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STANDARD**

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JIS H 3100:²⁰¹⁸

(JCBA/JSA)

**Copper and copper alloy sheets,
plates and strips**

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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 Copper and Brass Association (JCBA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS H 3100: 2012** is replaced with this Standard.

However, **JIS H 3100: 2012** may be applied in the **JIS** mark certification based on the relevant provisions of Article 19 Clause 1, etc. of the Industrial Standardization Law until March 19, 2019.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Copper and copper alloy sheets, plates and strips

1 Scope

This Japanese Industrial Standard specifies the rolled copper and copper alloy sheets and plates (hereafter referred to as plates) and strips (hereafter referred to as strips) (excluding the copper and copper alloy plates and strips specified in **JIS H 3110**, **JIS H 3130** and **JIS H 3510**).

The plates include the circular plates which are machined, punched or sheared from plates or strips.

2 Normative references

The following standards contain provisions which, 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 H 0321 *General rules for inspection of non-ferrous metal materials*
- JIS H 0500 *Glossary of terms used in wrought copper and copper alloys*
- JIS H 0501 *Methods for estimating average grain size of wrought copper and copper alloys*
- JIS H 0505 *Measuring methods for electrical resistivity and conductivity of non-ferrous materials*
- JIS H 1051 *Copper and copper alloys-Determination of copper content*
- JIS H 1052 *Methods for determination of tin in copper and copper alloys*
- JIS H 1053 *Methods for determination of lead in copper and copper alloys*
- JIS H 1054 *Methods for determination of iron in copper and copper alloys*
- JIS H 1055 *Methods for determination of manganese in copper and copper alloys*
- JIS H 1056 *Methods for determination of nickel in copper and copper alloys*
- JIS H 1057 *Methods for determination of aluminium in copper and copper alloys*
- JIS H 1058 *Copper and copper alloys-Determination of phosphorus content*
- JIS H 1062 *Methods for determination of zinc in copper and copper alloys*
- JIS H 1074 *Copper and copper alloys-Determination of zirconium content*
- JIS H 1292 *Copper alloys-Methods for X-ray fluorescence spectrometric analysis*
- JIS Z 2241 *Metallic materials-Tensile testing-Method of test at room temperature*
- JIS Z 2244 *Vickers hardness test-Test method*
- JIS Z 2248 *Metallic materials-Bend test*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in **JIS H 0500** apply.

3.1

oxygen free copper

copper which contains copper 99.96 % or more, satisfying the quality (hydrogen embrittlement) specified in **5.6**

NOTE Copper including oxygen may be subject to the hydrogen embrittlement at the elevated temperature of 400 °C or higher. Utilizing this property, the oxygen contained in copper is detectable by the hydrogen embrittlement test.

3.2

eddy current conductivity meter

device for measuring the electric conductivity of metal based on the correlation between the magnitude and distribution of eddy current generated in the metal by an adjacent a.c. magnetic field, and its electric conductivity

4 Name, grade, class and designation

The name, grade, class and designation of plates and strips are as given in Table 1. The product designation (see Table 3 and Table 5) shall be indicated by the designation given in Table 1 followed by the temper designation (see **JIS H 0500**). When plates and strips are used for the electric conduction or the pressure vessels, the product designation shall be indicated by the designation given in Table 1 followed by the symbol of application and the temper designation (see Table 4, Table 6 and Table 7).

Table 1 Name, grade, class and designation of plates and strips

Name	Grade		Class a)	Designation	Characteristics and application examples (informative)
	Alloy No.	Shape			
Oxygen-free copper	C 1020	Plate	Common	C 1020 pb)	Excellent electric conductivity, heat conductivity, workability and drawability. Good weldability, corrosion resistance and weathering resistance. Almost free from hydrogen embrittlement even when heated at elevated temperature in reducing atmosphere. Applicable to electrical use, chemical industries, etc.
			Special	C 1020 PS bl	
		Strip	Common	C 1020 R bl	
			Special	C 1020 RS bl	
Tough-pitch copper	C 1100	Plate	Common	C 1100 pb)c)	Excellent electric conductivity and heat conductivity, and good workability, drawability, corrosion resistance and weathering resistance. Applicable to electrical use, distillers, buildings, chemical industries, gaskets, appliances, etc.
			Special	C 1100 psb)c)	
		Strip	Common	C 1100 Rb)c)	
			Special	C 1100 RSb)c)	
Phosphorus-deoxidized copper	C 1201	Plate	Common	C 1201 P	Good workability, drawability, weldability, corrosion resistance, weathering resistance and heat conductivity. C 1220 is almost free from hydrogen embrittlement even when heated at elevated temperature in reducing atmosphere. C 1201 has better electric conductivity than C 1220. Applicable to bath boilers, water heaters, gaskets, buildings, chemical industries, etc.
			Special	C 1201 PS	
		Strip	Common	C 1201 R	
			Special	C 1201 RS	
	C 1220	Plate	Common	C 1220 pcl	
			Special	C 1220 PS cl	
		Strip	Common	C 1220 R cl	
			Special	C 1220 RS cl	
Tin bearing copper	C 1441	Plate	Special	C 1441 PS bl	Excellent electric conductivity, heat conductivity, thermal resistance and workability. Applicable to lead frames for semiconductors, wiring appliances or other electric and electronic parts, water heaters, etc.
		Strip	Special	C 1441 RS bl	
Copper-zirconium alloys	C 1510	Plate	Special	C 1510 PS bl	Excellent electric conductivity, heat conductivity, thermal resistance and workability. Applicable to lead frames for semiconductors, etc.
		Strip	Special	C 1510 RS bl	
Copper-iron alloys	C 1921	Plate	Special	C 1921 PS bl	Excellent electric conductivity, heat conductivity, strength and thermal resistance, and good workability. Applicable to lead frames for semiconductors, electric parts such as terminals and connectors, etc.
		Strip	Special	C 1921 RS bl	
	C 1940	Plate	Special	C 1940 PS b)	
		Strip	Special	C 1940 RS bl	
Copper for detonators	C 2051	Strip	Common	C 2051 R	Excellent drawability. Applicable to detonators.

Table 1 (continued)

Name	Grade		Class al	Designation	Characteristics and application examples (informative)
	Alloy No.	Shape			
Red brass	C 2100	Plate	Common	C 2100 P	Fine gloss, good workability, drawability and weathering resistance. Applicable to buildings, personal accessories, cosmetic cases, etc.
		Strip	Common	C 2100 R	
			Special	C 2100 RS	
	C 2200	Plate	Common	C 2200 P	
		Strip	Common	C 2200 R	
			Special	C 2200 RS	
	C 2300	Plate	Common	C 2300 P	
		Strip	Common	C 2300 R	
			Special	C 2300 RS	
	C 2400	Plate	Common	C 2400 P	
		Strip	Common	C 2400 R	
			Special	C 2400 RS	
Brass	C 2600	Plate	Common	C 2600 pb)	Excellent workability and drawability, and good plating property. Applicable to terminal connectors, etc.
		Strip	Common	C 2600 R bl	
			Special	C 2600 RSb)	
	C 2680	Plate	Common	C 2680 pb)	Good workability, drawability and good plating property. Intended for use in deep drawing work such as snap buttons, cameras, thermos bottles, and applicable to terminal connectors and wiring appliances, etc.
		Strip	Common	C 2680 Rb)	
			Special	C 2680 RS bl	
	C 2720	Plate	Common	C 2720 P	Good workability and drawability. Intended for use in shallow drawing work, etc.
		Strip	Common	C 2720 R	
			Special	C 2720 RS	
	C 2801	Plate	Common	C 2801 pb)	High strength and moderate workability. Applicable to parts of wiring appliances used as punched or in a bent state, name plates, instrument panels, etc.
		Strip	Common	C 2801 R bl	
			Special	C 2801 RS b)	
Free-cutting brass	C 3710	Plate	Common	C 3710 P	Excellent punchability, and good machinability. Applicable to clock parts, gears, etc.
		Strip	Common	C 3710 R	
	C 3713	Plate	Common	C 3713 P	
		Strip	Common	C 3713 R	
Tin bearing brass	C 4250	Plate	Common	C 4250 P	Good stress resistance, corrosion cracking resistance, wear resistance and spring property. Applicable to switches, relays, connectors and various spring parts, etc.
		Strip	Common	C 4250 R	
			Special	C 4250 RS	
Phosphate-admiralty brass	C 4450	Strip	Common	C 4450 R	Good corrosion resistance. Applicable to welded tubes for gas piping, etc.

Table 1 (concluded)

Name	Grade		Class al	Designation	Characteristics and application examples (informative)
	Alloy No.	Shape			
Naval brass	C 4621	Plate	Common	C 4621 P	Good corrosion resistance, especially against sea water. Thicker plates are applicable to tube plates for heat exchangers. Thinner plates are applicable to marine water-intake of ship use, etc. (C 4621 for Lloyd's and NK Class, and C 4640 for AB register of shipping).
	C 4640	Plate	Common	C 4640 pel	
Aluminium bronze	C 6140	Plate	Common	C 6140 pel	High strength, good corrosion resistance, especially against sea water, and good wear resistance. Applicable to machine parts, chemical industries, ship use, etc.
	C 6161	Plate	Common	C 6161 P	
	C 6280	Plate	Common	C 6280 P	
Cupronickel	C 7060	Plate	Common	C 7060 pel	Good corrosion resistance, especially against sea water. Durable for relatively high temperature operation. Applicable to tube plates for heat exchangers, welded tubes, etc.
	C 7150	Plate	Common	C 7150 pel	
Copper-nickel-tin	C 7250	Plate	Special	C 7250 PS	Good workability, molderability, fatigue resistance, thermal resistance and corrosion resistance. Applicable to springs for electronic or electric appliances, switches and relays, lead frames, connectors, etc.
		Strip	Special	C 7250 RS	
Notes al Grades are classified according to the accuracy in dimensions (tolerances or permissible values) (see Table 9, Table 10, Table 12, Table 13, Table 16, Table 17, Table 22 and Table 23). b) Plates and strips used for the electric conduction are indicated by the designation, P, PS, R or RS followed by C. c) Plates and strips used for pressure vessels are indicated by the designation, P, PS, R or RS followed by V.					

5 Quality

5.1 Appearance

The plates and strips shall have a uniform workmanlike finish, and shall be free from defects detrimental to use. The judgement on the defects detrimental to use shall be at the discretion of the manufacturer. If specially required, it may be upon the agreement between the purchaser and the manufacturer.

5.2 Chemical composition

The chemical composition of plates and strips shall be tested by 7.1, and the results shall be as given in Table 2.

Table 2 Chemical composition of plates and strips

Unit: %

Alloy No.	Cu	Pb	Fe	Sn	Zn	Al	Mn	Ni	P	Zr
C 1020	99.96 min.	—	—	—	—	—	—	—	—	—
C 1100	99.90 min.	—	—	—	—	—	—	—	—	—
C 1201	99.90 min.	—	—	—	—	—	—	—	0.004 to 0.014	—
C 1220	99.90 min.	—	—	—	—	—	—	—	0.015 to 0.040	—
C 1441	Remain- der ^{a)}	0.03 max.	0.02 max.	0.10 to 0.20	0.10 max.	—	—	—	0.001 to 0.020	—
C 1510	Remain- der ^{a)}	—	—	—	—	—	—	—	—	0.05 to 0.15
C 1921	Remain- der ^{a)}	—	0.05 to 0.15	—	—	—	—	—	0.015 to 0.050	—
C 1940	Remain- der ^{a) b)}	0.03 max.	2.1 to 2.6	—	0.05 to 0.20	—	—	—	0.015 to 0.150	—
C 2051	98.0 to 99.0	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2100	94.0 to 96.0	0.03 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2200	89.0 to 91.0	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2300	84.0 to 86.0	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2400	78.5 to 81.5	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2600	68.5 to 71.5	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2680	64.0 to 68.0	0.05 max.	0.05 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2720	62.0 to 64.0	0.07 max.	0.07 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 2801	59.0 to 62.0	0.10 max.	0.07 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 3710	58.0 to 62.0	0.6 to 1.2	0.10 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 3713	58.0 to 62.0	1.0 to 2.0	0.10 max.	—	Remain- der ^{a)}	—	—	—	—	—
C 4250	87.0 to 90.0	0.05 max.	0.05 max.	1.5 to 3.0	Remain- der ^{a)}	—	—	—	0.35 max.	—
C 4450	70.0 to 73.0	0.05 max.	0.03 max.	0.8 to 1.2	Remain- der ^{a)}	—	—	—	0.002 to 0.100	—
C 4621	61.0 to 64.0	0.20 max.	0.10 max.	0.7 to 1.5	Remain- der ^{a)}	—	—	—	—	—
C 4640	59.0 to 62.0	0.20 max.	0.10 max.	0.5 to 1.0	Remain- der ^{a)}	—	—	—	—	—

Table 2 (concluded)

Unit: %

Alloy No.	Cu	Pb	Fe	Sn	Zn	Al	Mn	Ni	P	Zr
C 6140 ^{cl}	88.0 to 92.5	0.01 max.	1.5 to 3.5	-	0.20 max.	6.0 to 8.0	1.0 max.	-	0.015 max.	-
C 6161 ^{d)}	83.0 to 90.0	0.02 max.	2.0 to 4.0	-	-	7.0 to 10.0	0.50 to 2.0	0.5 to 2.0	-	-
C 6280 ^{d)}	78.0 to 85.0	0.02 max.	1.5 to 3.5	-	-	8.0 to 11.0	0.50 to 2.0	4.0 to 7.0	-	-
C 7060	Remainder ^{e)}	0.02 max.	1.0 to 1.8	-	0.50 max.	-	0.20 to 1.0	9.0 to 11.0	-	-
C 7150	Remainder ^{e)}	0.02 max.	0.40 to 1.0	-	0.50 max.	-	0.20 to 1.0	29.0 to 33.0	-	-
C 7250	Remainder ^{al 0}	0.05 max.	0.6 max.	1.8 to 2.8	0.50 max.	-	0.20 max.	8.5 to 10.5	-	-
Notes a) The remainder is estimated from the contents of other elements than specified in this table; therefore, the remainder may include other elements than Cu or Zn. b) When Cu is analysed on the purchaser's request: Cu+ Pb+ Fe+ Zn+ P = 99.8 min. c) Cu+ Pb+ Fe+ Zn +Al+ Mn+ P = 99.5 min. d) Cu+ Fe+Al+ Mn+Ni=99.5 min. e) When Cu is analysed on the purchaser's request: Cu+ Fe+ Mn+ Ni= 99.5 min. f) When Cu is analysed on the purchaser's request: Cu+ Pb+ Fe+ Sn+ Zn+ Mn+ Ni= 99.8 min.										

5.3 Mechanical properties

The mechanical properties (tensile strength, elongation, bendability and hardness) of plates and strips shall be tested by **7.2 to 7.4**, and the results shall be as given in Table 3. The bendability and the hardness shall be applied only when requested by the purchaser. The plates and strips shall endure the bend test without generating any cracks on the outside surface of the bent position. In this case, the distance from the edges within which the generated cracks need not be evaluated shall be at the discretion of the manufacturer.

If specially required, the distance above mentioned shall be as agreed between the purchaser and the manufacturer. The obtained hardness shall be reported as an informative value.

The typical Vickers hardness values are given in Table 3 for reference.

The mechanical properties of plates and strips to be used for pressure vessels shall be tested by **7.2**, and the results shall be as given in Table 4.

Table 3 Mechanical properties of plates and strips

Alloy No.	Temper	Product designation	Tensile test			Bend test ^{a)}			Hardness test ^{a)} (informative)		
			Thickness mm	Tensile strength ^{b)} N/mm ²	Elongation ^{b)} %	Thick- ness mm	Bend- ing angle ^{c)}	Internal radius ^{c)}	Thick- ness mm	Vickers hardness ^{b)} HV	
C 1020	O	C 1020 P-O ^{d)} C 1020 PS-O ^{d)}	0.10 or over to and excl. 0.15	195 min.	20 min.	0.10 or over up to and incl. 2.0	180°	Close contact	—	—	
			0.15 or over to and excl. 0.30		30 min.						
			0.30 or over up to and incl. 30		35 min.						
		C 1020 R-O ^{d)} C 1020 RS-O ^{d)}	0.10 or over to and excl. 0.15		20 min.						
			0.15 or over to and excl. 0.30		30 min.						
			0.30 or over up to and incl. 4.0		35 min.						
	¹ / ₄ H	C 1020 P- ¹ / ₄ H ^{d)} C 1020 PS- ¹ / ₄ H ^{d)}	0.10 or over to and excl. 0.15	215 to 285	15 min.	0.10 or over up to and incl. 2.0	180°	Thick- ness × 0.5	0.30 or over up to and incl. 30	55 to 100 ^{e)}	
			0.15 or over to and excl. 0.30		20 min.						
			0.30 or over up to and incl. 30	215 to 275	25 min.						
		C 1020 R- ¹ / ₄ H ^{d)} C 1020 RS- ¹ / ₄ H ^{d)}	0.10 or over to and excl. 0.15	215 to 285	15 min.				0.30 or over up to and incl. 4.0		
			0.15 or over to and excl. 0.30		20 min.						
			0.30 or over up to and incl. 4.0	215 to 275	25 min.						
	¹ / ₂ H	C 1020 P- ¹ / ₂ H ^{d)} C 1020 PS- ¹ / ₂ H ^{d)}	0.10 or over to and excl. 0.15	235 to 315	—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1	0.20 or over up to and incl. 20	75 to 120 ^{e)}	
			0.15 or over to and excl. 0.30		10 min.						
			0.30 or over up to and incl. 20	245 to 315	15 min.						
		C 1020 R- ¹ / ₂ H ^{d)} C 1020 RS- ¹ / ₂ H ^{d)}	0.10 or over to and excl. 0.15	235 to 315	—				0.20 or over up to and incl. 4.0		
			0.15 or over to and excl. 0.30		10 min.						
			0.30 or over up to and incl. 4.0	245 to 315	15 min.						
	H	C 1020 P-H ^{d)} C 1020 PS-H ^{d)}	0.10 or over up to and incl. 10	275 min.	—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1.5	0.20 or over up to and incl. 10	80 min. ^{e)}	
		C 1020 R-H ^{d)} C 1020 RS-H ^{d)}	0.10 or over up to and incl. 4.0						0.20 or over up to and incl. 4.0		

Table 3 (continued)

Alloy No.	Temper	Product designation	Tensile test			Bend test ^{a)}			Hardness test ^{a)} (informative)								
			Thickness mm	Tensile strength ^{b)} N/mm ²	Elonga- tion ^{b)} %	Thick- ness mm	Bend- ing angle ^{c)}	Internal radius ^{c)}	Thick- ness mm	Vickers hardness ^{b)} HV							
C 1100	O	C 1100 P-O ^{d)} C 1100 PS-O ^{d)}	0.10 or over to and excl. 0.15	195 min.	20 min.	0.10 or over up to and incl. 2.0	180°	Close contact	—	—							
			0.15 or over to and excl. 0.50		30 min.												
			0.50 or over up to and incl. 30		35 min.												
		C 1100 R-O ^{d)} C 1100 RS-O ^{d)}	0.10 or over to and excl. 0.15		20 min.												
			0.15 or over to and excl. 0.50		30 min.												
			0.50 or over up to and incl. 4.0		35 min.												
		¹ / ₄ H	C 1100 P- ¹ / ₄ H ^{d)} C 1100 PS- ¹ / ₄ H ^{d)}		0.10 or over to and excl. 0.15						215 to 285	15 min.	0.10 or over up to and incl. 2.0	180°	Thick- ness × 0.5	0.30 or over up to and incl. 30	55 to 100 ^{e)}
					0.15 or over to and excl. 0.50						20 min.						
					0.50 or over up to and incl. 30						215 to 275	25 min.					
	C 1100 R- ¹ / ₄ H ^{d)} C 1100 RS- ¹ / ₄ H ^{d)}		0.10 or over to and excl. 0.15	215 to 285	15 min.	0.30 or over up to and incl. 4.0											
			0.15 or over to and excl. 0.50	20 min.													
			0.50 or over up to and incl. 4.0	215 to 275	25 min.												
	¹ / ₂ H		C 1100 P- ¹ / ₂ H ^{d)} C 1100 PS- ¹ / ₂ H ^{d)}	0.10 or over to and excl. 0.15	235 to 315	—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1	0.20 or over up to and incl. 20	75 to 120 ^{e)}						
				0.15 or over to and excl. 0.50	10 min.												
				0.50 or over up to and incl. 20	245 to 315	15 min.											
		C 1100 R- ¹ / ₂ H ^{d)} C 1100 RS- ¹ / ₂ H ^{d)}	0.10 or over to and excl. 0.15	235 to 315	—	0.20 or over up to and incl. 4.0											
			0.15 or over to and excl. 0.50	10 min.													
			0.50 or over up to and incl. 4.0	245 to 315	15 min.												
		H	C 1100 P-H ^{d)} C 1100 PS-H ^{d)}	0.10 or over up to and incl. 10	275 min.	—				0.10 or over up to and incl. 2.0		180°	Thick- ness × 1.5	0.20 or over up to and incl. 10	80 min. ^{e)}		
			C 1100 R-H ^{d)} C 1100 RS-H ^{d)}	0.10 or over up to and incl. 4.0										0.20 or over up to and incl. 4.0			

Table 3 (continued)

Alloy No.	Temper	Product designation	Tensile test			Bend test ^{a)}			Hardness test ^{a)} (informative)								
			Thickness mm	Tensile strength ^{b)} N/mm ²	Elongation ^{b)} %	Thick- ness mm	Bend- ing angle ^{c)}	Internal radius ^{c)}	Thick- ness mm	Vickers hardness ^{b)} HV							
C 1201 C 1220	O	C 1201 P-O C 1201 PS-O C 1220 P-O C 1220 PS-O	0.10 or over to and excl. 0.15	195 min.	20 min.	0.10 or over up to and incl. 2.0	180°	Close contact	—	—							
			0.15 or over to and excl. 0.30		30 min.												
			0.30 or over up to and incl. 30		35 min.												
		C 1201 R-O C 1201 RS-O C 1220 R-O C 1220 RS-O	0.10 or over to and excl. 0.15		20 min.												
			0.15 or over to and excl. 0.30		30 min.												
			0.30 or over up to and incl. 3.0		35 min.												
		¹ / ₄ H	C 1201 P- ¹ / ₄ H C 1201 PS- ¹ / ₄ H C 1220 P- ¹ / ₄ H C 1220 PS- ¹ / ₄ H		0.10 or over to and excl. 0.15						215 to 285	15 min.	0.10 or over up to and incl. 2.0	180°	Thick- ness × 0.5	0.30 or over up to and incl. 30	55 to 100 ^{e)}
					0.15 or over to and excl. 0.30							20 min.					
	0.30 or over up to and incl. 30			215 to 275	25 min.	0.30 or over up to and incl. 3.0											
	C 1201 R- ¹ / ₄ H C 1201 RS- ¹ / ₄ H C 1220 R- ¹ / ₄ H C 1220 RS- ¹ / ₄ H		0.10 or over to and excl. 0.15	215 to 285	15 min.												
			0.15 or over to and excl. 0.30		20 min.												
			0.30 or over up to and incl. 3.0	215 to 275	25 min.												
	¹ / ₂ H		C 1201 P- ¹ / ₂ H C 1201 PS- ¹ / ₂ H C 1220 P- ¹ / ₂ H C 1220 PS- ¹ / ₂ H	0.10 or over to and excl. 0.15	235 to 315		—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1	0.20 or over up to and incl. 20	75 to 120 ^{e)}					
				0.15 or over to and excl. 0.30		10 min.											
				0.30 or over up to and incl. 20	245 to 315	15 min.	0.20 or over up to and incl. 3.0										
			C 1201 R- ¹ / ₂ H C 1201 RS- ¹ / ₂ H C 1220 R- ¹ / ₂ H C 1220 RS- ¹ / ₂ H	0.10 or over to and excl. 0.15	235 to 315	—											
				0.15 or over to and excl. 0.30		10 min.											
				0.30 or over up to and incl. 3.0	245 to 315	15 min.											
	H	C 1201 P-H C 1201 PS-H C 1220 P-H C 1220 PS-H	0.10 or over up to and incl. 10	275 min.	—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1.5	0.20 or over up to and incl. 10	80 min. ^{e)}							
			0.10 or over up to and incl. 3.0						0.20 or over up to and incl. 3.0								
C 1201 R-H C 1201 RS-H C 1220 R-H C 1220 RS-H																	

Table 3 (continued)

Alloy No.	Temper	Product designation	Tensile test			Bend test ^{a)}			Hardness test ^{a)} (informative)	
			Thickness mm	Tensile strength ^{b)} N/mm ²	Elongation ^{b)} %	Thick- ness mm	Bend- ing angle ^{c)}	Internal radius ^{c)}	Thick- ness mm	Vickers hardness ^{b)} HV
C 1441	O	C 1441 PS-O ^{d)} C 1441 RS-O ^{d)}	0.10 or over to and excl. 0.15	195 min.	20 min.	0.10 or over up to and incl. 2.0	180°	Close contact	—	—
			0.15 or over up to and incl. 3.0		30 min.					
	¹ / ₄ H	C 1441 PS- ¹ / ₄ H ^{d)} C 1441 RS- ¹ / ₄ H ^{d)}	0.10 or over to and excl. 0.15	215 to 305	15 min.	0.10 or over up to and incl. 2.0	180°	Thick- ness × 0.5	0.30 or over up to and incl. 3.0	45 to 105 ^{e)}
			0.15 or over up to and incl. 3.0		20 min.					
	¹ / ₂ H	C 1441 PS- ¹ / ₂ H ^{d)} C 1441 RS- ¹ / ₂ H ^{d)}	0.10 or over up to and incl. 3.0	245 to 345	10 min.	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1	0.20 or over up to and incl. 3.0	60 to 120 ^{e)}
	H	C 1441 PS-H ^{d)} C 1441 RS-H ^{d)}	0.10 or over to and excl. 0.15	275 to 400	—	0.10 or over up to and incl. 2.0	180°	Thick- ness × 1.5	0.10 or over up to and incl. 3.0	90 to 125 ^{e)}
			0.15 or over up to and incl. 3.0		2 min.					
	EH	C 1441 PS-EH C 1441 RS-EH	0.10 or over up to and incl. 3.0	345 to 440	—	0.10 or over up to and incl. 2.0	W	Thick- ness × 1	0.10 or over up to and incl. 3.0	100 to 135 ^{e)}
	SH	C 1441 PS-SH C 1441 RS-SH	0.10 or over up to and incl. 3.0	380 min.	—	0.10 or over up to and incl. 2.0	W	Thick- ness × 1.5	0.10 or over up to and incl. 3.0	115 min. ^{e)}
C 1510	¹ / ₄ H	C 1510 PS- ¹ / ₄ H ^{d)} C 1510 RS- ¹ / ₄ H ^{d)}	0.10 or over up to and incl. 3.0	275 to 310	13 min.	—	—	—	0.20 or over up to and incl. 3.0	70 to 100 ^{e)}
	¹ / ₂ H	C 1510 PS- ¹ / ₂ H ^{d)} C 1510 RS- ¹ / ₂ H ^{d)}	0.10 or over up to and incl. 3.0	295 to 355	6 min.	—	—	—	0.20 or over up to and incl. 3.0	80 to 110 ^{e)}
	³ / ₄ H	C 1510 PS- ³ / ₄ H ^{d)} C 1510 RS- ³ / ₄ H ^{d)}	0.10 or over up to and incl. 3.0	325 to 385	3 min.	—	—	—	0.10 or over up to and incl. 3.0	100 to 125 ^{e)}
	H	C 1510 PS-H ^{d)} C 1510 RS-H ^{d)}	0.10 or over up to and incl. 3.0	365 to 430	2 min.	—	—	—	0.10 or over up to and incl. 3.0	100 to 135 ^{e)}
	EH	C 1510 PS-EH ^{d)} C 1510 RS-EH ^{d)}	0.10 or over up to and incl. 3.0	400 to 450	2 min.	—	—	—	0.10 or over up to and incl. 3.0	120 to 140 ^{e)}
	SH	C 1510 PS-SH ^{d)} C 1510 RS-SH ^{d)}	0.10 or over up to and incl. 3.0	400 min.	2 min.	—	—	—	0.10 or over up to and incl. 3.0	125 min. ^{e)}