0,025	0,020	0,08		2,5 3,5	V: 0,35	8,7
NW6625	NiCr22Mo9Nb	0,40		0,10	1,0	20,0 23,0		5,0	0,50	8,0 10,0	58,0	0,015	0,015	0,50	0,40		Nb+Ta: 3,15 to 4,15	8,5
NW6621	NiCr20Ti			0,08 0,15	5,0	18,0 21,0	0,5	5,0	1,0		Remainder		0,020	1,0	0,20 0,60		Pb: 0,0050(50)	8,4
NW7080	NiCr20Ti2Al	1,0 1,8	0,008	0,04 0,10	2,0	18,0 21,0	0,2	1,5	1,0		Remainder		0,015	1,0	1,8 2,7		Ag: 0,0005(5) Bi: 0,0001(1) Pb: 0,0020(20)	8,2
NW4400	NiCu30			0,30			28,0 34,0	2,5	2,0		63,0		0,025	0,5				8,8
NW4402	NiCu30-LC			0,04			28,0 34,0	2,5	2,0		63,0		0,025	0,5				8,8
NW5500	NiCu30Al3Ti	2,2 3,2		0,25			27,0 34,0	2,0	1,5		Remainder	0,020	0,015	0,5	0,35 0,85			8,5
NW8825	NiFe30Cr21Mo3	0,2		0,05		19,5 23,5	1,5 3,0	Remainder	1,0	2,5 3,5	38,0 46,0		0,015	0,5	0,6 1,2			8,1
NW9911	NiFe36Cr12Mo6Ti3	0,35	0,010 0,020	0,02 0,06		11,0 14,0	0,2	Remainder	0,5	5,0 6,5	40,0 45,0	0,020	0,020	0,4	2,8 3,1			8,2
NW0276	NiMo16Cr15Fe6W4			0,010	2,5	14,5 16,5		4,0 7,0	1,0	15,0 17,0	Remainder	0,040	0,030	0,08		3,0 4,5		8,9
NW0665	NiMo28			0,02	1,0	1,0		2,0	1,0	26,0 30,0	Remainder	0,040	0,030	0,1				9,2
NW0001	NiMo30Fe5			0,05	2,5	1,0		4,0 6,0	1,0	26,0 30,0	Remainder	0,040	0,030	1,0			V: 0,2 to 0,4	9,2
NW8028	FeNi31Cr27Mo4Cu1			0,030		26,0 28,0	0,6 1,4	Remainder	2,5	3,0 4,0	30,0 34,0	0,030	0,030	1,0				8,0
NW8800	FeNi32Cr21AlTi	0,15 0,60		0,10		19,0 23,0	0,7	Remainder	1,5		30,0 35,0		0,015	1,0	0,15 0,60			8,0

Alloy identification[1]		Composition % (m/m)[2]																	Density[3]
Number	Description	Al	B	C	Co[4]	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	Ti	W	Others[5]		g/cm³
NW8810	FeNi32Cr21AlTi-HC	0,15 0,60		0,05 0,10		19,0 23,0	0,7	Remainder	1,5		30,0 35,0		0,015	1,0	0,15 0,60				8,0
NW8811	FeNi32Cr21AlTi-HT	0,25 0,60		0,06 0,10		19,0 23,0	0,7	Remainder	1,5		30,0 35,0		0,015	1,0	0,25 0,60		Al+Ti: 0,85 to 1,2		8,0
NW8801	FeNi32Cr21Ti			0,10		19,0 22,0	0,5	Remainder	1,5		30,0 34,0		0,015	1,0	0,7 1,5				8,0
NW8020	FeNi35Cr20Cu4Mo2			0,07		19,0 21,0	3,0 4,0	Remainder	2,0	2,0 3,0	32,0 38,0	0,040	0,030	1,0			Nb+Ta: 8 × C to 1,0		8,1

1) For alloy identification either the number or the description may be used.

2) Single values are maximum limits, except for nickel where single values are minimum.

3) Density values are average values and are given for information only.

4) Where no limits are specified, cobalt up to a maximum of 1,5 % is allowed and counted as nickel. In this case, an indication of cobalt content is not required.

5) Values for Ag, Bi and Pb may be expressed in mass percentage [% (m/m)] or in parts per million (ppm).