



Designation: B209M – 10

## Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)<sup>1</sup>

This standard is issued under the fixed designation B209M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope\*

1.1 This specification covers aluminum and aluminum alloy flat sheet, coiled sheet, and plate in the alloys ([Note 1](#)) and tempers shown in [Tables 2 and 3](#), and in the following finishes:

1.1.1 Plate in all alloys and sheet in heat-treatable alloys: mill finish.

1.1.2 Sheet in nonheat-treatable alloys: mill finish, one-side bright mill finish, standard one-side bright finish, and standard two-sides bright finish.

1.2 Alloy and temper designations are in accordance with ANSI H35.1/H35.1(M). The equivalent Unified Numbering System (UNS) alloy designations are those of [Table 1](#) preceded by A9, for example, A91100 for aluminum 1100 in accordance with [Practice E527](#).

NOTE 1—Throughout this specification, use of the term *alloy* in the general sense includes aluminum as well as aluminum alloy.

NOTE 2—See Specification [B632/B632M](#) for Tread Plate.

NOTE 3—See Specification [B928/B928M](#) for 5xxx-H116 and 5xxx-H321 aluminum alloys containing 3 % or more nominal magnesium and intended for marine service and similar environments. Other alloy-temper products listed in Specification [B209](#), which do not require the additional corrosion testing/capability called out in Specification [B928/B928M](#), may be suitable for marine and similar environment applications.

1.3 This specification is the SI companion to Specification [B209](#).

1.4 For acceptance criteria for inclusion of new aluminum and aluminum alloys in this specification, see [Annex A2](#).

### 2. Referenced Documents

2.1 The following documents form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards*:<sup>2</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.03 on Aluminum Alloy Wrought Products.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- [B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate](#)
- [B548 Test Method for Ultrasonic Inspection of Aluminum-Alloy Plate for Pressure Vessels](#)
- [B557M Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products \(Metric\)](#)
- [B594 Practice for Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications](#)
- [B632/B632M Specification for Aluminum-Alloy Rolled Tread Plate](#)
- [B660 Practices for Packaging/Packing of Aluminum and Magnesium Products](#)
- [B666/B666M Practice for Identification Marking of Aluminum and Magnesium Products](#)
- [B881 Terminology Relating to Aluminum- and Magnesium-Alloy Products](#)
- [B918 Practice for Heat Treatment of Wrought Aluminum Alloys](#)
- [B928/B928M Specification for High Magnesium Aluminum-Alloy Sheet and Plate for Marine Service and Similar Environments](#)
- [B947 Practice for Hot Rolling Mill Solution Heat Treatment for Aluminum Alloy Plate](#)
- [E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
- [E34 Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys](#)
- [E290 Test Methods for Bend Testing of Material for Ductility](#)
- [E527 Practice for Numbering Metals and Alloys in the Unified Numbering System \(UNS\)](#)
- [E607 Test Method for Atomic Emission Spectrometric Analysis Aluminum Alloys by the Point to Plane Technique Nitrogen Atmosphere \(Withdrawn 2011\)<sup>3</sup>](#)
- [E716 Practices for Sampling and Sample Preparation of Aluminum and Aluminum Alloys for Determination of Chemical Composition by Spectrochemical Analysis](#)
- [E1004 Test Method for Determining Electrical Conductivity Using the Electromagnetic \(Eddy-Current\) Method](#)

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

\*A Summary of Changes section appears at the end of this standard

**TABLE 1 Chemical Composition Limits<sup>A,B,C</sup>**

NOTE 1—In case there is a discrepancy in the values listed in Table 1 with those listed in the “International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys” (known as the “Teal Sheets”), the composition limits registered with the Aluminum Association and published in the “Teal Sheets” should be considered the controlling composition. The “Teal Sheets” are available at <http://www.aluminum.org/tealsheets>.

Alloy	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Zinc	Titanium	Other Elements <sup>D</sup>		Aluminum
									Each	Total <sup>E</sup>	
1060	0.25	0.35	0.05	0.03	0.03	...	0.05	0.03	0.03 <sup>F</sup>	...	99.60 min <sup>G</sup>
1100	0.95 Si + Fe		0.05–0.20	0.05	...	...	0.10	...	0.05	0.15	99.00 min <sup>G</sup>
1230 <sup>H</sup>	0.70 Si + Fe		0.10	0.05	0.05	...	0.10	0.03	0.03 <sup>F</sup>	...	99.30 min <sup>G</sup>
2014	0.50–1.2	0.7	3.9–5.0	0.40–1.2	0.20–0.8	0.10	0.25	0.15	0.05	0.15	remainder
Alclad 2014	2014 clad with 6003 alloy										
2024	0.50	0.50	3.8–4.9	0.30–0.9	1.2–1.8	0.10	0.25	0.15	0.05	0.15	remainder
Alclad 2024	2024 clad with 1230 alloy										
2124	0.20	0.30	3.8–4.9	0.30–0.9	1.2–1.8	0.10	0.25	0.15	0.05	0.15	remainder
2219	0.20	0.30	5.8–6.8	0.20–0.40	0.02	...	0.10	0.02–0.10	0.05 <sup>I</sup>	0.15 <sup>I</sup>	remainder
Alclad 2219	2219 clad with 7072 alloy										
3003	0.6	0.7	0.05–0.20	1.0–1.5	...	...	0.10	...	0.05	0.15	remainder
Alclad 3003	3003 clad with 7072 alloy										
3004	0.30	0.7	0.25	1.0–1.5	0.8–1.3	...	0.25	...	0.05	0.15	remainder
Alclad 3004	3004 clad with 7072 alloy										
3005	0.6	0.7	0.30	1.0–1.5	0.20–0.6	0.10	0.25	0.10	0.05	0.15	remainder
3105	0.6	0.7	0.30	0.30–0.8	0.20–0.8	0.20	0.40	0.10	0.05	0.15	remainder
5005	0.30	0.7	0.20	0.20	0.50–1.1	0.10	0.25	...	0.05	0.15	remainder
5010	0.40	0.7	0.25	0.10–0.30	0.20–0.6	0.15	0.30	0.10	0.05	0.15	remainder
5050	0.40	0.7	0.20	0.10	1.1–1.8	0.10	0.25	...	0.05	0.15	remainder
5052	0.25	0.40	0.10	0.10	2.2–2.8	0.15–0.35	0.10	...	0.05	0.15	remainder
5059	0.45	0.50	0.25	0.6–1.2	5.0–6.0	0.25	0.40–0.9	0.20	0.05 <sup>J</sup>	0.15	remainder
5083	0.40	0.40	0.10	0.40–1.0	4.0–4.9	0.05–0.25	0.25	0.15	0.05	0.15	remainder
5086	0.40	0.50	0.10	0.20–0.7	3.5–4.5	0.05–0.25	0.25	0.15	0.05	0.15	remainder
5154	0.25	0.40	0.10	0.10	3.1–3.9	0.15–0.35	0.20	0.20	0.05	0.15	remainder
5252	0.08	0.10	0.10	0.10	2.2–2.8	...	0.05	...	0.03 <sup>F</sup>	0.10 <sup>F</sup>	remainder
5254	0.45 Si + Fe		0.05	0.01	3.1–3.9	0.15–0.35	0.20	0.05	0.05	0.15	remainder
5454	0.25	0.40	0.10	0.50–1.0	2.4–3.0	0.05–0.20	0.25	0.20	0.05	0.15	remainder
5456	0.25	0.40	0.10	0.50–1.0	4.7–5.5	0.05–0.20	0.25	0.20	0.05	0.15	remainder
5457	0.08	0.10	0.20	0.15–0.45	0.8–1.2	...	0.05	...	0.03 <sup>F</sup>	0.10 <sup>F</sup>	remainder
5657	0.08	0.10	0.10	0.03	0.6–1.0	...	0.05	...	0.02 <sup>K</sup>	0.05 <sup>K</sup>	remainder
5754	0.40	0.40	0.10	0.50 <sup>L</sup>	2.6–3.6	0.30 <sup>L</sup>	0.20	0.15	0.05	0.15	remainder
6003 <sup>H</sup>	0.35–1.0	0.6	0.10	0.8	0.8–1.5	0.35	0.20	0.10	0.05	0.15	remainder
6013	0.6–1.0	0.50	0.6–1.1	0.20–0.8	0.8–1.2	0.10	0.25	0.10	0.05	0.15	remainder
6061	0.40–0.8	0.7	0.15–0.40	0.15	0.8–1.2	0.04–0.35	0.25	0.15	0.05	0.15	remainder
Alclad 6061	6061 clad with 7072 alloy										
7072 <sup>H</sup>	0.7 Si + Fe		0.10	0.10	0.10	...	0.8–1.3	...	0.05	0.15	remainder
7075	0.40	0.50	1.2–2.0	0.30	2.1–2.9	0.18–0.28	5.1–6.1	0.20	0.05	0.15	remainder
Alclad 7075	7075 clad with 7072 alloy										

<sup>A</sup> Limits are in mass percent maximum unless shown as a range or stated otherwise.

<sup>B</sup> Analysis shall be made for the elements for which limits are shown in this table.

<sup>C</sup> For purposes of determining conformance to these limits, an observed value or a calculated value attained from analysis shall be rounded to the nearest unit in the last right hand place of figures used in expressing the specified limit, in accordance with the Rounding Method of Practice E29.

<sup>D</sup> *Others* includes listed elements for which no specific limit is shown as well as unlisted metallic elements. The producer may analyze samples for trace elements not specified in the specification. However, such analysis is not required and may not cover all metallic *Others* elements. Should any analysis by the producer or the purchaser establish that an *Others* element exceeds the limit of *Each* or that the aggregate of several *Others* elements exceeds the limit of *Total*, the material shall be considered non-conforming. The *Total* for *Other Elements* does not include elements shown in the footnotes with specific composition limits.

<sup>E</sup> *Other Elements*—Total shall be the sum of unspecified metallic elements 0.010 % or more, rounded to the second decimal before determining the sum.

<sup>F</sup> Vanadium 0.05 max. The total for other elements does not include vanadium.

<sup>G</sup> The aluminum content shall be calculated by subtracting from 100.00 % the sum of all metallic elements present in amounts of 0.010 % or more each, rounded to the second decimal before determining the sum.

<sup>H</sup> Composition of cladding alloy as applied during the course of manufacture. Samples from finished sheet or plate shall not be required to conform to these limits.

<sup>I</sup> Vanadium, 0.05–0.15, zirconium, 0.10–0.25.

<sup>J</sup> 0.05–0.25 Zr.

<sup>K</sup> Gallium 0.03 max, vanadium 0.05 max.

<sup>L</sup> 0.10-0.6 Mn + Cr.

**E1251 Test Method for Analysis of Aluminum and Aluminum Alloys by Spark Atomic Emission Spectrometry**  
**G34 Test Method for Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)**  
**G47 Test Method for Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products**

2.3 ISO Standards:<sup>4</sup>

**ISO209-1 Wrought Aluminum and Aluminum Alloys—Chemical Composition and Forms of Product**

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

**TABLE 2 Mechanical Property Limits for Nonheat-Treatable Alloys<sup>A,B</sup>**

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
1060	O	0.15	0.32	55	95	15	...	15	...	...
1060	O	0.32	0.63	55	95	15	...	18	...	...
1060	O	0.63	1.20	55	95	15	...	23	...	...
1060	O	1.20	6.30	55	95	15	...	25	...	...
1060	O	6.30	80.00	55	95	15	...	25	22	...
1060	H12 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	75	110	60	...	6	...	...
1060	H12 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	75	110	60	...	7	...	...
1060	H12 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	75	110	60	...	12	...	...
1060	H12 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	75	110	60	...	12	10	...
1060	H14 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	85	120	70	...	1	...	...
1060	H14 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	85	120	70	...	2	...	...
1060	H14 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	85	120	70	...	6	...	...
1060	H14 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	85	120	70	...	10	...	...
1060	H14 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	85	120	70	...	10	9	...
1060	H16 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	95	130	75	...	1	...	...
1060	H16 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	95	130	75	...	2	...	...
1060	H16 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	95	130	75	...	4	...	...
1060	H16 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	95	130	75	...	5	...	...
1060	H18 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	110	...	85	...	1	...	...
1060	H18 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	110	...	85	...	2	...	...
1060	H18 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	110	...	85	...	3	...	...
1060	H18 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	110	...	85	...	4	...	...
1060	H112	6.30	12.50	75	...	...	...	10	...	...
1060	H112	12.50	40.00	70	...	...	...	...	18	...
1060	H112	40.00	80.00	60	...	...	...	...	22	...
1060	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
1100	O	0.15	0.32	75	105	25	...	15	...	0
1100	O	0.32	0.63	75	105	25	...	17	...	0
1100	O	0.63	1.20	75	105	25	...	22	...	0
1100	O	1.20	6.30	75	105	25	...	30	...	0
1100	O	6.30	80.00	75	105	25	...	28	25	0
1100	H12 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	95	130	75	...	3	...	0
1100	H12 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	95	130	75	...	5	...	0
1100	H12 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	95	130	75	...	8	...	0
1100	H12 <sup>D</sup> or H22 <sup>D</sup>	6.30	12.50	95	130	75	...	10	9	0
1100	H12 <sup>D</sup> or H22 <sup>D</sup>	12.50	50.00	95	130	75	...	10	9	...
1100	H14 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	110	145	95	...	1	...	0
1100	H14 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	110	145	95	...	2	...	0
1100	H14 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	110	145	95	...	3	...	0
1100	H14 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	110	145	95	...	5	...	0
1100	H14 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	110	145	95	...	7	6	0
1100	H16 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	130	165	115	...	1	...	4
1100	H16 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	130	165	115	...	2	...	4
1100	H16 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	130	165	115	...	3	...	4
1100	H16 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	130	165	115	...	4	...	4
1100	H18 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	150	...	...	...	1	...	...
1100	H18 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	150	...	...	...	1	...	...
1100	H18 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	150	...	...	...	2	...	...
1100	H18 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	150	...	...	...	4	...	...
1100	H112	6.30	12.50	90	...	50	...	9	...	...
1100	H112	12.50	40.00	85	...	40	...	...	12	...
1100	H112	40.00	80.00	80	...	30	...	...	18	...
1100	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
3003	O	0.15	0.20	95	130	35	...	14	...	0
3003	O	0.20	0.32	95	130	35	...	18	...	0
3003	O	0.32	0.63	95	130	35	...	20	...	0
3003	O	0.63	1.20	95	130	35	...	23	...	0
3003	O	1.20	6.30	95	130	35	...	25	...	0
3003	O	6.30	80.00	95	130	35	...	23	21	...
3003	H12 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	120	160	85	...	3	...	0
3003	H12 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	120	160	85	...	4	...	0
3003	H12 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	120	160	85	...	6	...	0
3003	H12 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	120	160	85	...	9	8	...
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	140	180	115	...	1	...	0
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	140	180	115	...	2	...	0
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	140	180	115	...	3	...	0
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	1.20	3.20	140	180	115	...	5	...	0
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	3.20	6.30	140	180	115	...	5	...	2

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
3003	H14 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	140	180	115	...	8	7	...
3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	165	205	145	...	1	...	4
3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	165	205	145	...	2	...	4
3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	165	205	145	...	3	...	4
3003	H16 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	165	205	145	...	4	...	6
3003	H18 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	185	...	165	...	1	...	...
3003	H18 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	185	...	165	...	1	...	...
3003	H18 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	185	...	165	...	2	...	...
3003	H18 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	185	...	165	...	4	...	...
3003	H112	6.30	12.50	115	...	70	...	8	...	...
3003	H112	12.50	40.00	105	...	40	...	...	10	...
3003	H112	40.00	80.00	100	...	40	...	...	16	...
3003	F <sup>F</sup>	6.30	80.00	...	...	...	...	...	...	...
Alclad 3003	O	0.15	0.32	90	125	30	...	14	...	...
Alclad 3003	O	0.32	0.63	90	125	30	...	20	...	...
Alclad 3003	O	0.63	1.20	90	125	30	...	22	...	...
Alclad 3003	O	1.20	6.30	90	125	30	...	25	...	...
Alclad 3003	O	6.30	12.50	90	125	30	...	23	...	...
Alclad 3003	O	12.50	80.00	95 <sup>F</sup>	130 <sup>F</sup>	35 <sup>F</sup>	...	...	21	...
Alclad 3003	H12 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	115	155	80	...	4	...	...
Alclad 3003	H12 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	115	155	80	...	5	...	...
Alclad 3003	H12 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	115	155	80	...	6	...	...
Alclad 3003	H12 <sup>D</sup> or H22 <sup>D</sup>	6.30	12.50	115	155	80	...	9	...	...
Alclad 3003	H12 <sup>D</sup> or H22 <sup>D</sup>	12.50	50.00	120 <sup>F</sup>	160 <sup>F</sup>	85 <sup>F</sup>	...	...	8	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	135	175	110	...	1	...	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	135	175	110	...	2	...	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	135	175	110	...	3	...	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	135	175	110	...	5	...	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	6.30	12.50	135	175	110	...	8	...	...
Alclad 3003	H14 <sup>D</sup> or H24 <sup>D</sup>	12.50	25.00	140 <sup>F</sup>	180 <sup>F</sup>	115 <sup>F</sup>	...	...	7	...
Alclad 3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	160	200	140	...	1	...	...
Alclad 3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	160	200	140	...	2	...	...
Alclad 3003	H16 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	160	200	140	...	3	...	...
Alclad 3003	H16 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	160	200	140	...	4	...	...
Alclad 3003	H18	0.15	0.32	180	...	...	...	1	...	...
Alclad 3003	H18	0.32	0.63	180	...	...	...	1	...	...
Alclad 3003	H18	0.63	1.20	180	...	...	...	2	...	...
Alclad 3003	H18	1.20	3.20	180	...	...	...	4	...	...
Alclad 3003	H112	6.30	12.50	110	...	65	...	8	...	...
Alclad 3003	H112	12.50	40.00	105 <sup>F</sup>	...	40 <sup>F</sup>	...	...	10	...
Alclad 3003	H112	40.00	80.00	100 <sup>F</sup>	...	40 <sup>F</sup>	...	...	16	...
Alclad 3003	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
3004	O	0.15	0.32	150	200	60	...	9	...	0
3004	O	0.32	0.63	150	200	60	...	12	...	0
3004	O	0.63	1.20	150	200	60	...	15	...	0
3004	O	1.20	6.30	150	200	60	...	18	...	0
3004	O	6.30	80.00	150	200	60	...	16	14	...
3004	H32 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	190	240	145	...	1	...	0
3004	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	190	240	145	...	3	...	1
3004	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	3.20	190	240	145	...	5	...	2
3004	H32 <sup>D</sup> or H22 <sup>D</sup>	3.20	6.30	190	240	145	...	5	...	...
3004	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	190	240	145	...	6	5	...
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	220	265	170	...	1	...	2
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	220	265	170	...	2	...	2
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	220	265	170	...	3	...	3
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	3.20	220	265	170	...	4	...	4
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	3.20	6.30	220	265	170	...	4	...	...
3004	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	220	265	170	...	5	4	...
3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	240	285	190	...	1	...	6
3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	240	285	190	...	2	...	6
3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	240	285	190	...	3	...	6
3004	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	240	285	190	...	4	...	8
3004	H38 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	260	...	215	...	...	...	...
3004	H38 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	260	...	215	...	1	...	...
3004	H38 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	260	...	215	...	2	...	...
3004	H38 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	260	...	215	...	4	...	...
3004	H112	6.30	12.50	160	...	60	...	7	...	...

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
3004	H112	12.50	40.00	160	...	60	...	...	6	...
3004	H112	40.00	80.00	160	...	60	...	...	6	...
3004	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
Alclad 3004	O	0.15	0.32	145	195	55	...	9	...	...
Alclad 3004	O	0.32	0.63	145	195	55	...	12	...	...
Alclad 3004	O	0.63	1.20	145	195	55	...	15	...	...
Alclad 3004	O	1.20	6.30	145	195	55	...	18	...	...
Alclad 3004	O	6.30	12.50	145	195	55	...	16	...	...
Alclad 3004	O	12.50	80.00	150 <sup>F</sup>	200 <sup>F</sup>	60 <sup>F</sup>	...	...	14	...
Alclad 3004	H32 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	185	235	140	...	1	...	...
Alclad 3004	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	185	235	140	...	3	...	...
Alclad 3004	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	185	235	140	...	5	...	...
Alclad 3004	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	12.50	185	235	140	...	6	...	...
Alclad 3004	H32 <sup>D</sup> or H22 <sup>D</sup>	12.50	50.00	190 <sup>F</sup>	240 <sup>F</sup>	145 <sup>F</sup>	...	...	5	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	215	260	165	...	1	...	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	215	260	165	...	2	...	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	215	260	165	...	3	...	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	215	260	165	...	4	...	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	12.50	215	260	165	...	5	...	...
Alclad 3004	H34 <sup>D</sup> or H24 <sup>D</sup>	12.50	25.00	220 <sup>F</sup>	265 <sup>F</sup>	170 <sup>F</sup>	...	...	4	...
Alclad 3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	235	280	185	...	1	...	...
Alclad 3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	235	280	185	...	2	...	...
Alclad 3004	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	235	280	185	...	3	...	...
Alclad 3004	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	235	280	185	...	4	...	...
Alclad 3004	H38	0.15	0.32	255	...	...	...	...	...	...
Alclad 3004	H38	0.32	0.63	255	...	...	...	...	1	...
Alclad 3004	H38	0.63	1.20	255	...	...	...	...	2	...
Alclad 3004	H38	1.20	3.20	255	...	...	...	...	4	...
Alclad 3004	H112	6.30	12.50	155	...	55	...	...	7	...
Alclad 3004	H112	12.50	40.00	160 <sup>F</sup>	...	60 <sup>F</sup>	...	...	6	...
Alclad 3004	H112	40.00	80.00	160 <sup>F</sup>	...	60 <sup>F</sup>	...	...	6	...
Alclad 3004	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
3005	O	0.15	0.32	115	165	45	...	10	...	...
3005	O	0.32	0.63	115	165	45	...	14	...	...
3005	O	0.63	1.20	115	165	45	...	17	...	...
3005	O	1.20	6.30	115	165	45	...	20	...	...
3005	H12	0.40	0.63	140	190	115	...	1	...	...
3005	H12	0.63	1.20	140	190	115	...	2	...	...
3005	H12	1.20	6.30	140	190	115	...	3	...	...
3005	H14	0.20	0.32	165	215	145	...	1	...	...
3005	H14	0.32	0.63	165	215	145	...	1	...	...
3005	H14	0.63	1.20	165	215	145	...	2	...	...
3005	H14	1.20	6.30	165	215	145	...	3	...	...
3005	H16	0.15	0.32	190	240	170	...	1	...	...
3005	H16	0.32	0.63	190	240	170	...	1	...	...
3005	H16	0.63	1.20	190	240	170	...	2	...	...
3005	H16	1.20	4.00	190	240	170	...	2	...	...
3005	H18	0.15	0.32	220	...	200	...	1	...	...
3005	H18	0.32	0.63	220	...	200	...	1	...	...
3005	H18	0.63	1.20	220	...	200	...	2	...	...
3005	H18	1.20	3.20	220	...	200	...	2	...	...
3005	H19	0.15	0.32	235	...	...	...	...	...	...
3005	H19	0.32	0.63	235	...	...	...	...	1	...
3005	H19	0.63	1.20	235	...	...	...	...	1	...
3005	H19	1.20	1.60	235	...	...	...	...	1	...
3005	H25	0.15	0.32	180	235	150	...	1	...	...
3005	H25	0.32	0.63	180	235	150	...	2	...	...
3005	H25	0.63	1.20	180	235	150	...	3	...	...
3005	H25	1.20	2.00	180	235	150	...	4	...	...
3005	H27	0.15	0.32	205	260	175	...	1	...	...
3005	H27	0.32	0.63	205	260	175	...	2	...	...
3005	H27	0.63	1.20	205	260	175	...	3	...	...
3005	H27	1.20	2.00	205	260	175	...	4	...	...
3005	H28	0.15	0.32	215	...	185	...	1	...	...
3005	H28	0.32	0.63	215	...	185	...	2	...	...
3005	H28	0.63	1.20	215	...	185	...	3	...	...
3005	H28	1.20	2.00	215	...	185	...	4	...	...

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
3105	O	0.32	0.63	95	145	35	.....	16	...	...
3105	O	0.63	1.20	95	145	35	...	19	...	...
3105	O	1.20	2.00	95	145	35	...	20	...	...
3105	H12	0.40	0.63	130	180	105	...	1	...	...
3105	H12	0.63	1.20	130	180	105	...	2	...	...
3105	H12	1.20	2.00	130	180	105	...	3	...	...
3105	H14	0.32	0.63	150	200	125	...	1	.....	...
3105	H14	0.63	1.20	150	200	125	...	2	...	...
3105	H14	1.20	2.00	150	200	125	...	2	...	...
3105	H16	0.32	0.63	170	220	145	...	1	...	...
3105	H16	0.63	1.20	170	220	145	...	1	...	...
3105	H16	1.20	2.00	170	220	145	...	2	...	...
3105	H18	0.32	0.63	190	...	165	...	1	...	...
3105	H18	0.63	1.20	190	...	165	...	1	...	...
3105	H18	1.20	2.00	190	...	165	...	2	...	...
3105	H22	0.32	0.50	130	...	105	...	3	...	...
3105	H22	0.50	0.80	130	...	105	...	4	...	...
3105	H22	0.80	1.20	130	...	105	...	5	...	...
3105	H22	1.20	2.00	130	...	105	...	6	...	...
3105	H24	0.32	0.50	150	...	125	...	2	...	...
3105	H24	0.50	0.80	150	...	125	...	3	...	...
3105	H24	0.80	1.20	150	...	125	...	4	...	...
3105	H24	1.20	2.00	150	...	125	...	6	...	...
3105	H25	0.32	0.63	160	...	130	...	2	...	...
3105	H25	0.63	1.20	160	...	130	...	4	...	...
3105	H25	1.20	2.00	160	...	130	...	6	...	...
3105	H26	0.32	0.80	170	...	145	...	3	...	...
3105	H26	0.80	1.20	170	...	145	...	4	...	...
3105	H26	1.20	2.00	170	...	145	...	5	...	...
3105	H28	0.32	0.80	190	...	165	...	2	...	...
3105	H28	0.80	1.20	190	...	165	...	3	...	...
3105	H28	1.20	2.00	190	...	165	...	4	...	...
5005	O	0.15	0.32	105	145	35	...	12	...	...
5005	O	0.32	0.63	105	145	35	...	16	...	...
5005	O	0.63	1.20	105	145	35	...	19	...	...
5005	O	1.20	6.30	105	145	35	...	21	...	...
5005	O	6.30	80.00	105	145	35	...	22	...	...
5005	H12	0.40	0.63	125	165	95	...	2	...	...
5005	H12	0.63	1.20	125	165	95	...	4	...	...
5005	H12	1.20	6.30	125	165	95	...	6	...	...
5005	H12	6.30	50.00	125	165	95	...	9	8	...
5005	H14	0.20	0.32	145	185	115	...	1	...	...
5005	H14	0.32	0.63	145	185	115	...	1	...	...
5005	H14	0.63	1.20	145	185	115	...	2	...	...
5005	H14	1.20	6.30	145	185	115	...	3	...	...
5005	H14	6.30	25.00	145	185	115	...	8	7	...
5005	H16	0.15	0.32	165	205	135	...	1	...	...
5005	H16	0.32	0.63	165	205	135	...	1	...	...
5005	H16	0.63	1.20	165	205	135	...	2	...	...
5005	H16	1.20	4.00	165	205	135	...	3	...	...
5005	H18	0.15	0.32	185	...	...	...	1	...	...
5005	H18	0.32	0.63	185	...	...	...	1	...	...
5005	H18	0.63	1.20	185	...	...	...	2	...	...
5005	H18	1.20	3.20	185	...	...	...	3	...	...
5005	H32 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	120	160	85	...	3	...	...
5005	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	120	160	85	...	4	...	...
5005	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	120	160	85	...	7	...	...
5005	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	120	160	85	...	10	9	...
5005	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	140	180	105	...	2	...	...
5005	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	140	180	105	...	3	...	...
5005	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	140	180	105	...	4	...	...
5005	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	140	180	105	...	5	...	...
5005	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	140	180	105	...	8	7	...
5005	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	160	200	125	...	1	...	...
5005	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	160	200	125	...	2	...	...
5005	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	160	200	125	...	3	...	...
5005	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	160	200	125	...	4	...	...

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
5005	H38	0.15	0.32	180	...	...	...	1	...	...
5005	H38	0.32	0.63	180	...	...	...	2	...	...
5005	H38	0.63	1.20	180	...	...	...	3	...	...
5005	H38	1.20	3.20	180	...	...	...	4	...	...
5005	H112	6.30	12.50	115	...	...	...	8	...	...
5005	H112	12.50	40.00	105	...	...	...	...	10	...
5005	H112	40.00	80.00	100	...	...	...	...	16	...
5005	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5010	O	0.25	1.80	105	145	35	...	3	...	...
5010	H22	0.25	1.80	115	160	95	...	2	...	...
5010	H24	0.25	1.80	140	180	115	...	1	...	...
5010	H26	0.25	1.80	160	200	145	...	1	...	...
5010	H28	0.25	1.80	180	...	...	...	...	...	...
5050	O	0.15	0.32	125	165	40	...	15	...	0
5050	O	0.32	0.63	125	165	40	...	17	...	0
5050	O	0.63	1.20	125	165	40	...	19	...	0
5050	O	1.20	6.30	125	165	40	...	20	...	0
5050	O	6.30	80.00	125	165	40	...	20	18	2
5050	H32 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	150	195	110	...	4	...	1
5050	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	150	195	110	...	5	...	1
5050	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	150	195	110	...	6	...	2
5050	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	170	215	140	...	3	...	1
5050	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	170	215	140	...	3	...	1
5050	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	170	215	140	...	4	...	1
5050	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	170	215	140	...	5	...	3
5050	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	185	230	150	...	2	...	3
5050	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	185	230	150	...	2	...	3
5050	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	185	230	150	...	3	...	3
5050	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	185	230	150	...	4	...	4
5050	H38	0.15	0.32	200	...	...	...	1	...	...
5050	H38	0.32	0.63	200	...	...	...	2	...	...
5050	H38	0.63	1.20	200	...	...	...	3	...	...
5050	H38	1.20	3.20	200	...	...	...	4	...	...
5050	H112	6.30	12.50	140	...	55	...	12	...	...
5050	H112	12.50	40.00	140	...	55	...	...	10	...
5050	H112	40.00	80.00	140	...	55	...	...	10	...
5050	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5052	O	0.15	0.32	170	215	65	...	13	...	0
5052	O	0.32	0.63	170	215	65	...	15	...	0
5052	O	0.63	1.20	170	215	65	...	17	...	0
5052	O	1.20	6.30	170	215	65	...	19	...	0
5052	O	6.30	80.00	170	215	65	...	18	16	...
5052	H141	2.00	5.00	245	...	165	...	6	...	...
5052	H141	5.00	8.00	235	...	165	...	8	...	...
5052	H32 <sup>D</sup> or H22 <sup>D</sup>	0.40	0.63	215	265	160	...	4	...	0
5052	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	215	265	160	...	5	...	1
5052	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	3.20	215	265	160	...	7	...	2
5052	H32 <sup>D</sup> or H22 <sup>D</sup>	3.20	6.30	215	265	160	...	7	...	3
5052	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	215	265	160	...	11	10	...
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	235	285	180	...	3	...	1
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	235	285	180	...	3	...	1
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	235	285	180	...	4	...	2
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	3.20	235	285	180	...	6	...	3
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	3.20	6.30	235	285	180	...	6	...	4
5052	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	235	285	180	...	10	9	...
5052	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	255	305	200	...	2	...	4
5052	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	255	305	200	...	3	...	4
5052	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	255	305	200	...	4	...	5
5052	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	255	305	200	...	4	...	5
5052	H38 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	270	...	220	...	2	...	...
5052	H38 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	270	...	220	...	3	...	...
5052	H38 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	270	...	220	...	4	...	...
5052	H38 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	270	...	220	...	4	...	...
5052	H112	6.30	12.50	190	...	110	...	7	...	...
5052	H112	12.50	40.00	170	...	65	...	...	10	...

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
5052	H112	40.00	80.00	170	...	65	...	...	14	...
5052	H322	0.50	1.20	215	240	145	...	5	...	...
5052	H322	1.20	2.90	215	240	145	...	7	...	...
5052	H322	2.90	3.20	215	240	145	...	9	...	...
5052	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5059	O	1.99	6.30	330	...	160	...	24	...	...
5059	O	6.30	12.50	330	...	160	...	24	...	...
5059	O	12.50	20.00	330	...	160	...	...	24	...
5059	O	20.00	40.00	330	...	160	...	...	20	...
5059	O	40.00	180.00	300	...	145	...	...	17	...
5059	H111	1.99	6.30	330	...	160	...	24	...	...
5059	H111	6.30	12.50	330	...	160	...	24	...	...
5059	H111	12.50	20.00	330	...	160	...	...	24	...
5059	H111	20.00	40.00	330	...	160	...	...	20	...
5059	H111	40.00	180.00	300	...	145	...	...	17	...
5059	F <sup>E</sup>	6.30	200.00	...	...	...	...	...	...	...
5083	O	1.25	6.30	275	350	125	200	16	...	...
5083	O	6.30	80.00	270	345	115	200	16	14	...
5083	O	80.00	120.00	260	...	110	...	...	12	...
5083	O	120.00	160.00	255	...	105	...	...	12	...
5083	O	160.00	200.00	250	...	100	...	...	10	...
5083	H112	6.30	12.50	275	...	125	...	12	...	...
5083	H112	12.50	40.00	275	...	125	...	...	10	...
5083	H112	40.00	80.00	270	...	115	...	...	10	...
5083	H32	3.20	5.00	305	385	215	...	10	...	...
5083	H32	5.00	12.50	305	385	215	...	12	...	...
5083	H32	12.50	40.00	305	385	215	...	...	10	...
5083	H32	40.00	80.00	285	385	200	...	...	10	...
5083	F <sup>E</sup>	6.30	200.00	...	...	...	...	...	...	...
5086	O	0.50	0.63	240	305	95	...	15	...	...
5086	O	0.63	1.20	240	305	95	...	16	...	...
5086	O	1.20	6.30	240	305	95	...	18	...	...
5086	O	6.30	50.00	240	305	95	...	16	14	...
5086	H32 <sup>D</sup> or H22 <sup>D</sup>	0.50	0.63	275	325	195	...	6	...	...
5086	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	275	325	195	...	6	...	...
5086	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	275	325	195	...	8	...	...
5086	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	275	325	195	...	12	10	...
5086	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	300	350	235	...	4	...	...
5086	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	300	350	235	...	4	...	...
5086	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	300	350	235	...	5	...	...
5086	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	300	350	235	...	6	...	...
5086	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	300	350	235	...	10	9	...
5086	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	325	375	260	...	3	...	...
5086	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	325	375	260	...	3	...	...
5086	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	325	375	260	...	4	...	...
5086	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	325	375	260	...	6	...	...
5086	H38 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.63	345	...	285	...	3	...	...
5086	H112	4.00	12.50	250	...	125	...	8	...	...
5086	H112	12.50	40.00	240	...	105	...	...	9	...
5086	H112	40.00	80.00	235	...	95	...	...	12	...
5086	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5154	O	0.50	0.63	205	285	75	...	12	...	...
5154	O	0.63	1.20	205	285	75	...	13	...	...
5154	O	1.20	6.30	205	285	75	...	16	...	...
5154	O	6.30	80.00	205	285	75	...	18	16	...
5154	H32 <sup>D</sup> or H22 <sup>D</sup>	0.50	0.63	250	300	180	...	5	...	...
5154	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	250	300	180	...	6	...	...
5154	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	250	300	180	...	8	...	...
5154	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	250	300	180	...	12	10	...
5154	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	270	320	200	...	4	...	...
5154	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	270	320	200	...	4	...	...
5154	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	270	320	200	...	5	...	...
5154	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	270	320	200	...	6	...	...



**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
5154	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	270	320	200	...	10	9	...
5154	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	290	340	220	...	3	...	...
5154	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	290	340	220	...	3	...	...
5154	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	290	340	220	...	4	...	...
5154	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	290	340	220	...	4	...	...
5154	H38 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	310	...	240	...	3	...	...
5154	H38 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	310	...	240	...	3	...	...
5154	H38 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	310	...	240	...	3	...	...
5154	H38 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	310	...	240	...	4	...	...
5154	H112	6.30	12.50	220	...	125	...	8	...	...
5154	H112	12.50	40.00	210	...	90	...	...	9	...
5154	H112	40.00	80.00	205	...	75	...	...	13	...
5154	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5252	H24	0.63	2.50	205	260	...	...	10	...	...
5252	H25	0.63	2.50	215	270	...	...	9	...	...
5252	H28	0.63	2.50	260	...	...	...	3	...	...
5254	O	0.50	0.63	205	285	75	...	12	...	...
5254	O	0.63	1.20	205	285	75	...	13	...	...
5254	O	1.20	6.30	205	285	75	...	16	...	...
5254	O	6.30	80.00	205	285	75	...	18	16	...
5254	H32 <sup>D</sup> or H22 <sup>D</sup>	0.50	0.63	250	300	180	...	5	...	...
5254	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	250	300	180	...	6	...	...
5254	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	250	300	180	...	8	...	...
5254	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	250	300	180	...	12	10	...
5254	H34 <sup>D</sup> or H24 <sup>D</sup>	0.20	0.32	270	320	200	...	4	...	...
5254	H34 <sup>D</sup> or H24 <sup>D</sup>	0.32	0.63	270	320	200	...	4	...	...
5254	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	270	320	200	...	5	...	...
5254	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	270	320	200	...	6	...	...
5254	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	270	320	200	...	10	9	...
5254	H36 <sup>D</sup> or H26 <sup>D</sup>	0.15	0.32	290	340	220	...	3	...	...
5254	H36 <sup>D</sup> or H26 <sup>D</sup>	0.32	0.63	290	340	220	...	3	...	...
5254	H36 <sup>D</sup> or H26 <sup>D</sup>	0.63	1.20	290	340	220	...	4	...	...
5254	H36 <sup>D</sup> or H26 <sup>D</sup>	1.20	4.00	290	340	220	...	4	...	...
5254	H38 <sup>D</sup> or H28 <sup>D</sup>	0.15	0.32	310	...	240	...	3	...	...
5254	H38 <sup>D</sup> or H28 <sup>D</sup>	0.32	0.63	310	...	240	...	3	...	...
5254	H38 <sup>D</sup> or H28 <sup>D</sup>	0.63	1.20	310	...	240	...	3	...	...
5254	H38 <sup>D</sup> or H28 <sup>D</sup>	1.20	3.20	310	...	240	...	4	...	...
5254	H112	6.30	12.50	220	...	125	...	8	...	...
5254	H112	12.50	40.00	210	...	90	...	...	9	...
5254	H112	40.00	80.00	205	...	75	...	...	13	...
5254	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5454	O	0.50	0.63	215	285	85	...	12	...	...
5454	O	0.63	1.20	215	285	85	...	13	...	...
5454	O	1.20	6.30	215	285	85	...	16	...	...
5454	O	6.30	80.00	215	285	85	...	18	16	...
5454	H32 <sup>D</sup> or H22 <sup>D</sup>	0.50	0.63	250	305	180	...	5	...	...
5454	H32 <sup>D</sup> or H22 <sup>D</sup>	0.63	1.20	250	305	180	...	6	...	...
5454	H32 <sup>D</sup> or H22 <sup>D</sup>	1.20	6.30	250	305	180	...	8	...	...
5454	H32 <sup>D</sup> or H22 <sup>D</sup>	6.30	50.00	250	305	180	...	12	10	...
5454	H34 <sup>D</sup> or H24 <sup>D</sup>	0.50	0.63	270	325	200	...	4	...	...
5454	H34 <sup>D</sup> or H24 <sup>D</sup>	0.63	1.20	270	325	200	...	5	...	...
5454	H34 <sup>D</sup> or H24 <sup>D</sup>	1.20	6.30	270	325	200	...	6	...	...
5454	H34 <sup>D</sup> or H24 <sup>D</sup>	6.30	25.00	270	325	200	...	10	9	...
5454	H112	6.30	12.50	220	...	125	...	8	...	...
5454	H112	12.50	40.00	215	...	85	...	...	9	...
5454	H112	40.00	80.00	215	...	85	...	...	13	...
5454	F <sup>E</sup>	6.30	80.00	...	...	...	...	...	...	...
5754	O	0.75	1.40	200	270	80	...	17	...	...
5754	O	1.40	2.20	200	270	80	...	18	...	...
5754	O	2.20	3.50	200	270	80	...	19	...	...
5456	O	1.20	6.30	290	365	130	205	16	...	...

**TABLE 2** *Continued*

Alloy	Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, % <sup>C</sup>		Bend Diameter Factor, <i>N</i>
		over	through	min	max	min	max	in 50 mm	in 5x Diameter	
5456	O	6.30	80.00	285	360	125	205	16	14	...
5456	O	80.00	120.00	275	...	120	...	...	12	...
5456	O	120.00	160.00	270	...	115	...	...	12	...
5456	O	160.00	200.00	265	...	105	...	...	10	...
5456	H112	6.30	12.50	290	...	130	...	12	...	...
5456	H112	12.50	40.00	290	...	130	...	...	10	...
5456	H112	40.00	80.00	285	...	125	...	...	10	...
5456	H32	4.00	12.50	315	405	230	...	12	...	...
5456	H32	12.50	40.00	305	385	215	...	...	10	...
5456	H32	40.00	80.00	285	370	200	...	...	10	...
5456	F <sup>E</sup>	6.30	200.00	...	...	...	...	...	...	...
5457	O	0.63	2.50	110	150	...	...	20	...	...
5657	H241 <sup>G</sup>	0.63	2.50	125	180	...	...	13	...	...
5657	H25	0.63	2.50	140	195	...	...	8	...	...
5657	H26	0.63	2.50	150	205	...	...	7	...	...
5657	H28	0.63	2.50	170	...	...	...	5	...	...

<sup>A</sup> To determine conformance to this specification, each value for tensile strength and for yield strength shall be rounded to the nearest 1 MPa and each value for elongation to the nearest 0.5 %, both in accordance with the Rounding Method of Practice E29.

<sup>B</sup> The basis for establishment of mechanical property limits is shown in Annex A1.

<sup>C</sup> Elongations in 50 mm apply for thicknesses up through 12.50 mm and in 5x diameter for thicknesses over 12.50 mm.

<sup>D</sup> Materials in either of these tempers, (H32 or H22), (H34 or H24), (H36 or H26), (H38 or H28), (H12 or H22), (H14 or H24), (H16 or H26), (H18 or H28), may be supplied at the option of the supplier, unless one is specifically excluded by the contract or purchase order. When ordered as H2X tempers, the maximum tensile strength and minimum yield strength do not apply. When H2X tempers are supplied instead of ordered H1X or H3X tempers, the supplied H2X temper material shall meet the respective H1X or H3X temper tensile property limits.

<sup>E</sup> Tests of F temper plate for tensile properties are not required.

<sup>F</sup> The tension test specimen from plate over 12.50 mm in thickness is machined from the core and does not include the cladding alloy.

<sup>G</sup> This material is subject to some recrystallization and an attendant loss of brightness.

### ISO2107 Aluminum, Magnesium and their Alloys-Temper Designation

### ISO6361-2 Wrought Aluminum and Aluminum Alloys, Sheets, Strips, and Plates

#### 2.4 ANSI Standards:<sup>5</sup>

#### H35.1/H35.1(M) Alloy and Temper Designation Systems for Aluminum

#### H35.2M Dimensional Tolerances for Aluminum Mill Products

#### 2.5 AMS Specification:<sup>6</sup>

#### AMS 2772 Heat Treatment of Aluminum Alloy Raw Materials

#### 2.6 Other Standards:<sup>7</sup>

#### CEN EN 14242 Aluminum and aluminum alloys. Chemical analysis. Inductively coupled plasma optical emission spectral analysis

## 3. Terminology

### 3.1 Definitions:

3.2 Refer to Terminology B881 for definitions of product terms used in this specification.

<sup>5</sup> Available from Aluminum Association, Inc., 1525 Wilson Blvd., Suite 600, Arlington, VA 22209, <http://www.aluminum.org>.

<sup>6</sup> Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.

<sup>7</sup> Available from European Committee for Standardization (CEN), 36 rue de Stassart, B-1050, Brussels, Belgium, <http://www.cen.eu/eseach>.

### 3.3 Definitions of Terms Specific to This Standard:

3.3.1 *capable of*—The term *capable of* as used in this specification means that the test need not be performed by the producer of the material. However, should testing by the purchaser establish that the material does not meet these requirements, the material shall be subject to rejection.

## 4. Ordering Information

4.1 Orders for material to this specification shall include the following information:

4.1.1 This specification designation (which includes the number, the year, and the revision letter, if applicable),

4.1.2 Quantity in pieces or kilograms,

4.1.3 Alloy (7.1),

4.1.4 Temper (9.1),

4.1.5 Finish for sheet in nonheat-treatable alloys (Section 1),

4.1.6 For sheet, whether flat or coiled,

4.1.7 Dimensions (thickness, width, and length or coil size),

4.2 Additionally, orders for material to this specification shall include the following information when required by the purchaser:

4.2.1 Whether a supply of one of the pairs of tempers where shown in Table 2, (H14 or H24) or (H34 or H24), is specifically excluded (Table 2, Footnote D),

4.2.2 Whether bend tests are required (12.1),

4.2.3 Whether heat treatment in accordance with Practice B918 is required (8.2),