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(JAA/JSA)

**Aluminium and aluminium alloy extruded
tubes and cold-drawn tubes**

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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 4080:2006** is replaced with this Standard.

However, **JIS H 4080: 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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Aluminium and aluminium alloy extruded tubes and cold-drawn tubes

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 first edition of ISO 6362-6 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, and the first edition of ISO 6363-6 published in 2012 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 JA.

1 Scope

This Standard specifies the extruded and cold-drawn aluminium and aluminium alloy seamless tubes (hereafter referred to as “tubes”). This Standard applies exclusively to tubes of circular cross-section.

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 6362-6 : 2012 *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 6 : Round, square, rectangular and hexagonal tubes — 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 6363-6 : 2012 *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — Part 6 : Drawn round tubes — 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 *Methods for determination of iron in aluminium and aluminium alloys*

JIS H 1354 *Methods for determination of copper in aluminium and aluminium alloys*

JIS H 1355 *Methods for determination of manganese in aluminium and aluminium alloys*

JIS H 1356 *Method for determination of zinc in aluminium and aluminium alloys*

JIS H 1357 *Methods for determination of magnesium in aluminium and aluminium alloys*

JIS H 1358 *Methods for determination of chromium in aluminium and aluminium alloys*

JIS H 1359 *Methods for determination of titanium in aluminium and aluminium alloys*

JIS H 1360 *Methods for determination of nickel in aluminium and aluminium alloys*

JIS H 1361 *Methods for determination of tin in aluminium and aluminium alloys*

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>
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 tube

hollow wrought product with a hollow over the length and a uniform cross-section and wall thickness, supplied in straight or coiled figure

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 symbol of 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 tube	A1070TE	A1070TES	Alloy having low strength, but high thermal conductivity, electric conductivity, weldability and corrosion resistance. For materials of chemical apparatus, business machines, conductors, etc.
	Cold-drawn tube	A1070TD	A1070TDS	
1050	Extruded tube	A1050TE	A1050TES	
	Cold-drawn tube	A1050TD	A1050TDS	
1050A	Extruded tube	A1050ATE	A1050ATES	
	Cold-drawn tube	A1050ATD	A1050ATDS	
1100	Extruded tube	A1100TE	A1100TES	Alloy having comparatively low strength, but high weldability, corrosion resistance, surface treatability, and comparatively high thermal conductivity. For materials of chemical apparatus, furniture, parts of electric appliances, etc.
	Cold-drawn tube	A1100TD	A1100TDS	
1200	Extruded tube	A1200TE	A1200TES	
	Cold-drawn tube	A1200TD	A1200TDS	
2011	Extruded tube	A2011TE	A2011TES	Alloy having high cutting workability and strength, but low corrosion resistance. For optical appliance parts, screws, etc.
	Cold-drawn tube	A2011TD	A2011TDS	
2014	Extruded tube	A2014TE	A2014TES	Thermal-treated alloy having high strength. For ski poles, two-wheeled vehicle parts, aircraft parts, etc.
	Cold-drawn tube	A2014TD	A2014TDS	
2014A	Extruded tube	A2014ATE	A2014ATES	Alloy having slightly less strength than 2014.
	Cold-drawn tube	A2014ATD	A2014ATDS	
2017	Extruded tube	A2017TE	A2017TES	Heat-treated alloy having high strength and cutting machinability but low corrosion resistance. For general machine parts, forging materials, etc.
	Cold-drawn tube	A2017TD	A2017TDS	
2017A	Extruded tube	A2017ATE	A2017ATES	Alloy having higher strength than 2017.
	Cold-drawn tube	A2017ATD	A2017ATDS	
2024	Extruded tube	A2024TE	A2024TES	Alloy having higher strength than 2017, and high cutting workability. For aircraft parts, sporting goods, etc.
	Cold-drawn tube	A2024TD	A2024TDS	

Table 1 (continued)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
2030	Extruded tube	A2030TE	A2030TES	Alloy having high cutting workability and strength. For machine parts, etc.
	Cold-drawn tube	A2030TD	A2030TDS	
3102	Extruded tube	A3102TE	A3102TES	Alloy having equivalent strength to 1100, as well as high workability, thermal conductivity and corrosion resistance. For automotive heat exchangers, air-conditioner heat exchangers, etc.
3003	Extruded tube	A3003TE	A3003TES	Alloy having slightly higher strength than 1100, and high weldability and corrosion resistance. For materials of chemical apparatus, drums of copying machines, automotive heat exchangers, etc.
	Cold-drawn tube	A3003TD	A3003TDS	
3103	Extruded tube	A3103TE	A3103TES	
	Cold-drawn tube	A3103TD	A3103TDS	
3203	Extruded tube	A3203TE	A3203TES	
	Cold-drawn tube	A3203TD	A3203TDS	
3021	Extruded tube	A3021TE	A3021TES	Alloy having equivalent strength to 1100, as well as high workability, thermal conductivity and corrosion resistance. For automotive heat exchangers, air-conditioner heat exchangers, etc.
	Cold-drawn tube	A3021TD	A3021TDS	
5005	Extruded tube	A5005TE	A5005TES	Alloy having equivalent strength to 3003 and high workability, weldability and corrosion resistance. For building exterior and interior, vehicle interior, ships interior, etc.
	Cold-drawn tube	A5005TD	A5005TDS	
5050	Cold-drawn tube	A5050TD	A5050TDS	Alloy having high corrosion resistance and weldability. For architectural materials, materials for refrigerators, etc.
5251	Extruded tube	A5251TE	A5251TES	Alloy having intermediate strength between 5050 and 5052.
	Cold-drawn tube	A5251TD	A5251TDS	
5052	Extruded tube	A5052TE	A5052TES	Alloy having intermediate strength, high corrosion resistance and weldability. For vehicle interior, materials of ships, optical appliances, materials for other general machines, etc.
	Cold-drawn tube	A5052TD	A5052TDS	
5154	Extruded tube	A5154TE	A5154TES	Alloy having intermediate strength between 5052 and 5083, high corrosion resistance and weldability. For materials of chemical apparatus.
	Cold-drawn tube	A5154TD	A5154TDS	

Table 1 (continued)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
5454	Extruded tube	A5454TE	A5454TES	Alloy having higher strength than 5052, high corrosion resistance and weldability. For automobile wheels, etc.
5754	Extruded tube	A5754TE	A5754TES	Alloy having intermediate strength between 5052 and 5454.
	Cold-drawn tube	A5754TD	A5754TDS	
5056	Extruded tube	A5056TE	A5056TES	Alloy having high corrosion resistance, cutting workability and processability for anodic oxidation. For optical appliance parts, etc.
	Cold-drawn tube	A5056TD	A5056TDS	
5083	Extruded tube	A5083TE	A5083TES	Alloy having the highest strength among non-heat-treated alloys, and high corrosion resistance, weldability, cutting workability and cold workability. For materials of vehicles, ships, civil engineering, etc.
	Cold-drawn tube	A5083TD	A5083TDS	
5086	Extruded tube	A5086TE	A5086TES	Alloy for welding construction having higher strength than 5154 and high corrosion resistance. For materials of ships, pressure vessels, etc.
	Cold-drawn tube	A5086TD	A5086TDS	
6101	Extruded tube	A6101TE	A6101TES	Alloy for high-strength conductors with 55% IACS guaranteed. For pipe bus, etc.
6005A	Extruded tube	A6005ATE	A6005ATES	Alloy having intermediate strength between 6061 and 6063, and high extruding workability and quenching performance. High corrosion resistance and weldability. For materials of vehicles, etc.
6005C (6N01) ^{a)}	Extruded tube	A6005CTE (A6N01TE) ^{a)}	A6005CTES (A6N01TES) ^{a)}	
6060	Extruded tube	A6060TE	A6060TES	Alloy having slightly lower strength than 6063, but high corrosion resistance and surface treatability. For materials of building and civil engineering, parts of electric appliances, etc.
	Cold-drawn tube	A6060TD	A6060TDS	
6061	Extruded tube	A6061TE	A6061TES	Anti-corrosive alloy of heat treatment type, For bobbins, materials for civil engineering works, equipment for sports, leisure amusement, conductors, etc.
	Cold-drawn tube	A6061TD	A6061TDS	
6262	Extruded tube	A6262TE	A6262TES	Anti-corrosive free-cutting alloy having strength equivalent to that of 6061. For carburetor parts, brake parts, etc.
	Cold-drawn tube	A6262TD	A6262TDS	

Table 1 (concluded)

Alloy number	Product category	Class and symbol		Characteristics and typical application (informative)
		Ordinary class	Special class	
6063	Extruded tube	A6063TE	A6063TES	Alloy having slightly lower strength than 6061, but high corrosion resistance and surface treatability. For materials of construction and civil engineering works, parts of electric appliances, conductors, materials of vehicles, etc.
	Cold-drawn tube	A6063TD	A6063TDS	
6463	Extruded tube	A6463TE	A6463TES	Alloy having equivalent strength to 6063. For ornamental materials, etc.
6082	Extruded tube	A6082TE	A6082TES	Alloy having higher strength than 6061, high corrosion resistance and weldability. For materials of vehicles and ships, etc.
	Cold-drawn tube	A6082TD	A6082TDS	
7003	Extruded tube	A7003TE	A7003TES	Alloy for welding construction having slightly lower strength than 7204, but high extrudability. For materials of civil engineering, materials of welding construction, etc.
7204 (7N01) ^{a)}	Extruded tube	A7204TE (A7N01TE) ^{a)}	A7204TES (A7N01TES) ^{a)}	Alloy for welding construction having high strength and high corrosion resistance. For materials of welding construction, vehicles, etc.
7020	Extruded tube	A7020TE	A7020TES	Alloy having slightly lower strength than 7075, but high extrudability and machinability. For bicycle frames, general machine parts, etc.
	Cold-drawn tube	A7020TD	A7020TDS	
7050	Extruded tube	A7050TE	A7050TES	Alloy made by improving hardenability of 7075, having high stress corrosion cracking resistance. For aircraft parts, etc.
7075	Extruded tube	A7075TE	A7075TES	One of the strongest aluminium alloys having low corrosion resistance. For aircraft parts, etc.
	Cold-drawn tube	A7075TD	A7075TDS	
Note ^{a)} A number in the 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

The tubes shall be finished smoothly and uniformly, and free from defects detri-

mental to use, e.g. blister and flaw. The surface defects shall be removed to make it smooth.

5.2 Chemical composition

The chemical composition of tubes 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, Ni, Zr, 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.
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.	—	—	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.	Ni 0.10 max. Zr+Ti 0.20 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.	^{b)}	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 0.25 max.	—	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.	^{b)}	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
3102	0.40 max.	0.7 max.	0.10 max.	0.05 to 0.40	—	—	0.30 max.	—	0.10 max.	0.05 max.	0.15 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
3203	0.6 max.	0.7 max.	0.05 max.	1.0 to 1.5	—	—	0.10 max.	—	—	0.05 max.	0.15 max.	Remainder
3021	0.50 max.	0.7 max.	0.20 to 0.6	0.05 to 0.8	0.10 max.	0.10 max.	0.10 max.	—	0.10 max.	0.05 max.	0.15 max.	Remainder
5005	0.30 max.	0.7 max.	0.20 max.	0.20 max.	0.50 to 1.1	0.10 max.	0.25 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
5251	0.40 max.	0.50 max.	0.15 max.	0.10 to 0.50	1.7 to 2.4	0.15 max.	0.15 max.	—	0.15 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

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Table 2 (continued)

Unit: %

Alloy number	Si	Fe	Cu	Mn	Mg	Cr	Zn	V, Bi, Pb, Ni, Zr, 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.	—	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
6463	0.20 to 0.6	0.15 max.	0.20 max.	0.05 max.	0.45 to 0.9	—	0.05 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

Table 2 (concluded)

Unit: %

Alloy number	Si	Fe	Cu	Mn	Mg	Cr	Zn	V, Bi, Pb, Ni, Zr, etc.	Ti	Others ^{a)}		Al
										Individual	Total	
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
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	^{c)}	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)} Zr+Ti may be 0.20 % or under by agreement between the purchaser and the manufacturer. ^{c)} 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 tubes shall be tested according to 7.2, and shall conform to Tables 3 and 4.

The mechanical properties of other dimensions than wall thickness, outside diameter and sectional area given in Tables 3 and 4 shall be agreed between the purchaser and the manufacturer.

Table 3 Mechanical properties for extruded tubes

Alloy number	Temper grade ^{a)}	Tensile test						
		Wall thickness mm	Outside diameter mm	Sectional area cm ²	Tensile strength N/mm ²	Proof stress N/mm ²	Elongation ^{b)} %	
							A _{50 mm}	A
1070	H112	All	All	—	55 min.	15 min.	—	—
1050	H112	All	All	—	65 min.	20 min.	—	—
1050A	H112	All	All	—	60 min.	20 min.	23 min.	25 min.
	O H111	All	All	—	60 min. 95 max.	20 min.	23 min.	25 min.
1100 1200	H112	All	All	—	75 min.	20 min.	25 min.	—
2011	T6 ^{e)}	25 or under	All	—	310 min.	230 min.	4 min.	6 min.
2014	O ^{c)}	All	All	—	245 max.	125 max.	12 min.	—
	T4	All	All	—	345 min.	245 min.	12 min.	—
	T42 ^{d)}	All	All	—	345 min.	205 min.	12 min.	—
	T4510 T4511	20 or under	All	—	370 min.	230 min.	10 min.	11 min.
	T6	12 or under	All	—	410 min.	365 min.	7 min.	—
		Over 12 up to and incl. 19	All	—	440 min.	400 min.	7 min.	—
		Over 19	All	160 max.	470 min.	410 min.	7 min.	—
				Over 160 up to and incl. 200	470 min.	400 min.	6 min.	—
				Over 200 up to and incl. 250	450 min.	380 min.	6 min.	—
				Over 250 up to and incl. 300	430 min.	365 min.	6 min.	—
	T62 ^{d)}	19 or under	All	—	410 min.	365 min.	7 min.	—
		Over 19	All	160 max.	410 min.	365 min.	7 min.	—
				Over 160 up to and incl. 200	410 min.	365 min.	6 min.	—