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(JSSA/JSA)

**Corrosion-resistant and heat-resistant
superalloy, nickel and nickel alloy — Bars**

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Stainless Steel Association (JSSA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS G 4901 : 2008**), which has been technically revised, and **JIS H 4553 : 1999**, which has been withdrawn.

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Symbol of grade	Patent holder	Title of invention	Patent number	Registration date of establishment of patent right
NCF354	Nippon Yakin Kogyo Co., Ltd.	Stainless steel used in environment containing organic acid and salt content	4325141	19 June 2009
NCF020	Nippon Yakin Kogyo Co., Ltd.	Fe-Ni-Cr based alloy and production method therefor having excellent sulfuric acid corrosion resistance, intergranular corrosion resistance and surface properties	5950306	17 June 2016
NW6210	Hitachi Metals, Ltd.	The Ni-base alloy excellent in hot forging property and corrosion resistance	5725630	10 April 2015

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Corrosion-resistant and heat-resistant superalloy, nickel and nickel alloy — Bars

1 Scope

This Japanese Industrial Standard specifies requirements for corrosion-resistant and heat-resistant superalloy, nickel and nickel alloy bars (round bars, square bars, hexagonal bars and flats, hereafter generically referred to as “bars”).

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

- JIS B 0401-2 *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2 : Tables of standard tolerance classes and limit deviations for holes and shafts*
- JIS G 0201 *Glossary of terms used in iron and steel (Heat treatment)*
- JIS G 0202 *Glossary of terms used in iron and steel (Testing)*
- JIS G 0203 *Glossary of terms used in iron and steel (Products and quality)*
- JIS G 0320 *Standard test method for heat analysis of steel products*
- JIS G 0321 *Product analysis and its tolerance for wrought steel*
- JIS G 0404 *Steel and steel products — General technical delivery requirements*
- JIS G 0415 *Steel and steel products — Inspection documents*
- JIS G 0551 *Steels — Micrographic determination of the apparent grain size*
- JIS G 0567 *Method of elevated temperature tensile test for steels and heat-resisting alloys*
- JIS H 1270 *Nickel and nickel alloys — Sampling and general rules for analytical methods*
- JIS Z 2241 *Metallic materials — Tensile testing — Method of test at room temperature*
- JIS Z 2243-1 *Brinell hardness test — Part 1 : Test method*
- JIS Z 2245 *Rockwell hardness test — Test method*
- JIS Z 2343-1 *Non-destructive testing — Penetrant testing — Part 1 : General principles — Method for liquid penetrant testing and classification of the penetrant indication*
- JIS Z 2344 *General rule of ultrasonic testing of metals by pulse echo technique*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in **JIS G 0201**, **JIS G 0202** and **JIS G 0203** apply.

3.1

nickel alloy

alloy composed mainly of nickel, having excellent corrosion resistance and/or heat resistance

3.2

melt

alloy or metal molten into a liquid state ready for forging

Note 1 to entry This is equivalent to “heat” in iron and steel **JISs**.

3.3

molten metal analysis values

results of chemical analysis done on a sample taken from the melt, generally in the process between pouring the melt from a ladle into a mould and solidification of the melt

Note 1 to entry Molten metal analysis values are representative of the chemical composition of the melt. Chemical composition of a bar product is normally indicated by these values.

3.4

flat

bar formed by rolling or forging, rectangular in cross section, and having rolled or forged surfaces on all four sides of the cross section

Note 1 to entry Flat bars, generally 5 mm or thicker and not exceeding 2 000 mm in width, are also called flats.

4 Symbol of grade

Bars are classified into 27 grades. The classification and the symbols of grades of bars shall be as given in Table 1.

Table 1 Classification and symbols of grade

Classification	Symbol of grade ^{a)}	Classification	Symbol of grade ^{a)}
Corrosion-resistant and heat-resistant superalloy (NCF)	NCF600	Nickel and nickel ally (NW)	NW2200
	NCF601		NW2201
	NCF625		NW4400
	NCF690		NW4402
	NCF718		NW5500
	NCF750		NW0001
	NCF751		NW0665
	NCF80A		NW0276
	NCF800		NW6455
	NCF800H		NW6022
	NCF825		NW6210
	NCF020		NW6007
	NCF354		NW6985
			NW6002
Note ^{a)} To indicate that the product is a bar, attach the mark “-B” to the end of the symbol of grade. Example NCF600-B			

5 Manufacturing method

The manufacturing method shall be as follows.

- Bars shall be hot rolled, hot forged or given other hot working process, and then heat treated. Upon agreement between the purchaser and the manufacturer, however, bars may be supplied as hot worked, i.e. without any heat treatment.
- The type of heat treatment to apply shall be as agreed between the purchaser and the manufacturer, and the conditions of heat treatment shall be selected to ensure conformance to the mechanical properties requirements given in Clause 7. Examples of typical heat treatment conditions are shown in Annex A for reference.
- Cold-finished steel bars shall be manufactured by cold drawing, grinding, cutting or a combination of these.

Heat treatment after cold finishing shall only be given if requested by the purchaser.

- Black scales generated by heat treatment, etc. shall be removed, if necessary, by pickling, cutting or other suitable means.
- Symbols of heat treatment and finishing are shown in Table 2.