IS 1367 (Part 14/Sec 3) : 2002
ISO 3506-3 : 1997

भारतीय मानक

इस्पात के चूड़ीदार बंधकों के लिए तकनीकी पूर्ति शर्तें

भाग 14 संक्षरण प्रतिरोधी स्टेनलैस इस्पात बंधकों के यांत्रिक गुणधर्म

अनुभाग 3 सेट पेंच एवं समान बंधक जो तनाव प्रतिबल में नहीं

(तीसरा पुनरीक्षण)

Indian Standard

TECHNICAL SUPPLY CONDITIONS FOR THREADED STEEL FASTENERS

PART 14 MECHANICAL PROPERTIES OF CORROSION-RESISTANT STAINLESS-STEEL FASTENERS

Section 3 Set Screws and Similar Fasteners not Under Tensile Stress

(Third Revision)

ICS 21.060.10

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2002

Price Group 7

NATIONAL FOREWORD

This Indian Standard (Part 14/Sec 3) (Third Revision) which is identical with ISO 3506-3:1997 'Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 3 : Set screws and similar fasteners not under tensile stress' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Bolts, Nuts and Fasteners Accessories Sectional Committee and approval of the Basic and Production Engineering Division Council.

This standard was originally published in 1961 and subsequently revised in 1967 and 1984. The last revision was in conformity with ISO 3506:1979. Consequent upon the revision of ISO 3506:1979 into three parts, the Committee decided to revise the Indian Standard into three sections aligning them with ISO 3506-1:1997, ISO 3506-2:1997 and ISO 3506-3:1997 respectively.

In view of the above IS 1367 (Part 14) has been splitted into three sections by adopting Part 1, Part 2 and Part 3 of ISO 3506 respectively. The other two sections of this part are given as under:

IS 1367 (Part 14/Sec 1) : 2002 Technical supply conditions for threaded steel fasteners : Part 14 Mechanical properties of corrosion-resistant stainless-steel fasteners, Section 1 Bolts, screws and studs (*third revision*)

IS 1367 (Part 14/Sec 2) : 2002 Technical supply conditions for threaded steel fasteners : Part 14 Mechanical properties of corrosion-resistant stainless-steel fasteners, Section 2 Nuts (*third revision*)

The text of ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain terminology and conventions are, however, not identical to those used in Indian Standards. Attention is drawn especially to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 68-1:[1)]	IS 4218 (Part 1) : 2001 ISO General purpose metric screw threads : Part 1 Basic profile (*second revision*)	Identical
ISO 261:[1)]	IS 4218(Part 2) : 2001 ISO General purpose metric screw threads : Part 2 General plan (*second revision*)	do
ISO 262:[1)]	IS 4218(Part 4) : 2001 ISO General purpose metric screw threads : Part 4 Selected sizes for screws, bolts and nuts (*second revision*)	do

(Continued on third cover)

[1)]Since published in 1998.

Indian Standard

TECHNICAL SUPPLY CONDITIONS FOR THREADED STEEL FASTENERS

PART 14 MECHANICAL PROPERTIES OF CORROSION-RESISTANT STAINLESS-STEEL FASTENERS
Section 3 Set Screws and Similar Fasteners not Under Tensile Stress

(Third Revision)

1 Scope

This part of ISO 3506 specifies the mechanical properties of set screws and similar fasteners not under tensile stress made of austenitic stainless steel when tested over an ambient temperature range of 15 °C to 25 °C. Properties will vary at higher or lower temperatures.

It applies to set screws and similar fasteners

— with nominal thread diameters (*d*) from 1,6 mm up to and including 24 mm;

— of triangular ISO metric threads with diameters and pitches according to ISO 68-1, ISO 261 and ISO 262;

— of any shape.

It does not apply to screws with special properties such as weldability.

This part of ISO 3506 does not define corrosion or oxidation resistance in particular environments.

The aim of this part of ISO 3506 is a classification into property classes of corrosion resistant stainless steel fasteners. Corrosion and oxidation performances and mechanical properties for use at elevated or sub-zero temperatures must be the subject of agreement between user and manufacturer in each particular case. Annex D shows how the risk of intergranular corrosion at elevated temperatures depends on the carbon content.

All austenitic stainless steel fasteners are normally non-magnetic in the annealed condtition; after cold working, some magnetic properties may be evident (see annex E).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 3506. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 3506 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 68-1:—[1)], *ISO general purpose screw threads – Basic profile – Part 1: Metric screw threads.*

ISO 261:—[2)], *ISO general purpose metric screw threads – General plan.*

1) To be published. (Revision of ISO 68:1973)

2) To be published. (Revision of ISO 261:1973)

ISO 262:—[3], *ISO general purpose metric screw threads – Selected sizes for screws, bolts and nuts.*

ISO 898-5:—[4], *Mechanical properties of fasteners – Part 5: Set screws and similar threaded fasteners not under tensile stresses.*

ISO 965-3:—[5], *ISO general-purpose metric screw threads – Tolerances – Part 3: Deviations for constructional threads.*

ISO 3651-1:—[5], *Determination of resistance to intergranular corrosion stainless steels – Part 1: Austenitic and ferritic-austenitic (duplex) stainless steels – Corrosion test in nitric acid medium by measurement of loss in mass (Huey test).*

ISO 3651-2:—[6], *Determination of resistance to intergranular corrosion stainless steels – Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels – Corrosion test in media containing sulfuric acid.*

ISO 6506:1981, *Metallic materials – Hardness test – Brinell test.*

ISO 6507-1:1997, *Metallic materials – Hardness test – Vickers test – Part 1: Test method.*

ISO 6508:1986, *Metallic materials – Hardness test – Rockwell test (scales A – B – C – D – E – F– G – H – K).*

3 Designation, marking and finish

3.1 Designation

The designation system for stainless steel grades and property classes for set screws and similar fasteners is shown in figure 1. The designation of the material consists of two blocks which are separated by a hyphen. The first block designates the steel grade, the second block the property class.

The designation of the steel grade (first block) consists of the letter

A for austenitic steel

which indicates the group of steel and a digit which indicates a range of chemical compositions within this steel group.

The designation of the property class (second block) consists of two digits representing 1/10 of the minimum Vickers hardness and the letter H referring to hardness, see table 1.

Table 1 —Designations of property classes in relation to Vickers hardness

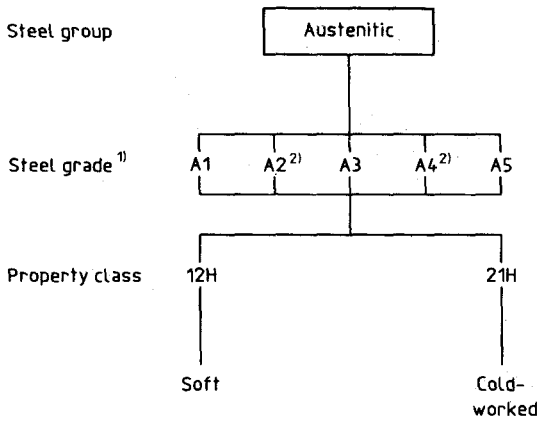
Property class	12H	21H
Vickers hardness, HV min.	125	210

EXAMPLE:

A1-12H indicates:

austenitic stainless steel, soft, minimum hardness 125 HV.

3) To be published. (Revision of ISO 262:1973)
4) To be published. (Revision of ISO 898-5:1980)
5) To be published. (Revision of ISO 965-3:1980)
6) To be published. (Revision of ISO 3651-1:1976)
7) To be published. (Revision of ISO 3651-2:1976)



1) The steel grades classified in figure 1 are described in the informative annex A and specified by the chemical composition in table 2.

2) Low carbon stainless steels with carbon content not exceeding 0,03 % may additionally be marked with an L.

Example: A4L – 21H

Figure 1 — Designation system for stainless steel grades and property classes for set screws and similar fasteners

3.2 Marking

3.2.1 Set screws

Marking of set screws is not mandatory.

Only if all requirements in this part of ISO 3506 are met, parts shall be marked and/or described according to the designation system described in 3.1.

3.2.2 Packages and containers

Marking with the designation and manufacturer's identification mark is mandatory on all packages of all sizes.

3.3 Finish

Unless otherwise specified, fasteners in accordance with this part of ISO 3506 shall be supplied clean and bright. For maximum corrosion resistance passivation is recommended.

4 Chemical composition

The chemical compositions of stainless steels suitable for fasteners in accordance with this part of ISO 3506 are given in table 2.

The final choice of chemical composition within the specified steel grade is at the discretion of the manufacturer unless by prior agreement between the purchaser and the manufacturer.

In applications where risk of intergranular corrosion is present, testing in accordance with ISO 3651-1 or ISO 3651-2 is recommended. In such cases, stabilized stainless steels A3 and A5 or stainless steels A2 and A4 with carbon content not exceeding 0,03 % are recommended.

Table 2 — Stainless steel grades — Chemical composition

Group	Grade	Chemical composition % (*m/m*) [1]									Notes
		C	Si	Mn	P	S	Cr	Mo	Ni	Cu	
Austenitic	A1	0,12	1	6,5	0,2	0,15 to 0,35	16 to 19	0,7	5 to 10	1,75 to 2,25	2) 3) 4)
	A2	0,1	1	2	0,05	0,03	15 to 20	— [5]	8 to 19	4	6) 7)
	A3	0,08	1	2	0,045	0,03	17 to 19	— [5]	9 to 12	1	8)
	A4	0,08	1	2	0,045	0,03	16 to 18,5	2 to 3	10 to 15	1	7) 9)
	A5	0,08	1	2	0,045	0,03	16 to 18,5	2 to 3	10,5 to 14	1	8) 9)

NOTES

1 A description of the groups and grades of stainless steels also entering into their specific properties and application is given in annex A.

2 Examples for stainless steels which are standardized in ISO 683-13 and in ISO 4954 are given in annexes B and C respectively.

1) Values are maximum unless otherwise indicated.

2) Sulfur may be replaced by selenium.

3) If the nickel content is below 8 %, the minimum manganese content must be 5 %.

4) There is no minimum limit to the copper content provided that the nickel content is greater than 8 %.

5) Molybdenum may be present at the discretion of the manufacturer. However, if for some applications limiting of the molybdenum content is essential, this must be stated at the time of ordering by the purchaser.

6) If the chromium content is below 17 %, the minimum nickel content should be 12 %.

7) For austenitic stainless steels having a maximum carbon content of 0,03 %, nitrogen may be present to a maximum of 0,22 %.

8) Must contain titanium $\geq 5 \times C$ up to 0,8 % maximum for stabilization and be marked appropriately in accordance with this table, or must contain niobium (columbium) and/or tantalum $\geq 10 \times C$ up to 1 % maximum for stabilization and be marked appropriately in accordance with this table.

9) At the discretion of the manufacturer the carbon content may be higher where required to obtain the specified mechanical properties at larger diameters but shall not exceed 0,12 %.

5 Mechanical properties

The mechanical properties of set screws in accordance with this part of ISO 3506 shall conform to the values given in tables 3 and 4.

For acceptance purposes the mechanical properties specified in 5.1 and 5.2 apply and shall be tested in accordance with 6.1 and 6.2 respectively.

5.1 Proof torque of hexagon socket set screws

Hexagon socket set screws shall conform to the torque requirements given in table 3.

Table 3 — Proof torque requirements

Nominal thread diameter (*d*)	Minimum length[1] of set screws for test, mm				Proof torque, Nm min.	
					Property class	
	Flat point	Cone point	Dog point	Cup point	12H	21H
1,6	2,5	3	3	2,5	0,03	0,05
2	4	4	4	3	0,06	0,1
2,5	4	4	5	4	0,18	0,3
3	4	5	6	5	0,25	0,42
4	5	6	8	6	0,8	1,4
5	6	8	8	6	1,7	2,8
6	8	8	10	8	3	5
8	10	10	12	10	7	12
10	12	12	16	12	14	24
12	16	16	20	16	25	42
16	20	20	25	20	63	105
20	25	25	30	25	126	210
24	30	30	35	30	200	332

1) The minimum lengths to be tested are the lengths below the dotted line in the product standard, i.e. the lengths having the normal hexagon socket depth.

5.2 Hardness

Set screws shall conform to the hardness requirements given in table 4.

Table 4 — Hardness

Test method	Property class	
	12H	21H
	Hardness	
Vickers hardness HV	125 to 209	210 min.
Brinell hardness HB	123 to 213	214 min.
Rockwell hardness HRB	70 to 95	96 min.

6 Test methods

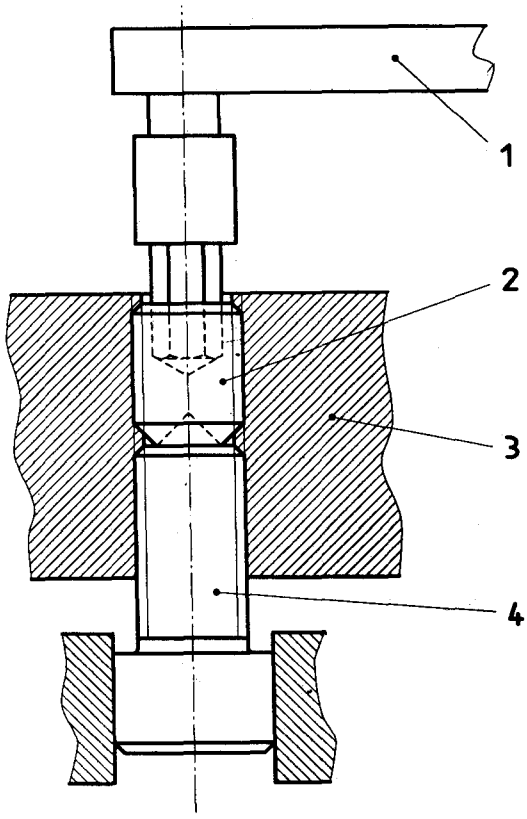
6.1 Proof torque test for hexagon socket set screws

The set screw shall be inserted in a test block as shown in figure 2 until the top surface of the screw face is flush with the test block and the point bears on a firm base, for example a backing screw inserted from the other side.

Using a hexagon test bit with a tolerance of h9 for the width across flats, with a minimum width across corners equal to 1,13 s_{min} and a hardness of 50 HRC to 55 HRC, engaging the full depth of the set screw socket, the screw shall withstand the proof torque given in table 3 without splitting, cracking or thread stripping.

For this proof torque test, a calibrated torque measuring instrument shall be used.

NOTE — Visual marks at the socket due to torque testing shall not be cause for rejection.



Key

1 Torque wrench
2 Screw under test
3 Test block minimum 50 HRC, tolerance 5H (ISO 965-3) for the internal thread
4 Backing screw 450 HV to 570 HV

Figure 2 — Torque test equipment

6.2 Hardness test HB, HRB or HV for set screws

The hardness test shall be carried out in accordance with ISO 6506 (HB), ISO 6508 (HRB), or ISO 6507-1 (HV). In case of doubt, the Vickers hardness test is decisive for acceptance (see table 4).

The test procedure shall be as specified in ISO 898-5.

Annex A
(informative)

Description of the groups and grades of stainless steels

A.1 General

In ISO 3506-1, ISO 3506-2 and ISO 3506-3 reference is made to steel grades A1 to A5, C1 to C4 and F1 covering steels of the following groups:

Austenitic steel	A1 to A5
Martensitic steel	C1 to C4
Ferritic steel	F1

In this annex the characteristics of the above mentioned steel groups and grades are described.

This annex also gives some information on the non-standardized steel group FA. Steels of this group have a ferritic-austenitic structure.

A.2 Steel group A (austenitic structure)

Five main grades of austenitic steels, A1 to A5, are included in ISO 3506-1, ISO 3506-2 and ISO 3506-3. They cannot be hardened and are usually non-magnetic. In order to reduce the susceptibility to work hardening copper may be added to the steel grades A1 to A5 as specified in table 2.

For non-stabilized steel grades A2 and A4 the following applies.

As chromic oxide makes steel resistant to corrosion, low carbon content is of great importance to non-stabilized steels. Due to the high affinity of chrome to carbon, chrome carbide is obtained instead of chromic oxide which is more likely at elevated temperature. (See annex D.)

For stabilized steel grades A3 and A5 the following applies.

The elements Ti, Nb or Ta affect the carbon and chromic oxide is produced to its full extent.

For offshore or similar applications, steels with Cr and Ni contents of about 20 % and Mo of 4,5 % to 6,5 % are required.

When risk of corrosion is high experts should be consulted.

A.2.1 Steel grade A1

Steel grade A1 is especially designed for machining. Due to the high sulfur content of the steels within this grade have lower resistance to corrosion than corresponding steels with normal sulfur content.

A.2.2 Steel grade A2

Steels of grade A2 are the most frequently used stainless steels. They are used for kitchen equipment and apparatus for the chemical industry. Steels within this grade are not suitable for use in non-oxidizing acid and agents with chloride content, i.e. swimming pools and sea water.

A.2.3 Steel grade A3

Steels of grade A3 are stabilized "stainless steels" with properties of steels in grade A2.

A.2.4 Steel grade A4

Steels of grade A4 are "acid proof steels", which are Mo alloyed and give considerably better resistance to corrosion. A4 is used to a great extent by the cellulose industry as this steel grade is developed for boiling sulfuric acid (thus given the name "acid proof") and is, to a certain extent, also suitable in an environment with chloride content. A4 is also frequently used by the food industry and by the ship-building industry.

A.2.5 Steel grade A5

Steels of grade A5 are stabilized "acid proof steels" with properties of steels in grade A4.

A.3 Steel group F (ferritic structure)

One ferritic steel grade (F1) is included in ISO 3506-1, ISO 3506-2 and ISO 3506-3. The steels within the steel grade F1 cannot be hardened normally and should not be hardened even if possible in certain cases. The F1 steels are magnetic.

A.3.1 Steel grade F1

Steel grade F1 is normally used for simpler equipment with the exeption of the superferrites which have extremely low C and N contents. The steels within grade F1 can, if need be, replace steels of grades A2 and A3 and be used at higher chloride content.

A.4 Steel group C (martensitic structure)

Three types of martensitic steel grades, C1, C3 and C4, are included in ISO 3506-1, ISO 3506-2 and ISO 3506-3. They can be hardened to an excellent strength and are magnetic.

A.4.1 Steel grade C1

Steels within grade C1 have limited resistance to corrosion. They are used in turbines, pumps and for knives.

A.4.2 Steel grade C3

Steels within the grade C3 have limited resistance to corrosion though better resistance than C1. They are used in pumps and valves.

A.4.3 Steel grade C4

Steels within grade C4 have limited resistance to corrosion. They are intended for machining, otherwise they are similar to steels of grade C1.

A.5 Steel group FA (ferritic-austenitic structure)

Steel group FA is not included in ISO 3506-1, ISO 3506-2 and ISO 3506-3 but will most probably be included in the future.

Steels of this steel group are the so-called duplex steels. The first FA steels to be developed had some drawbacks that have been eliminated in the recently developed steels. The FA steels have better properties than steels of the types A4 and A5 especially as strength is concerned. They also exhibit superior resistance to pitting and crack corrosion.

Examples of composition are shown in table A.1

Table A.1 — Ferritic-austenitic steels - Chemical composition

Group	Chemical composition % (*m/m*)						
	C max.	Si	Mn	Cr	Ni	Mo	N
Ferritic-austenitic	0,03	1,7	1,5	18,5	5	2,7	0,07
	0,03	< 1	< 2	22	5,5	3	0,14

Annex B
(informative)

Austenitic stainless steel composition specifications
(Extract from ISO 683-13:1986)

Table B.1

Type[2)] of steel	Chemical composition % (m/m) [1)]														Fastener grade identification [4)]
	C max.	Si max.	Mn max.	P max.	S	N	Al	Cr	Mo	Nb[3)]	Ni	Se min.	Ti	Cu	
10	0,030	1,0	2,0	0,045	0,030 max.	—	—	17,0 to 19,0	—	—	9,0 to 12,0	—	—	—	A2 [5)]
11	0,07	1,0	2,0	0,045	0,030 max.	—	—	17,0 to 19,0	—	—	8,0 to 11,0	—	—	—	A2
15	0,08	1,0	2,0	0,045	0,030 max.	—	—	17,0 to 19,0	—	—	9,0 to 12,0	—	5 × % C ≤ 0,80	—	A3 [6)]
16	0,08	1,0	2,0	0,045	0,030 max.	—	—	17,0 to 19,0	—	10 × % C ≤ 1,0	9,0 to 12,0	—	—	—	A3 [6)]
17	0,12	1,0	2,0	0,060	0,15 to 0,35	—	—	17,0 to 19,0	— [7)]	—	8,0 to 10,0[8)]	—	—	—	A1
13	0,10	1,0	2,0	0,045	0,030 max.	—	—	17,0 to 19,0	—	—	11,0 to 13,0	—	—	—	A2
19	0,030	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,0 to 2,5	—	11,0 to 14,0	—	—	—	A4
20	0,07	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,0 to 2,5	—	10,5 to 13,5	—	—	—	A4
21	0,08	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,0 to 2,5	—	11,0 to 14,0	—	5 × % C ≤ 0,80	—	A5 [6)]
23	0,08	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,0 to 2,5	10 × % C ≤ 1,0	11,0 to 14,0	—	—	—	A5 [6)]
19a	0,030	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,5 to 3,0	—	11,5 to 14,5	—	—	—	A4
20a	0,07	1,0	2,0	0,045	0,030 max.	—	—	16,5 to 18,5	2,5 to 3,0	—	11,0 to 14,0	—	—	—	A4
10N	0,030	1,0	2,0	0,045	0,030 max.	0,12 to 0,22	—	17,0 to 19,0	—	—	8,5 to 11,5	—	—	—	A2
19N	0,030	1,0	2,0	0,045	0,030 max.	0,12 to 0,22	—	16,5 to 18,5	2,0 to 2,5	—	10,5 to 13,5	—	—	—	A4 [5)]
19aN	0,030	1,0	2,0	0,045	0,030 max.	0,12 to 0,22	—	16,5 to 18,5	2,5 to 3,0	—	11,5 to 14,5	—	—	—	A4 [5)]

1) Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition, from scrap or other material used in manufacture, of such elements which affect the hardenability, mechanical properties and applicability.

2) The type numbers are tentative and will be subject to alteration when the relevant International Standards have been established.

3) Tantalum determined as niobium.

4) Not part of ISO 683-13.

5) Excellent resistance to intergranular corrosion.

6) Stabilized steels.

7) The manufacturer has the option of adding molybdenum up to 0,70 % (*m/m*).

8) The maximum nickel content of semi-finished products for fabrication into seamless tubes may be increased by 0,5 % (*m/m*).

Annex C
(informative)

Austenitic stainless steels for cold heading and extruding
(Extract from ISO 4954:1993)

Table C.1

Type of steel Designation 1)			Chemical composition % (m/m) 2)									Fastener grade identification 3)
No.	Name	according to ISO 4954:1979	C	Si max.	Mn max.	P max.	S max.	Cr	Mo	Ni	Other	
78	X 2 CrNi 18 10 E	D 20	≤ 0,030	1,00	2,00	0,045	0,030	17,0 to 19,0		9,0 to 12,0		A2 4)
79	X 5 CrNi 18 9 E	D 21	≤ 0,07	1,00	2,00	0,045	0,030	17,0 to 19,0		8,0 to 11,0		A2
80	X 10 CrNi 18 9 E	D 22	≤ 0,12	1,00	2,00	0,045	0,030	17,0 to 19,0		8,0 to 10,0		A2
81	X 5 CrNi 18 12 E	D 23	≤ 0,07	1,00	2,00	0,045	0,030	17,0 to 19,0		11,0 to 13,0		A2
82	X 6 CrNi 18 16 E	D 25	≤ 0,08	1,00	2,00	0,045	0,030	15,0 to 17,0		17,0 to 19,0		A2
83	X 6 CrNiTi 18 10 E	D 26	≤ 0,08	1,00	2,00	0,045	0,030	17,0 to 19,0		9,0 to 12,0	Ti: 5 × % C ≤ 0,80	A3
84	X 5 CrNiMo 17 12 2 E	D 29	≤ 0,07	1,00	2,00	0,045	0,030	16,5 to 18,5	2,0 to 2,5	10,5 to 13,5		A4
85	X 6 CrNiMoTi 17 12 2 E	D 30	≤ 0,08	1,00	2,00	0,045	0,030	16,5 to 18,5	2,0 to 2,5	11,0 to 14,0	Ti: 5 × % C ≤ 0,80	A5
86	X 2 CrNiMo 17 13 3 E	—	≤ 0,030	1,00	2,00	0,045	0,030	16,5 to 18,5	2,5 to 3,0	11,5 to 14,5		A4 4)
87	X 2 CrNiMoN 17 13 3 E	—	≤ 0,030	1,00	2,00	0,045	0,030	16,5 to 18,5	2,5 to 3,0	11,5 to 14,5	N: 0,12 to 0,22	A4 4)
88	X 3 CrNiCu 18 9 3 E	D 32	≤ 0,04	1,00	2,00	0,045	0,030	17,0 to 19,0		8,5 to 10,5	Cu: 3,00 to 4,00	A2

1) The designations given in the first column are consecutive numbers. The designations given in the second column are in accordance with the system proposed by ISO/TC 17/SC 2. The designations given in the third column represent the antiquated numbers used in ISO 4954:1979 (revised in 1993).

2) Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition, from scrap or other material used in manufacture, of such elements which affect the hardenability, mechanical properties and applicablility.

3) Not part of ISO 4954.

4) Excellent resistance to intergranular corrosion.

Annex D
(informative)

Time-temperature-diagram of intergranular corrosion in austenitic stainless steels, grade A2 (18/8 steels)

Figure D.1 gives the approximate time for austenitic stainless steels, grade A2 (18/8 steels), with different carbon contents in the temperature zone between 550 °C and 925 °C before risk of intergranular corrosion occurs.

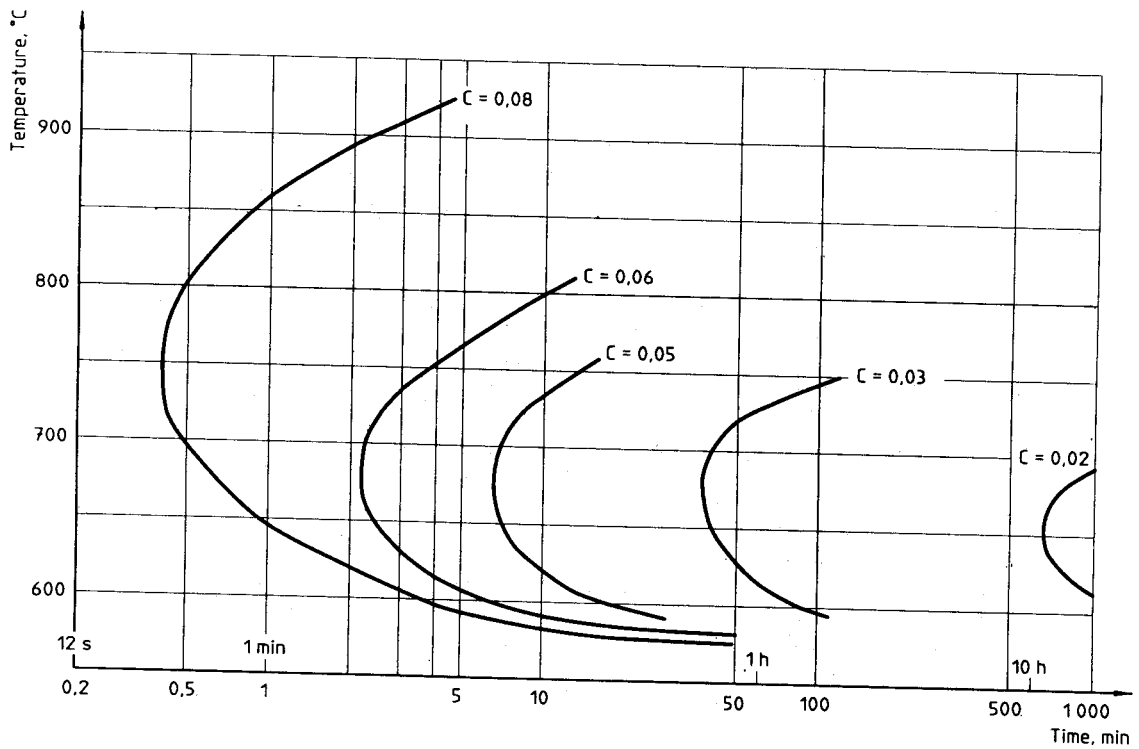


Figure D.1

Annex E
(informative)

Magnetic properties for austenitic stainless steels

All austenitic stainless steel fasteners are normally non-magnetic; after cold working, some magnetic properties may be evident.

Each material is characterized by its ability to be magnetized, which applies even to stainless steel. Only a vacuum will probably be entirely non-magnetic. The measure of the material's permeability in a magnetic field is the permeability value μ_r for that material in relation to a vacuum. The material has low permeability if μ_r becomes close to 1.

EXAMPLES

A2: $\mu_r \approx 1,8$

A4: $\mu_r \approx 1,015$

A4L: $\mu_r \approx 1,005$

F1: $\mu_r \approx 5$

Annex F
(informative)

Bibliography

[1] ISO 683-13: 1986, *Heat-treated steels, alloy steels and free cutting steels – Part 13: Wrought stainless steels.*[8)]

[2] ISO 4954:1993, *Steels for cold heading and cold extruding.*

8) International Standard withdrawn.

(Continued from second cover)

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 898-5:[1)]	IS 1367(Part 5) : 2002 Technical supply conditions for threaded steel fasteners : Part 5 Mechanical properties of fasteners made of carbon and alloy steel — Set screws and similar threaded fasteners not under tensile stress (*third revision*)	Identical
ISO 965-3:[1)]	IS 14962(Part 3) : 2001 ISO general purpose metric screw threads — Tolerances : Part 3 Deviations for constructional screw threads	do
ISO 6506:1981	IS 1500:1983 Method for Brinell hardness test for metallic materials (*second revision*)	Technically equivalent
ISO 6507-1:1997	IS 1501 (Part 1) : 1984 Method for Vickers hardness test for metallic materials : Part 1 HV 5 to HV 100 (*second revision*)	do
ISO 6508:1986	IS 1586:1988 Method for Rockwell hardness test for metallic materials (Scales A – B – C – D – E – F – G – H – K 15N, 30N, 45N, 15T, 30T and 45T) *(third revision)*	do

The concerned Technical Committee has reviewed the provisions of following ISO Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

ISO Standard	*Title*
ISO 3651-1:[2)]	Determination of resistance to intergranular corrosion stainless steels — Part 1: Austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in nitric acid medium by measurement of loss in mass (Huey test)
ISO 3651-2:[3)]	Determination of resistance to intergranular corrosion stainless steels — Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in media containing sulfuric acid

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'.

[1)]Since published in 1998.
[2)]To be published (Revision of ISO 3651-1:1976).
[3)]To be published (Revision of ISO 3651-2:1976).

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This Indian Standard has been developed from Doc : No.BP 33 (0267).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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