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(JAA/JSA)

**Aluminium and aluminium alloy bars and
wires**

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Foreword

This translation has been made based on the original Japanese Industrial Standard 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 Aluminium Association (JAA)/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 4040:2006** is replaced with this Standard.

However, **JIS H 4040:2006** 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 November 19, 2016.

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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.

Aluminium and aluminium alloy bars and wires

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of ISO 209 published in 2007, the second edition of ISO 6362-1 published in 2012, the fourth edition of ISO 6362-2 published in 2014, the third editions of ISO 6362-3 and ISO 6362-5 published in 2012, the second edition of ISO 6362-7 published in 2014, the second editions of ISO 6363-1 and ISO 6363-2 published in 2012, the first edition of ISO 6363-3 published in 2012, and the second editions of ISO 6363-4 and ISO 6363-5 with some modifications of the technical contents.

The portions given sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies extruded aluminium and aluminium alloy rods/bars (hereafter referred to as “extruded bars”), cold-drawn aluminium and aluminium alloy rods/bars (hereafter referred to as “cold-drawn bars”) and cold-drawn aluminium and aluminium alloy wires (hereafter referred to as “cold-drawn wires”). This Standard applies to bars and wires having a circular, square, rectangular (with the short side length exceeding one-tenth of the long side length) or hexagonal cross-section, but does not apply to shapes having a square, rectangular or hexagonal cross-section whose corner radii are specified.

NOTE: The International Standards corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 209 : 2007 *Aluminium and aluminium alloys — Chemical composition*

ISO 6362-1 : 2012 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 1 : Technical conditions for inspection and delivery*

ISO 6362-2 : 2014 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 2 : Mechanical properties*

ISO 6362-3 : 2012 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 3 : Extruded rectangular bars — Tolerances on shape and dimensions*

ISO 6362-5 : 2012 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 5 : Round, square and hexagonal bars — Tolerances on shape and dimensions*

ISO 6362-7 : 2014 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 7 : Chemical composition*

ISO 6363-1 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — Part 1 : Technical conditions for inspection and delivery*

ISO 6363-2 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars and tubes and wires — Part 2 : Mechanical properties*

ISO 6363-3 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — Part 3 : Drawn round bars and wires — Tolerances on form and dimensions (symmetric plus and minus tolerances on diameter)*

ISO 6363-4 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — Part 4 : Drawn rectangular bars and wires — Tolerances on form and dimensions*

ISO 6363-5 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — Part 5 : Drawn square and hexagonal bars and wires — Tolerances on form and dimensions (overall evaluation : MOD)*

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/IEC Guide 21-1.

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 0001 *Aluminium, magnesium and their alloys — Temper designation*

NOTE : Corresponding International Standard : ISO 2107 *Aluminium and aluminium alloys — Wrought products — Temper designations* (MOD)

JIS H 0321 *General rules for inspection of non-ferrous metal materials*

JIS H 0505 *Measuring methods for electrical resistivity and conductivity of non-ferrous materials*

JIS H 1305 *Method for optical emission spectrochemical analysis of aluminium and aluminium alloys*

JIS H 1306 *Methods for atomic absorption spectrometric analysis of aluminium and aluminium alloys*

JIS H 1307 *Methods for inductively coupled plasma emission spectrometric analysis of aluminium and aluminium alloys*

JIS H 1351 *General rules for chemical analysis of aluminium and aluminium alloy*

JIS H 1352 *Methods for determination of silicon in aluminium and aluminium alloys*

JIS H 1353	<i>Methods for determination of iron in aluminium and aluminium alloys</i>
JIS H 1354	<i>Methods for determination of copper in aluminium and aluminium alloys</i>
JIS H 1355	<i>Methods for determination of manganese in aluminium and aluminium alloys</i>
JIS H 1356	<i>Method for determination of zinc in aluminium and aluminium alloys</i>
JIS H 1357	<i>Methods for determination of magnesium in aluminium and aluminium alloys</i>
JIS H 1358	<i>Methods for determination of chromium in aluminium and aluminium alloys</i>
JIS H 1359	<i>Methods for determination of titanium in aluminium and aluminium alloys</i>
JIS H 1360	<i>Methods for determination of nickel in aluminium and aluminium alloys</i>
JIS H 1361	<i>Methods for determination of tin in aluminium and aluminium alloys</i>
JIS H 1362	<i>Method for determination of vanadium in aluminium and aluminium alloys</i>
JIS H 1363	<i>Methods for determination of zirconium in aluminium alloys</i>
JIS H 1364	<i>Methods for determination of bismuth in aluminium and aluminium alloys</i>
JIS H 1365	<i>Methods for determination of boron in aluminium and aluminium alloys</i>
JIS H 1366	<i>Methods for determination of lead in aluminium and aluminium alloys</i>
JIS H 1367	<i>Methods for determination of beryllium in aluminium and aluminium alloys</i>
JIS H 1368	<i>Method for determination of gallium in aluminium and aluminium alloys</i>
JIS H 8711	<i>Test methods for stress corrosion cracking on aluminium alloys</i>
JIS Z 2241	<i>Metallic materials — Tensile testing — Method of test at room temperature</i>
JIS Z 2248	<i>Metallic materials — Bend test</i>
EN 754-1	<i>Aluminium and aluminium alloys — Cold drawn rod/bar and tube — Part 1 : Technical conditions for inspection and delivery</i>
EN 755-1	<i>Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Part 1 : Technical conditions for inspection and delivery</i>

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1 extruded bar

extruded product of hollow-free, uniform cross-section along its whole length, supplied in straight lengths

3.2 cold-drawn bar

cold-drawn product of hollow-free, uniform cross-section along its whole length, supplied in straight lengths

3.3 cold-drawn wire

cold-drawn product of hollow-free, uniform cross-section along its whole length, supplied in coiled form

4 Alloy number, product category, class and symbol

The alloy number, product category, class and symbol shall be as given in Table 1. The class shall be classified into ordinary class and special class according to the dimensional tolerances and shapes. Suffix the temper grade to the symbol given in Table 1 to take as product symbol.

Table 1 Alloy number, product category, class and symbol

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
1070	Extruded bar	A1070BE	A1070BES	Alloy having low strength, but high thermal conductivity, electric conductivity, weldability and corrosion resistance. For ornaments, conductors, and weld wires, etc.
	Cold-drawn bar	A1070BD	A1070BDS	
	Cold-drawn wire	A1070W	A1070WS	
1060	Extruded bar	A1060BE	A1060BES	Alloy having low strength, but high thermal conductivity and electric conductivity. For conductors, the electric conductivity is guaranteed. For bus bars, etc.
1050	Extruded bar	A1050BE	A1050BES	Alloy having low strength, but high thermal conductivity, electric conductivity, weldability and corrosion resistance. For ornaments, weld wires, etc.
	Cold-drawn bar	A1050BD	A1050BDS	
	Cold-drawn wire	A1050W	A1050WS	
1050A	Extruded bar	A1050ABE	A1050ABES	
	Cold-drawn bar	A1050ABD	A1050ABDS	

Table 1 (continued)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
1100	Extruded bar	A1100BE	A1100BES	Alloy having comparatively low strength, but high weldability and corrosion resistance. For building materials, electric appliances, heat exchanger parts, etc.
	Cold-drawn bar	A1100BD	A1100BDS	
	Cold-drawn wire	A1100W	A1100WS	
1200	Extruded bar	A1200BE	A1200BES	
	Cold-drawn bar	A1200BD	A1200BDS	
	Cold-drawn wire	A1200W	A1200WS	
2011	Extruded bar	A2011BE	A2011BES	Alloy having equivalent strength to 2017 and high cutting workability but low corrosion resistance. For volume shafts, optical appliance parts, screws, etc.
	Cold-drawn bar	A2011BD	A2011BDS	
	Cold-drawn wire	A2011W	A2011WS	
2014	Extruded bar	A2014BE	A2014BES	Alloy having high strength and comparably high hot workability, which is also applicable to wrought products. For bolt materials, aircraft parts, hydraulic device parts, etc.
	Cold-drawn bar	A2014BD	A2014BDS	
2014A	Extruded bar	A2014ABE	A2014ABES	Alloy having slightly less strength than 2014. For material for rivets, etc.
	Cold-drawn bar	A2014ABD	A2014ABDS	
2017	Extruded bar	A2017BE	A2017BES	Alloy which can obtain high strength through natural ageing, having high cutting workability but low corrosion resistance and weldability. For machine parts, material for rivets, material for aircraft, automobile parts, etc.
	Cold-drawn bar	A2017BD	A2017BDS	
	Cold-drawn wire	A2017W	A2017WS	
2017A	Extruded bar	A2017ABE	A2017ABES	Alloy having higher strength than 2017. For material for rivets, etc.
	Cold-drawn bar	A2017ABD	A2017ABDS	
2117	Cold-drawn wire	A2117W	A2117WS	Alloy whose natural aging has been decelerated after solution heat treatment so that it can be caulked as a material for rivets. For material for rivets, etc.

Table 1 (continued)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
2219	Cold-drawn bar	A2219BD	A2219BDS	Alloy having slightly less strength than 2024, but high heat resistance at both low and high temperature, and high weldability. For high-temperature structural material, etc.
2024	Extruded bar	A2024BE	A2024BES	Alloy having an improved property of natural ageing more than 2017 as well as high strength and cutting workability. For material for aircraft, spindles, material for bolts, material for rivets, etc.
	Cold-drawn bar	A2024BD	A2024BDS	
	Cold-drawn wire	A2024W	A2024WS	
2030	Extruded bar	A2030BE	A2030BES	Free-cutting alloy with high cutting workability and high strength. For machine parts, etc.
	Cold-drawn bar	A2030BD	A2030BDS	
3003	Extruded bar	A3003BE	A3003BES	Alloy having slightly higher strength than 1100, and high weldability and corrosion resistance. For heat exchanger parts, general mechanical parts, etc.
	Cold-drawn bar	A3003BD	A3003BDS	
	Cold-drawn wire	A3003W	A3003WS	
3103	Extruded bar	A3103BE	A3103BES	Alloy having slightly higher strength than 1100, and high weldability and corrosion resistance.
	Cold-drawn bar	A3103BD	A3103BDS	
5041 (5N02) ^{a)}	Cold-drawn bar	A5041BD (A5N02BD) ^{a)}	A5041BDS (A5N02BDS) ^{a)}	Alloy for rivets, with high corrosion resistance. For material for rivets, etc.
	Cold-drawn wire	A5041W (A5N02W) ^{a)}	A5041WS (A5N02WS) ^{a)}	Alloy having lower strength than 5052. For building materials, material for refrigerator, etc.
5050	Cold-drawn bar	A5050BD	A5050BDS	Alloy having lower strength than 5052. For building materials, material for refrigerator, etc.
5052	Extruded bar	A5052BE	A5052BES	Alloy having intermediate strength, and high corrosion resistance and weldability. For materials of ships, vehicles and construction, etc.
	Cold-drawn bar	A5052BD	A5052BDS	
	Cold-drawn wire	A5052W	A5052WS	
5154	Cold-drawn bar	A5154BD	A5154BDS	Alloy having intermediate strength between 5052 and 5083, and high corrosion resistance and weldability. For materials of ships, etc.

Table 1 (continued)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
5454	Extruded bar	A5454BE	A5454BES	Alloy having higher strength than 5052. For material of automobile parts, etc.
5754	Extruded bar	A5754BE	A5754BES	
	Cold-drawn bar	A5754BD	A5754BDS	
5056	Extruded bar	A5056BE	A5056BES	Alloy having high strength, ductility, corrosion resistance and cutting workability, as well as high anodizing performance. For optical appliances, transmission device parts, fasteners, etc.
	Cold-drawn bar	A5056BD	A5056BDS	
	Cold-drawn wire	A5056W	A5056WS	
5083	Extruded bar	A5083BE	A5083BES	Alloy having highest strength among non-heat-treated alloys, and high corrosion resistance and weldability. For general machine parts, etc.
	Cold-drawn bar	A5083BD	A5083BDS	
	Cold-drawn wire	A5083W	A5083WS	
5086	Extruded bar	A5086BE	A5086BES	Non-heat-treated alloy for welding construction having higher strength than 5154, and high corrosion resistance in sea water. For ship parts, etc.
	Cold-drawn bar	A5086BD	A5086BDS	
6101	Extruded bar	A6101BE	A6101BES	Material for high-strength conductors with its electric conductivity guaranteed. For bus bars, etc.
6005A	Extruded bar	A6005ABE	A6005ABES	Alloy having intermediate strength between 6061 and 6063, and high extruding workability, quenching performance and corrosion resistance. It can be welded. For construction materials, etc.
6005C (6N01) ^{a)}	Extruded bar	A6005CBE (A6N01BE) ^{a)}	A6005CBES (A6N01BES) ^{a)}	
6060	Extruded bar	A6060BE	A6060BES	Alloy having slightly lower strength than 6063, but high extrudability, corrosion resistance and surface treatability. For building materials, furniture, household electric appliances, etc.
	Cold-drawn bar	A6060BD	A6060BDS	
6061	Extruded bar	A6061BE	A6061BES	Anti-corrosive alloy of heat treatment type, which can obtain considerably high proof stress value by age-hardening, but has low weldability. For material for rivets, bolt materials, automobile parts, etc.
	Cold-drawn bar	A6061BD	A6061BDS	
	Cold-drawn wire	A6061W	A6061WS	
6262	Extruded bar	A6262BE	A6262BES	Anti-corrosive free-cutting alloy. For camera mirror body, carburetor parts, etc.
	Cold-drawn bar	A6262BD	A6262BDS	

Table 1 (concluded)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
6063	Extruded bar	A6063BE	A6063BES	Typical extruded alloy. Alloy having slightly lower strength than 6061, but high extrudability, corrosion resistance and surface treatability. For materials of building, civil engineering, furniture, household electric appliances, vehicles, etc.
	Cold-drawn bar	A6063BD	A6063BDS	
6181	Cold-drawn bar	A6181BD	A6181BDS	Alloy having slightly lower strength than 6061, but high corrosion resistance.
6082	Extruded bar	A6082BE	A6082BES	Alloy having slightly higher strength than 6061 and high corrosion resistance. For construction materials, etc.
	Cold-drawn bar	A6082BD	A6082BDS	
7003	Extruded bar	A7003BE	A7003BES	Alloy for welding construction. Alloy having slightly lower strength than 7204, but high extrudability. For materials of welding construction.
7204 (7N01) ^{a)}	Extruded bar	A7204BE (A7N01BE) ^{a)}	A7204BES (A7N01BES) ^{a)}	Alloy for welding construction having such strength that the weld strength recovers as much as the base metal strength when left at ordinary temperature. It also has good corrosion resistance. For general machine parts, etc.
7020	Extruded bar	A7020BE	A7020BES	Alloy having slightly higher strength than 7204. For bicycle frames, general machine parts, etc.
	Cold-drawn bar	A7020BD	A7020BDS	
7049A	Extruded bar	A7049ABE	A7049ABES	Alloy having higher strength than 7075.
	Cold-drawn bar	A7049ABD	A7049ABDS	
7050	Extruded bar	A7050BE	A7050BES	Alloy made by improving hardenability of 7075, having high resistance to stress corrosion cracking. For aircraft parts, etc.
7075	Extruded bar	A7075BE	A7075BES	One of the strongest aluminium alloys. For aircraft parts, material for rivets, etc.
	Cold-drawn bar	A7075BD	A7075BDS	
Note ^{a)} A number in parentheses is an old alloy number. It is preferable to avoid using old alloy numbers. These old numbers will be deleted in the next revision of this Standard.				

5 Quality

5.1 Appearance

Extruded bars, cold-drawn bars (both hereafter referred to as “bars”) and cold-drawn wires (hereafter referred to as “wires”) shall be finished well and uniformly, and be free from defects ditrimental to use, e.g. blister and flaws. The surface, if carrying defects on it, shall be finished smoothly.

5.2 Chemical composition

The chemical composition of bars and wires shall be tested according to 7.1, and the results shall be as given in Table 2.

Table 2 Chemical composition

Unit: %

Alloy number	Si	Fe	Cu	Mn	Mg	Cr	Zn	V, Bi, Pb, Zr, Ni, etc.	Ti	Others ^{a)}		Al
										Individual	Total	
1070	0.20 max.	0.25 max.	0.04 max.	0.03 max.	0.03 max.	—	0.04 max.	V 0.05 max.	0.03 max.	0.03 max.	—	99.70 min.
1060	0.25 max.	0.35 max.	0.05 max.	0.03 max.	0.03 max.	—	0.05 max.	V 0.05 max.	0.03 max.	0.03 max.	—	99.60 min.
1050	0.25 max.	0.40 max.	0.05 max.	0.05 max.	0.05 max.	—	0.05 max.	V 0.05 max.	0.03 max.	0.03 max.	—	99.50 min.
1050A	0.25 max.	0.40 max.	0.05 max.	0.05 max.	0.05 max.	—	0.07 max.	—	0.05 max.	0.03 max.	—	99.50 min.
1100	Si + Fe 0.95 max.		0.05 to 0.20	0.05 max.	—	—	0.10 max.	b)	—	0.05 max.	0.15 max.	99.00 min.
1200	Si + Fe 1.00 max.		0.05 max.	0.05 max.	—	—	0.10 max.	—	0.05 max.	0.05 max.	0.15 max.	99.00 min.
2011	0.40 max.	0.7 max.	5.0 to 6.0	—	—	—	0.30 max.	Bi 0.20 to 0.6, Pb 0.20 to 0.6	—	0.05 max.	0.15 max.	Remainder
2014	0.50 to 1.2	0.7 max.	3.9 to 5.0	0.40 to 1.2	0.20 to 0.8	0.10 max.	0.25 max.	b)	0.15 max.	0.05 max.	0.15 max.	Remainder
2014A	0.50 to 0.9	0.50 max.	3.9 to 5.0	0.40 to 1.2	0.20 to 0.8	0.10 max.	0.25 max.	Zr + Ti 0.25 max, Ni 0.10 max.	0.15 max.	0.05 max.	0.15 max.	Remainder
2017	0.20 to 0.8	0.7 max.	3.5 to 4.5	0.40 to 1.0	0.40 to 0.8	0.10 max.	0.25 max.	c)	0.15 max.	0.05 max.	0.15 max.	Remainder
2017A	0.20 to 0.8	0.7 max.	3.5 to 4.5	0.40 to 1.0	0.40 to 1.0	0.10 max.	0.25 max.	Zr + Ti 0.20 max.	—	0.05 max.	0.15 max.	Remainder
2117	0.8 max.	0.7 max.	2.2 to 3.0	0.10 max.	0.20 to 0.50	—	0.25 max.	d)	—	0.05 max.	0.15 max.	Remainder
2219	0.20 max.	0.30 max.	5.8 to 6.8	0.20 to 0.40	0.02 max.	—	0.10 max.	V 0.05 to 0.15, Zr 0.10 to 0.25	0.02 to 0.10	0.05 max.	0.15 max.	Remainder
2024	0.50 max.	0.50 max.	3.8 to 4.9	0.30 to 0.9	1.2 to 1.8	0.10 max.	0.25 max.	e)	0.15 max.	0.05 max.	0.15 max.	Remainder
2030	0.8 max.	0.7 max.	3.3 to 4.5	0.20 to 1.0	0.50 to 1.3	0.10 max.	0.50 max.	Bi 0.20 max, Pb 0.8 to 1.5	0.20 max.	0.10 max.	0.30 max.	Remainder
3003	0.6 max.	0.7 max.	0.05 to 0.20	1.0 to 1.5	—	—	0.10 max.	—	—	0.05 max.	0.15 max.	Remainder
3103	0.50 max.	0.7 max.	0.10 max.	0.9 to 1.5	0.30 max.	0.10 max.	0.20 max.	Zr + Ti 0.10 max.	—	0.05 max.	0.15 max.	Remainder
5041 (5N02)	0.40 max.	0.40 max.	0.10 max.	0.30 to 1.0	3.0 to 4.0	0.50 max.	0.10 max.	—	0.20 max.	0.05 max.	0.15 max.	Remainder
5050	0.40 max.	0.7 max.	0.20 max.	0.10 max.	1.1 to 1.8	0.10 max.	0.25 max.	—	—	0.05 max.	0.15 max.	Remainder
5052	0.25 max.	0.40 max.	0.10 max.	0.10 max.	2.2 to 2.8	0.15 to 0.35	0.10 max.	—	—	0.05 max.	0.15 max.	Remainder

Table 2 (continued)

Unit: %

Alloy number	Si	Fe	Cu	Mn	Mg	Cr	Zn	V, Bi, Pb, Zr, Ni, etc.	Ti	Others ^{a)}		Al
										Individual	Total	
5154	0.25 max.	0.40 max.	0.10 max.	0.10 max.	3.1 to 3.9	0.15 to 0.35	0.20 max.	b)	0.20 max.	0.05 max.	0.15 max.	Remainder
5454	0.25 max.	0.40 max.	0.10 max.	0.50 to 1.0	2.4 to 3.0	0.05 to 0.20	0.25 max.	—	0.20 max.	0.05 max.	0.15 max.	Remainder
5754	0.40 max.	0.40 max.	0.10 max.	0.50 max.	2.6 to 3.6	0.30 max.	0.20 max.	Mn + Cr 0.10 to 0.6	0.15 max.	0.05 max.	0.15 max.	Remainder
5056	0.30 max.	0.40 max.	0.10 max.	0.05 to 0.20	4.5 to 5.6	0.05 to 0.20	0.10 max.	—	—	0.05 max.	0.15 max.	Remainder
5083	0.40 max.	0.40 max.	0.10 max.	0.40 to 1.0	4.0 to 4.9	0.05 to 0.25	0.25 max.	—	0.15 max.	0.05 max.	0.15 max.	Remainder
5086	0.40 max.	0.50 max.	0.10 max.	0.20 to 0.7	3.5 to 4.5	0.05 to 0.25	0.25 max.	—	0.15 max.	0.05 max.	0.15 max.	Remainder
6101	0.30 to 0.7	0.50 max.	0.10 max.	0.03 max.	0.35 to 0.8	0.03 max.	0.10 max.	B 0.06 max.	—	0.03 max.	0.10 max.	Remainder
6005A	0.50 to 0.9	0.35 max.	0.30 max.	0.50 max.	0.40 to 0.7	0.30 max.	0.20 max.	Mn + Cr 0.12 to 0.50	0.10 max.	0.05 max.	0.15 max.	Remainder
6005C (6N01)	0.40 to 0.9	0.35 max.	0.35 max.	0.50 max.	0.40 to 0.8	0.30 max.	0.25 max.	Mn + Cr 0.50 max.	0.10 max.	0.05 max.	0.15 max.	Remainder
6060	0.30 to 0.6	0.10 to 0.30	0.10 max.	0.10 max.	0.35 to 0.6	0.05 max.	0.15 max.	—	0.10 max.	0.05 max.	0.15 max.	Remainder
6061	0.40 to 0.8	0.7 max.	0.15 to 0.40	0.15 max.	0.8 to 1.2	0.04 to 0.35	0.25 max.	—	0.15 max.	0.05 max.	0.15 max.	Remainder
6262	0.40 to 0.8	0.7 max.	0.15 to 0.40	0.15 max.	0.8 to 1.2	0.04 to 0.14	0.25 max.	Bi 0.40 to 0.7, Pb 0.40 to 0.7	0.15 max.	0.05 max.	0.15 max.	Remainder
6063	0.20 to 0.6	0.35 max.	0.10 max.	0.10 max.	0.45 to 0.9	0.10 max.	0.10 max.	—	0.10 max.	0.05 max.	0.15 max.	Remainder
6181	0.8 to 1.2	0.45 max.	0.10 max.	0.15 max.	0.6 to 1.0	0.10 max.	0.20 max.	—	0.10 max.	0.05 max.	0.15 max.	Remainder
6082	0.7 to 1.3	0.50 max.	0.10 max.	0.40 to 1.0	0.6 to 1.2	0.25 max.	0.20 max.	—	0.10 max.	0.05 max.	0.15 max.	Remainder
7003	0.30 max.	0.35 max.	0.20 max.	0.30 max.	0.50 to 1.0	0.20 max.	5.0 to 6.5	Zr 0.05 to 0.25	0.20 max.	0.05 max.	0.15 max.	Remainder
7204 (7N01)	0.30 max.	0.35 max.	0.20 max.	0.20 to 0.7	1.0 to 2.0	0.30 max.	4.0 to 5.0	V 0.10 max, Zr 0.25 max.	0.20 max.	0.05 max.	0.15 max.	Remainder
7020	0.35 max.	0.40 max.	0.20 max.	0.05 to 0.50	1.0 to 1.4	0.10 to 0.35	4.0 to 5.0	Zr 0.08 to 0.20 Zr + Ti 0.08 to 0.25	—	0.05 max.	0.15 max.	Remainder

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Table 2 (concluded)

Unit: %

Alloy number	Si	Fe	Cu	Mn	Mg	Cr	Zn	V, Bi, Pb, Zr, Ni, etc.	Ti	Others ^{a)}		Al
										Individual	Total	
7049A	0.40 max.	0.50 max.	1.2 to 1.9	0.50 max.	2.1 to 3.1	0.05 to 0.25	7.2 to 8.4	Zr + Ti 0.25 max.	0.06 max.	0.05 max.	0.15 max.	Remainder
7050	0.12 max.	0.15 max.	2.0 to 2.6	0.10 max.	1.9 to 2.6	0.04 max.	5.7 to 6.7	Zr 0.08 to 0.15	0.06 max.	0.05 max.	0.15 max.	Remainder
7075	0.40 max.	0.50 max.	1.2 to 2.0	0.30 max.	2.1 to 2.9	0.18 to 0.28	5.1 to 6.1	^{d)}	0.20 max.	0.05 max.	0.15 max.	Remainder

Notes ^{a)} Other elements mean elements not given in the table, which are analysed at the discretion of the manufacturer, either when their existence is anticipated or when they may exceed the specified limit during routine analysis. "Individual" value means the component value of each element not given in the table. "Total" value means the sum of component values of individual elements.

^{b)} Be : 0.000 3 % max., when used for filler rods and welding wires.

^{c)} Zr + Ti may be 0.20 % or under by agreement between the purchaser and the manufacturer.

^{d)} Zr + Ti may be 0.25 % or under by agreement between the purchaser and the manufacturer.

5.3 Mechanical properties

The mechanical properties (tensile strength, proof stress and elongation) of bars and wires shall be tested according to 7.2, and shall conform to Table 3 for extruded bars, and conform to Table 4 for cold-drawn bars and wires.

The mechanical properties of other dimensions than diameters, thickness, width across flats and sectional area given in Tables 3 and 4 shall be agreed between the purchaser and the manufacturer.

Table 3 Mechanical properties for extruded bars

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
1070	H112	All	—	55 min.	15 min.	—	—
1060	H112	3 or over up to and incl. 30	—	60 min.	30 min.	25 min.	—
1050	H112	All	—	65 min.	20 min.	—	—
1050A	O	All	—	60 min. 95 max.	20 min.	23 min.	25 min.
	H112	35 or under (30 or under) ^{c)}	—	65 min.	20 min.	23 min.	25 min.
1100	H112	Less than 35 (less than 30) ^{c)}	—	75 min.	20 min.	18 min.	18 min.
		35 min. (30 min.) ^{c)}	—	75 min.	20 min.	—	—
1200	H112	Less than 35 (less than 30) ^{c)}	—	75 min.	25 min.	18 min.	20 min.
		35 or over (up to and incl. 30) ^{c)}	—	75 min.	20 min.	—	—
2011	T4 ^{d)}	3 or over up to and incl. 200	—	275 min.	125 min.	16 min.	14 min.
	T6 ^{d)}	3 or over up to and incl. 75	—	310 min.	230 min.	10 min.	8 min.
		Over 75 up to and incl. 160	—	295 min.	195 min.	8 min.	6 min.
2014	O ^{e)}	All	—	250 max.	135 max.	12 min.	10 min.
	T4 T4510 T4511	All	—	345 min.	240 min.	12 min.	10 min.
	T42 ^{f)}	All	—	345 min.	205 min.	12 min.	—
	T6 T6510 T6511	12 or under	—	410 min.	365 min.	7 min.	—
		Over 12 up to and incl. 19	—	440 min.	400 min.	7 min.	6 min.
		Over 19	160 max.	470 min.	410 min.	7 min.	6 min.
		Over 19	Over 160 up to and incl. 200	470 min.	400 min.	6 min.	6 min.
		Over 19	Over 200 up to and incl. 250	450 min.	380 min.	6 min.	6 min.
		Over 19	Over 250 up to and incl. 300	430 min.	365 min.	6 min.	6 min.

Table 3 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
	T62 ^δ	19 or under	—	410 min.	365 min.	7 min.	—
		Over 19	160 max.	410 min.	365 min.	7 min.	—
		Over 19	Over 160 up to and incl. 200	410 min.	365 min.	6 min.	—
2014A	O	10 or over up to and incl. 200	—	250 max.	135 max.	12 min.	10 min.
		T4 T4510 T4511	—	345 min.	240 min.	12 min.	10 min.
		T6 T6510 T6511	—	440 min.	400 min.	—	6 min.
		Over 100 up to and incl. 120	—	430 min.	350 min.	—	6 min.
		Over 120 up to and incl. 200	—	430 min.	350 min.	—	6 min.
2017	O ^{e)}	All	—	245 max.	125 max.	16 min.	—
	T4 ^{d)}	All	700 max.	345 min.	215 min.	12 min.	—
	T42 ^δ	All	Over 700 up to and incl. 1000	335 min.	195 min.	12 min.	—
2017A	O	10 or over up to and incl. 100	—	250 max.	150 max.	—	10 min.
		T4 ^{d)}	—	390 min.	265 min.	—	10 min.
		T4510 ^{d)} T4511 ^{d)}	—	360 min.	220 min.	—	7 min.
2024	O ^{e)}	All	—	245 max.	125 max.	12 min.	10 min.
		T4	6 or under	—	390 min.	295 min.	12 min.
			Over 6 up to and incl. 19	—	410 min.	305 min.	12 min.
			Over 19 up to and incl. 38	—	450 min.	315 min.	10 min.
			Over 38 up to and incl. 100	160 max.	480 min.	365 min.	10 min.
				Over 160 up to and incl. 200	470 min.	335 min.	8 min.
				Over 200 up to and incl. 300	460 min.	315 min.	8 min.
			Over 100 up to and incl. 200	160 max.	480 min.	365 min.	10 min.
				Over 160 up to and incl. 200	470 min.	335 min.	8 min.
				Over 200 up to and incl. 300	460 min.	315 min.	8 min.
		T42 ^δ	19 or under	—	390 min.	265 min.	12 min.
			Over 19 up to and incl. 38	—	390 min.	265 min.	10 min.
			Over 38	160 max.	390 min.	265 min.	10 min.
				Over 160 up to and incl. 200	390 min.	265 min.	8 min.

Table 3 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
2030	T4	80 or under	—	370 min.	250 min.	6 min.	8 min.
	T4510	Over 80 up to and incl. 200	—	340 min.	220 min.	—	8 min.
	T4511	Over 200 up to and incl. 250	—	330 min.	210 min.	—	7 min.
3003	O	All	—	95 min. 135 max.	35 min.	20 min.	25 min.
	H112	All	—	95 min.	35 min.	—	—
3103	O	All	—	95 min. 135 max.	35 min.	20 min.	25 min.
	H112	All	—	95 min.	35 min.	20 min.	25 min.
5052	O	All	—	175 min. 245 max.	70 min.	20 min.	—
	H112	All	—	175 min.	70 min.	—	—
5454	O	200 or under	—	200 min. 275 max.	85 min.	16 min.	18 min.
	H112	All	—	215 min.	100 min.	12 min.	—
5754	O	150 or under	—	180 min. 250 max.	80 min.	15 min.	17 min.
	H112	150 or under	—	180 min.	80 min.	12 min.	14 min.
		Over 150 up to and incl. 250	—	180 min.	70 min.	—	13 min.
5056	H112	All	300 max.	245 min.	100 min.	—	—
		All	Over 300 up to and incl. 700	225 min.	80 min.	—	—
		All	Over 700 up to and incl. 1000	215 min.	70 min.	—	—
5083	O	130 or under	200 max.	275 min. 355 max.	110 min.	14 min.	—
	H112	130 or under	200 max.	275 min.	110 min.	12 min.	12 min.
5086	O	200 or under	—	240 min. 320 max.	95 min.	15 min.	18 min.
	H112	250 or under	—	240 min.	95 min.	10 min.	12 min.
6101	T6 ^{d)}	3 or over up to and incl. 7	—	195 min.	165 min.	10 min.	—
		Over 7 up to and incl. 17	—	195 min.	165 min.	12 min.	—
		Over 17 up to and incl. 30	—	175 min.	145 min.	14 min.	—
	T7 ^{d)}	3 or over up to and incl. 17	—	135 min.	110 min.	10 min.	—
6005A	T6 ^{d)}	25 or under	—	270 min.	225 min.	8 min.	10 min.
		Over 25 up to and incl. 50	—	270 min.	225 min.	—	8 min.
		Over 50 up to and incl. 100	—	260 min.	215 min.	—	8 min.

Table 3 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
6005C (6N01)	T5	6 or under	—	245 min.	205 min.	8 min.	—
		Over 6 up to and incl. 12	—	225 min.	175 min.	8 min.	—
	T6 ^{d)}	6 or under	—	265 min.	235 min.	8 min.	—
6060	T4 ^{d)}	150 or under	—	120 min.	60 min.	14 min.	16 min.
	T5	150 or under	—	160 min.	120 min.	6 min.	8 min.
	T6 ^{d)}	100 or under	—	190 min.	150 min.	8 min.	10 min.
	T64 ^{d)}	50 or under	—	180 min.	120 min.	10 min.	12 min.
	T66 ^{d)}	150 or under	—	215 min.	160 min.	6 min.	8 min.
6061	O ^{e)}	All	—	145 max.	110 max.	16 min.	—
	T4 ^{d)}	All	—	180 min.	110 min.	16 min.	14 min.
	T4511 ^{d)}						
	T42 ^{d)}	All	—	175 min.	85 min.	16 min.	—
	T6 ^{d)}	6 or under	—	260 min.	240 min.	8 min.	7 min.
6063	O	200 or under	—	130 max.	—	16 min.	18 min.
	T1	12 or under	—	120 min.	60 min.	12 min.	—
		Over 12 up to and incl. 25	—	110 min.	55 min.	12 min.	—
	T4 ^{d)}	150 or under	—	130 min.	65 min.	12 min.	14 min.
		Over 150 up to and incl. 200	—	120 min.	65 min.	—	12 min.
	T5	12 or under	—	150 min.	110 min.	8 min.	7 min.
		Over 12 up to and incl. 25	—	145 min.	105 min.	8 min.	7 min.
	T6 ^{d)}	3 or under	—	205 min.	170 min.	8 min.	—
6082		Over 3 up to and incl. 25	—	205 min.	170 min.	10 min.	9 min.
	T66 ^{d)}	200 or under	—	245 min.	200 min.	8 min.	10 min.
	O	200 or under	—	160 max.	110 max.	12 min.	14 min.
	H111						
7003	T5	12 or under	—	285 min.	245 min.	10 min.	—
		Over 12 up to and incl. 25	—	275 min.	235 min.	10 min.	—
	T6 ^{d)}	50 or under	—	350 min.	290 min.	8 min.	10 min.
		Over 50 up to and incl. 150	—	340 min.	280 min.	8 min.	10 min.

Table 3 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
7204 (7N01)	O	All	—	245 max.	145 max.	12 min.	—
	T4 ^{d), g)}	All	—	315 min.	195 min.	11 min.	—
	T5	All	—	325 min.	245 min.	10 min.	—
	T6 ^{d)}	All	—	335 min.	275 min.	10 min.	—
7020	T6 ^{d)}	50 or under	—	350 min.	290 min.	8 min.	10 min.
		Over 50 up to and incl. 200	—	340 min.	275 min.	—	10 min.
7049A	T6	100 or under	—	610 min.	530 min.	4 min.	5 min.
	T6510	Over 100 up to and incl. 125	—	560 min.	500 min.	—	5 min.
	T6511	Over 125 up to and incl. 150	—	520 min.	430 min.	—	5 min.
		Over 150 up to and incl. 180	—	450 min.	400 min.	—	3 min.
7050	T73511	125 or under	200 max.	485 min.	415 min.	8 min.	7 min.
	T74511	76 or under	—	505 min.	435 min.	7 min.	—
	T76510	127 or under	—	545 min.	475 min.	7 min.	—
7075	O ^{e)}	All	200 max.	275 max.	165 max.	10 min.	9 min.
	T6	6 or under	—	540 min.	480 min.	7 min.	—
		Over 6 up to and incl. 75	—	560 min.	500 min.	7 min.	6 min.
	T6511	Over 75 up to and incl. 110	130 max.	560 min.	490 min.	7 min.	5 min.
		Over 75 up to and incl. 110	Over 130 up to and incl. 200	540 min.	480 min.	7 min.	5 min.
		Over 110 up to and incl. 130	200 max.	540 min.	470 min.	6 min.	5 min.
		Over 130 up to and incl. 150	—	500 min.	440 min.	—	5 min.
	T73	10 or over up to and incl. 25	—	485 min.	420 min.	—	7 min.
		Over 25 up to and incl. 50	—	475 min.	405 min.	—	7 min.
		Over 50 up to and incl. 70	—	475 min.	405 min.	—	7 min.
		Over 70 up to and incl. 100	—	470 min.	390 min.	—	6 min.
	T73510 T73511	25 or under	—	485 min.	420 min.	5 min.	7 min.
		Over 25 up to and incl. 75	—	475 min.	405 min.	—	7 min.
		Over 75 up to and incl. 100	—	470 min.	390 min.	—	6 min.
		Over 100 up to and incl. 150	—	440 min.	360 min.	—	6 min.

Table 3 (concluded)

NOTE : 1 N/mm² = 1 MPa

Notes a) The temper grade shall be in accordance with JIS H 0001.

b) For elongation, either of the following two systems having different gauge lengths is adopted. The elongation is measured by $A_{50 \text{ mm}}$ system unless otherwise specified by the purchaser. When $A_{50 \text{ mm}}$ system is not specified, the elongation is measured by A system.

$A_{50 \text{ mm}}$: elongation at 50 mm gauge length

A : elongation at $5.65 \sqrt{S_0}$ gauge length (S_0 : sectional area of the parallel part of test piece, mm²)

c) The values in parentheses are applied to other bars than round bars (rectangular, square and hexagonal bars).

d) It may be applied to materials which hold solid state at room temperature through controlled cooling after extrusion.

e) The material of temper grade O is a base material of temper grade T42 or T62. Upon request by the purchaser, the manufacturer shall guarantee the performance of these materials when the purchaser applies adequate heat treatment.

f) The mechanical properties of materials of temper grade T42 shall be applied when the purchaser conducted solution heat treatment then natural age hardening in sufficiently stable status for a material of temper grade O. The mechanical properties of materials of temper grade T62 shall be applied when the purchaser conducted solution heat treatment then artificial age hardening for a material of temper grade O. When some cold working or hot working has been conducted by the purchaser prior to solution heat treatment, the values of mechanical properties can be lower than the specified values.

g) For alloy number 7204 (7N01), the mechanical properties of materials of temper grade T4 are specified based on the values obtained by solution heat treatment then by natural aging (at about 20 °C) for one month.

When a material is subjected to tensile test before one-month natural aging, it is permitted to guarantee the tensile performance of materials of temper grade T4 by confirming that the material satisfies the tensile performance of materials of temper grade T6. In this case, state that a material of temper grade T6 was used for the test.

Table 4 Mechanical properties of cold-drawn bars and wires

Alloy number	Temper grade a)	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation b) %	
						$A_{50 \text{ mm}}$	A
1070	O	3 or under	—	55 or over up to and incl. 95	—	—	—
		Over 3 up to and incl. 100	—	55 or over up to and incl. 95	15 min.	25 min.	—
	H14	10 or under	—	85 min.	—	—	—
	H18	10 or under	—	120 min.	—	—	—
1050	O	3 or under	—	60 or over up to and incl. 100	—	—	—
		Over 3 up to and incl. 100	—	60 or over up to and incl. 100	20 min.	25 min.	—
	H14	10 or under	—	95 min.	—	—	—
	H18	10 or under	—	125 min.	—	—	—

Table 4 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
1050A	O	30 or under	—	60 min.	20 min.	—	25 min.
	H14	30 or under	—	100 min.	70 min.	5 min.	6 min.
	H16	15 or under (5 or under) ^{c)}	—	120 or over up to and incl. 160	105 min.	3 min.	4 min.
	H18	10 or under	—	130 min.	110 min.	—	3 min.
1100	O	3 or under	—	75 or over up to and incl. 110	—	—	—
		Over 3 up to and incl. 100	—	75 or over up to and incl. 110	20 min.	25 min.	22 min.
	H14	30 or under	—	110 min.	80 min.	—	5 min.
	H18	10 or under	—	150 min.	130 min.	—	3 min.
1200	O	3 or under	—	75 or over up to and incl. 110	—	—	—
		Over 3 up to and incl. 30	—	75 or over up to and incl. 110	30 min.	25 min.	20 min.
		Over 30 up to and incl. 100	—	75 or over up to and incl. 110	20 min.	25 min.	—
	H14	30 or under	—	110 min.	80 min.	—	5 min.
	H16	15 or under (5 or under) ^{c)}	—	135 or over up to and incl. 170	115 min.	3 min.	3 min.
	H18	10 or under	—	140 min.	120 min.	—	3 min.
2011	H13	18 or under	—	155 or over up to and incl. 225	—	—	—
	H18	10 or under	—	240 min.	—	—	—
	T3 ^{d)}	3 or over up to and incl. 38	—	310 min.	260 min.	10 min.	9 min.
		Over 38 up to and incl. 50	—	295 min.	235 min.	12 min.	10 min.
		Over 50 up to and incl. 80	—	280 min.	205 min.	14 min.	10 min.
	T8 ^{d)}	3 or over up to and incl. 80	—	370 min.	270 min.	10 min.	8 min.
2014	O ^{e)}	3 or over up to and incl. 100	—	245 max.	—	12 min.	—
	T3	80 or under	—	380 min.	290 min.	6 min.	8 min.
	T351	80 or under	—	380 min.	290 min.	4 min.	6 min.
	T4 T42 ^{f)} T451	3 or over up to and incl. 100	230 max.	380 min.	220 min.	16 min.	10 min.
	T6 T62 ^{f)} T651	3 or over up to and incl. 100	230 max.	450 min.	380 min.	8 min.	7 min.

Table 4 (continued)

Alloy number	Temper grade ^{a)}	Tensile test					
		Diameter, thickness or width across flats mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
						A _{50 mm}	A
2014A	O	80 or under	—	240 max.	125 max.	10 min.	12 min.
	H111						
	H18	10 or under	—	295 min.	—	—	—
	T3	80 or under	—	380 min.	290 min.	6 min.	8 min.
	T351	80 or under	—	380 min.	290 min.	4 min.	6 min.
	T4	100 or under	—	380 min.	220 min.	10 min.	10 min.
	T451						
2017	T6	50 or under	—	440 min.	360 min.	8 min.	7 min.
	T651	100 or under	—	450 min.	380 min.	8 min.	7 min.
	O ^{e)}	3 or under	—	245 max.	—	—	—
		Over 3 up to and incl. 100	—	245 max.	—	16 min.	—
	H13	3 or over up to and incl. 10	—	205 or over up to and incl. 275	—	—	—
2017A	T4	3 or under	—	380 min.	—	—	—
	T42 ^{d)}	Over 3 up to and incl. 100	300 max.	380 min.	225 min.	12 min.	—
	O	80 or under	—	240 max.	125 max.	10 min.	12 min.
	H111						
	H18	10 or under	—	315 min.	—	—	—
	T3 ^{d)}	80 or under	—	400 min.	250 min.	8 min.	10 min.
2117	T351 ^{d)}	80 or under	—	400 min.	250 min.	6 min.	8 min.
	T4	50 or under	—	380 min.	220 min.	—	10 min.
	T451	Over 50 up to and incl. 100	—	390 min.	235 min.	—	10 min.
2219	H15	3 or over up to and incl. 10	—	195 or over up to and incl. 245	—	—	—
	H18	18 or under	—	260 min.	—	—	—
	T4	3 or over up to and incl. 10	—	265 min.	125 min.	18 min.	—
224	T851	10 or over up to and incl. 50	—	400 min.	275 min.	—	3 min.
		Over 50 up to and incl. 100	—	395 min.	270 min.	—	3 min.
2024	O ^{e)}	3 or under	—	245 max.	—	—	—
	H111	Over 3 up to and incl. 100	—	245 max.	—	16 min.	—
	H18	10 or under	—	320 min.	—	—	—
	T3	10 or under	—	425 min.	310 min.	8 min.	10 min.
		Over 10 up to and incl. 80	—	425 min.	290 min.	7 min.	9 min.