



Designation: B918/B918M – 20a

## Standard Practice for Heat Treatment of Wrought Aluminum Alloys<sup>1</sup>

This standard is issued under the fixed designation B918/B918M; 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 reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

### 1. Scope\*

1.1 This practice is intended for use in the heat treatment of wrought aluminum alloys for general purpose applications.

1.1.1 The heat treatment of wrought aluminum alloys used in specific aerospace applications is covered in AMS2772.

1.1.2 Heat treatment of aluminum alloy castings for general purpose applications is covered in Practice B917/B917M.

1.2 Times and temperatures appearing in the heat-treatment tables are typical for various forms, sizes, and manufacturing methods and may not provide the optimum heat treatment for a specific item.

1.3 Some alloys in the 6xxx series may achieve the T4 temper by quenching from within the solution temperature range during or immediately following a hot working process, such as upon emerging from an extrusion die. Such alternatives to furnace heating and immersion quenching are indicated in Table 1, by footnote L, for heat treatment of wrought aluminum alloys. However, this practice does not cover the requirements for a controlled extrusion press or hot rolling mill solution heat treatment; it only covers the requirements of artificial aging, annealing and associated pyrometry of those processes for products solution heat treated in accordance with Practices B807/B807M and B947. (Refer to Practice B807/B807M for extrusion press solution heat treatment of aluminum alloys and to Practice B947 for hot rolling mill solution heat treatment of aluminum alloys and associated pyrometry.)

1.4 *Units*—The values stated in either Metric or US Customary units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appro-*

<sup>1</sup> This practice 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.

Current edition approved Dec. 1, 2020. Published January 2021. Originally approved in 2001. Last previous edition approved in 2020 as B918/B918M – 20. DOI: 10.1520/B0918\_B0918M-20A.

*priate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 The following documents, of the issue in effect on the date of material purchase, form a part of this practice to the extent referenced herein:

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

B557 Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

B557M Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)

B807/B807M Practice for Extrusion Press Solution Heat Treatment for Aluminum Alloys

B881 Terminology Relating to Aluminum- and Magnesium-Alloy Products

B917/B917M Practice for Heat Treatment of Aluminum-Alloy Castings From All Processes

B947 Practice for Hot Rolling Mill Solution Heat Treatment for Aluminum Alloy Plate

G69 Test Method for Measurement of Corrosion Potentials of Aluminum Alloys

2.3 *ANSI Standard:*<sup>3</sup>

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

2.4 *SAE Standard:*<sup>4</sup>

AMS2750 Pyrometry

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

<sup>3</sup> Available from Aluminum Association, 1400 Crystal Dr., Suite 430, Arlington, VA 22202, http://www.aluminum.org.

<sup>4</sup> Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, http://www.sae.org.

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

**TABLE 1 Recommended Heat Treatment for Wrought Aluminum Alloys<sup>A,W</sup>**

Product	Solution Heat Treatment			Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>	Temper	Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>2011 Alloy<sup>A</sup></b>						
Cold-finished wire, rod, and bar	945–995 [507–535]	110 [43] max	T3 T4 T451	320 [160] ... ...	14 ... ...	T8 ... ...
Drawn tube and pipe	975 [524]	110 [43] max	T3 T4511	320 [160] ...	14 ...	T8 ...
<b>2014 Alloy<sup>A</sup></b>						
Flat sheet, bare or Alclad	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T3 T42	... 320 [160] <sup>U</sup>	... 18–20 <sup>U</sup>	... T62 <sup>U</sup>
Coiled sheet, bare or Alclad	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T4 T42	320 [160] 320 [160] <sup>U</sup>	18 18–20 <sup>U</sup>	T6 T62 <sup>U</sup>
Plate, bare or Alclad	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T451 T42	320 [160] 350 [177] <sup>U</sup>	18 8–9 <sup>U</sup>	T651 T62 <sup>U</sup>
Cold-finished wire, rod, and bar	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T4 T451 T42	350 [177] 350 [177] 350 [177] <sup>U</sup>	9 9 8–9 <sup>U</sup>	T6 T651 T62 <sup>U</sup>
Extruded wire, rod, bar, profiles, tube, and pipe	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T4 T4510 T4511 T42	350 [177] 350 [177] 350 [177] 350 [177] <sup>U</sup>	9 9 9 8–9 <sup>U</sup>	T6 T6510 T6511 T62 <sup>U</sup>
Drawn tube and pipe	925–945 [496–507] 935 [502] <sup>U</sup>	110 [43] max	T4 T42	350 [177] 350 [177] <sup>U</sup>	9 8–9 <sup>U</sup>	T6 T62 <sup>U</sup>
Die forgings	925–945 [496–507]	140–180 [60–82]	T4	350 [177]	9	T6
Hand forgings and rolled rings	925–945 [496–507] 935 [502] <sup>U</sup>	140–180 [60–82]	T4 T452	350 [177] 350 [177] <sup>U</sup>	9 10 <sup>U</sup>	T6 T652 <sup>U</sup>
<b>2017 Alloy<sup>A</sup></b>						
Cold-finished wire, rod, and bar	925–950 [496–510]	110 [43] max	T4 T451 T42	... ... ...	... ... ...	... ... ...
<b>2018 Alloy<sup>A</sup></b>						
Die forgings	940–970 [504–521]	Boiling Water <sup>F</sup>	T4	340 [171]	10	T61
<b>2024 Alloy<sup>A</sup></b>						
Flat sheet, bare or Alclad	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T3 T361 T42 T42	375 [191] 375 [191] <sup>U</sup> 375 [191] <sup>U</sup> 375 [191] <sup>U</sup>	12 8 <sup>U</sup> 9–10 <sup>U</sup> 16–18 <sup>U</sup>	T81 T861 <sup>U</sup> T62 <sup>U</sup> T72 <sup>U</sup>
Coiled sheet, bare or Alclad	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T4 T42 T42	375 [191] 375 [191] <sup>U</sup> 375 [191] <sup>U</sup>	9–10 9 <sup>U</sup> 16–18 <sup>U</sup>	T6 T62 <sup>U</sup> T72 <sup>U</sup>
Plate, bare or Alclad	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T351 T361 T42	375 [191] 375 [191] <sup>U</sup> 375 [191] <sup>U</sup>	12 8 <sup>U</sup> 9–10 <sup>U</sup>	T851 T861 <sup>U</sup> T62 <sup>U</sup>
Cold-finished wire, rod, and bar	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T351 T36 T4 T42	375 [191] ... 375 [191] 375 [191] <sup>U</sup>	12 ... 12 12–13 <sup>U</sup>	T851 ... T6 T62 <sup>U</sup>
Extruded wire, rod, bar, profiles, tube, and pipe	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T3 T3510 T3511 T42	375 [191] 375 [191] 375 [191] 375 [191] <sup>U</sup>	12 12 12 12–13 <sup>U</sup>	T81 T8510 T8511 T62 <sup>U</sup>
Drawn tube and pipe	910–930 [488–499] 920 [493] <sup>U</sup>	110 [43] max	T3 T42	375 [191] 375 [191] <sup>U</sup>	12 9–10 <sup>U</sup>	T8 T62 <sup>U</sup>
<b>2025 Alloy<sup>A</sup></b>						
Die forgings	950–970 [510–521]	140–160 [60–71]	T4	350 [177]	9	T6
<b>2117 Alloy<sup>A</sup></b>						
Cold-finished wire or rod	925–950 [496–510]	110 [43] max	T4	...	...	...

**B918/B918M – 20a****TABLE 1** *Continued*

Product	Solution Heat Treatment			Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>	Temper	Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>2124 Alloy<sup>A</sup></b>						
Plate	910–930 [488–499]	110 [43] max	T3	375 [191]	12	T8
			T31	370 [188]	12	T8151
	920 [493] <sup>U</sup>		T4	375 [191]	9	T6
			T3	375 [191] <sup>U</sup>	12 <sup>U</sup>	T82 <sup>U</sup>
			T42	375 [191] <sup>U</sup>	10 <sup>U</sup>	T62 <sup>U</sup>
<b>2218 Alloy<sup>A</sup></b>						
Die forgings	940–960 [504–516]	Boiling Water <sup>T</sup>	T4	340 [171]	10	T61
			T4	460 [238]	6	T7
	950 [510] <sup>U</sup>		T4	340 [171] <sup>U</sup>	10 <sup>U</sup>	T62 <sup>U</sup>
			T4	460 [238] <sup>U</sup>	6 <sup>U</sup>	T72 <sup>U</sup>
<b>2219 Alloy<sup>A</sup></b>						
Flat sheet, bare or Alclad	985–1005 [529–541]	110 [43] max	T31	350 [177]	18	T81
			T37	325 [163]	24	T87
	995 [535] <sup>U</sup>		T42	375 [191] <sup>U</sup>	17–19 <sup>U</sup>	T62 <sup>U</sup>
Plate	985–1005 [529–541]	110 [43] max	T37	325 [163]	17–19	T87
			T351	350 [177]	18	T851
	995 [535] <sup>U</sup>		T42	375 [191] <sup>U</sup>	35–37 <sup>U</sup>	T62 <sup>U</sup>
Cold-finished wire, rod, and bar	985–1005 [529–541]	110 [43] max	T4	375 [191]	18	T6
			T351	375 [191]	18	T851
Extruded wire, rod, bar, profiles, tube, and pipe	985–1005 [529–541]	110 [43] max	T31	375 [191]	18	T81
			T3510	375 [191]	18	T8510
	995 [535] <sup>U</sup>		T3511	375 [191]	18	T8511
			T42	375 [191] <sup>U</sup>	35–37 <sup>U</sup>	T62 <sup>U</sup>
			T3	375 [191] <sup>U</sup>	17–19 <sup>U</sup>	T82 <sup>U</sup>
Die forgings and rolled rings	985–1005 [529–541]	110 [43] max	T4	375 [191]	26	T6
			T42	375 [191] <sup>U</sup>	25–27 <sup>U</sup>	T62 <sup>U</sup>
	995 [535] <sup>U</sup>		T352	350 [177] <sup>U</sup>	17–19 <sup>U</sup>	T82 <sup>U</sup>
Hand forgings	985–1005 [529–541]	110 [43] max	T4	375 [191]	26	T6
			T42	375 [191] <sup>U</sup>	25–27 <sup>U</sup>	T62 <sup>U</sup>
	995 [335] <sup>U</sup>		T352	350 [177] <sup>U</sup>	17–19 <sup>U</sup>	T852 <sup>U</sup>
<b>2618 Alloy<sup>A</sup></b>						
Die, hand, and rolled ring forgings	975–995 [524–535]	Boiling Water <sup>T</sup>	T4	390 [199]	20	T61
	985 [529] <sup>U</sup>		T42	390 [199] <sup>U</sup>	19–21 <sup>U</sup>	T62 <sup>U</sup>
<b>4032 Alloy</b>						
Die forgings	940–970 [504–521]	140–180 [60–82]	T4	340 [171]	10	T6
	955 [513] <sup>U</sup>		T42	340 [171] <sup>U</sup>	9–11 <sup>U</sup>	T62 <sup>U</sup>
<b>6005 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	350 [177]	8	T5
<b>6005A Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	350 [177]	8	T5
			T4	350 [177]	8	T61
<b>6013 Alloy<sup>A</sup></b>						
Sheet, bare	1045–1065 [563–574]	110 [43] max	T4	375 [191]	4	T6
	1000 [538] <sup>U</sup>			or 345 [174]	8	
			T42	375 [191] <sup>U</sup>	4–5 <sup>U</sup>	T62 <sup>U</sup>
Plate, bare	1020–1050 [549–566]	110 [43] max	...	345 [174]	8–16	T651
Cold-finished wire, rod, and bar	1040–1060 [560–571]	110 [43] max	...	375 [191]	4	T651
			...	375 [191]	4	T8
<b>6020 Alloy<sup>A</sup></b>						
Rod, bar & extrusion	1010–1050 [543–566]	110 [43] max	W <sup>I</sup>	355 [179]	8–10	T6511
<b>6041 Alloy</b>						
Extruded rod, bar, and profiles	1010–1050 [543–566]	110 [43] max	T4	350 [176]	8	T6
			T4511	350 [176]	8	T6511
<b>6042 Alloy</b>						
Extruded rod, bar, and profiles	1010–1050 [543–566]	110 [43] max	T1	350 [176]	8	T5
			T1	350 [176]	8	T5511

**B918/B918M – 20a****TABLE 1** *Continued*

Product	Solution Heat Treatment			Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>	Temper	Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>6053 Alloy<sup>A</sup></b>						
Cold-finished wire and rod	960–980 [516–527]	110 [43] max	T4	355 [179]	8	T61
Die forgings	960–980 [516–527] 970 [521] <sup>U</sup>	110 [43] max	T4 T42	340 [171] 340 [171] <sup>U</sup>	10 10 <sup>U</sup>	T6 T62 <sup>U</sup>
<b>6061 Alloy<sup>A</sup></b>						
Sheet, bare or Alclad	960–1075 [516–579] <sup>F</sup> 985 [529] <sup>U</sup>	110 [43] max	T4 T42 T42 <sup>P</sup>	320 [160] 350 [177] <sup>U</sup> 320 [160] <sup>P,U</sup>	18 8–10 <sup>U</sup> 17–19 <sup>P,U</sup>	T6 T62 <sup>U</sup> T62 <sup>P,U</sup>
Plate	960–1075 [516–579] 985 [529] <sup>U</sup>	110 [43] max	T451 T42	320 [160] 350 [177] <sup>U</sup>	18 18 <sup>U</sup>	T651 T62 <sup>U</sup>
Tread Sheet and Plate <sup>G</sup>	960–1075 [516–579]	110 [43] max	T4	320 [160]	18	T6
Cold-finished wire, rod, and bar	960–1075 [516–579]	110 [43] max <sup>H</sup>	T4	350 [177] or 320 [160]	8 18	T6
			T3	340 [171] or 320 [160]	8 18	T89
			T4 T451	350 [177] 350 [177]	8 8	T94 T651
	985 [529] <sup>U</sup>		T42	350 [177] <sup>U</sup>	8–10 <sup>U</sup>	T62 <sup>U</sup>
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup> 960–1075 [516–579] <sup>L</sup>	... 110 [43] max <sup>H</sup>	T1 T4 T4510 T4511	350 [177] 350 [177] 350 [177] 350 [177]	8 8 8 8	T51 T6 T6510 T6511
	985 [529] <sup>U</sup>		T42	350 [177] <sup>U</sup>	8–10 <sup>U</sup>	T62 <sup>U</sup>
Structural profiles	960–1075 [516–579] <sup>L</sup>	110 [43] max <sup>H</sup>	T4	350 [177]	8	T6
Drawn tube and pipe	960–1075 [516–579] <sup>L</sup> 985 [529] <sup>U</sup>	110 [43] max	T4 T42	320 [160] or 340 [171] 340 [171] <sup>U</sup>	18 8 8 <sup>U</sup>	T6 T62 <sup>U</sup>
Die and hand forgings	960–1075 [516–579]	110 [43] max	T4	350 [177] or 340 [171]	8 10	T6
Rolled rings	960–1075 [516–579] 985 [529] <sup>U</sup>	110 [43] max	T4 T452	350 [177] 350 [177] <sup>U</sup>	8 8–10	T6 T652 <sup>U</sup>
<b>6064 Alloy</b>						
Extruded rod, bar, tube, pipe, and profiles	... <sup>L</sup>	...	T1	400 [204] or 360 [182]	1–2 3	T5
			T1	400 [204] <sup>U</sup> or 360 [182] <sup>U</sup>	1–2 <sup>U</sup> 3 <sup>U</sup>	T52 <sup>U</sup>
	960–1010 [516–543] <sup>L</sup>	110 [43] max <sup>H</sup>	T4	350 [177] or 360 [182]	8 6	T6 T62 <sup>U</sup>
	985 [529] <sup>U</sup>		T42	350 [177] <sup>U</sup>	8–10 <sup>U</sup>	T62 <sup>U</sup>
Drawn tube and pipe	960–1010 [516–543] <sup>L</sup> 985 [529] <sup>U</sup>	110 [43] max	T4 T3 T3 T3 T42	350 [177] 350 [177] 350 [177] 350 [177] 350 [177] <sup>U</sup>	8 8 8 8 8–10 <sup>U</sup>	T6 T83 T831 T832 T62 <sup>U</sup>
<b>6066 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	960–1010 [516–543] <sup>L</sup> 985 [529] <sup>U</sup>	110 [43] max	T4 T4510 T4511 T42	350 [177] 350 [177] 350 [177] 350 [177] <sup>U</sup>	8 8 8 8–10 <sup>U</sup>	T6 T6510 T6511 T62 <sup>U</sup>
Die forgings	960–1010 [516–543]	110 [43] max	T4	350 [177]	8	T6
<b>6070 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	1015 [546] <sup>L</sup>	110 [43] max	T4 T42	320 [160] 320 [160] <sup>U</sup>	18 18 <sup>U</sup>	T6 T62 <sup>U</sup>
<b>6082 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	980 [527] <sup>L</sup>	...	T4 T4511	350 [177] 350 [177]	8 8	T6 T6511

**B918/B918M – 20a****TABLE 1** *Continued*

Product	Solution Heat Treatment			Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>	Temper	Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>6101 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	970 [521] <sup>L</sup>	110 [43] max <sup>H</sup>	T4	390 [199]	10	T6
			T4	440 [227]	5	T61
			T4	410 [210]	9	T63
			T4	535 [279]	7	T64
			T4	430 [221]	3	T65
<b>6105 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	350 [177]	8	T5
			T4	350 [177]	8	T6
<b>6110 Alloy</b>						
Cold-finished wire, rod, and bar	980–1050 [527–566]	110 [43] max	T4	380 [193]	8	T9
<b>6151 Alloy</b>						
Die forgings	950–980 [510–527]	110 [43] max	T4	340 [171]	10	T6
Rolled rings	960 [516]	110 [43] max	T4	340 [171]	10	T6
	965 [518] <sup>U</sup>		T452	340 [171] <sup>U</sup>	10	T652 <sup>U</sup>
<b>6162 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	350 [177]	8	T5
			T1510	350 [177]	8	T5510
			T1511	350 [177]	8	T5511
	980 [527] <sup>L</sup>	...	T4	350 [177]	8	T6
			T4510	350 [177]	8	T6510
			T45111	350 [177]	8	T6511
<b>6201 Alloy</b>						
Wire	950 [510]	110 [43] max	T3	320 [160]	4	T81
<b>6262 Alloy</b>						
Cold-finished wire, rod, and bar	960–1050 [516–566]	110 [43] max	T4	340 [171]	8	T6
			T4	340 [171]	8	T9
			T451	340 [171]	8	T651
			T42	340 [171] <sup>U</sup>	8 <sup>U</sup>	T62 <sup>U</sup>
<b>6262 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	960–1050 [516–566] <sup>L</sup>	110 [43] max	T4	350 [177]	12	T6
			T4510	350 [177]	12	T6510
			T4511	350 [177]	12	T6511
			T42	350 [177] <sup>U</sup>	11–13 <sup>U</sup>	T62 <sup>U</sup>
<b>6262 Alloy</b>						
Drawn tube and pipe	960–1050 [516–566]	110 [43] max	T4	340 [171]	8	T6
			T4	340 [171]	8	T9
			T42	340 [171] <sup>U</sup>	8 <sup>U</sup>	T62 <sup>U</sup>
<b>6351 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	350 [177]	8	T5
			T11	350 [177]	8	T51
	... <sup>L</sup>	...	T11	250 [121]	10	T54
			T4	or 350 [177] 350 [177]	8	T6
960–1010 [516–543] <sup>L</sup>	110 [43] max <sup>H</sup>	T4	350 [177]	8	T6	
<b>6463 Alloy</b>						
Extruded rod, bar, profiles, tube, and pipe	... <sup>L</sup>	...	T1	400 [204]	1	T5
			T4	or 360 [182]	3	T6
			T4	350 [177] or 360 [182]	8 6	T6
<b>7005 Alloy</b>						
Extruded rod, bar, and profiles	... <sup>L</sup>	...	T1	room temperature 225 [107] 300 [149]	72 plus 8 plus 16	T53
<b>7049 Alloy<sup>A</sup></b>						
Extruded rod, bar, and profiles	860-900 [460-482]	110 [43] max	W511 <sup>I</sup>	room temperature 250 [121] 375 [163]	48 plus 24 plus 13	T76511
			W511 <sup>I</sup>	room temperature 250 [121] 330 [166]	48 plus 24 plus 17	T73511
			W51 <sup>I</sup>	room temperature 250 [121] 335 [168]	8–24 plus 8–24 plus 6–16	T7351
			W52 <sup>I</sup>	room temperature <sup>U</sup> 250 [121] <sup>U</sup> 330 [166] <sup>U</sup>	24 plus <sup>U</sup> 8–24 plus <sup>U</sup> 6–16 <sup>U</sup>	T7352 <sup>U</sup>
Die and hand forgings*	860–900 [460–482]	140–160 [60–71]	W <sup>I</sup>	room temperature 250 [121] 340 [171]	48 plus 8–24 6–16	T73
			W51 <sup>I</sup>	room temperature 250 [121] 335 [168]	8–24 plus 8–24 plus 6–16	T7351
			W52 <sup>I</sup>	room temperature <sup>U</sup> 250 [121] <sup>U</sup> 330 [166] <sup>U</sup>	24 plus <sup>U</sup> 8–24 plus <sup>U</sup> 6–16 <sup>U</sup>	T7352 <sup>U</sup>
			W52 <sup>I</sup>	room temperature <sup>U</sup> 250 [121] <sup>U</sup> 330 [166] <sup>U</sup>	24 plus <sup>U</sup> 8–24 plus <sup>U</sup> 6–16 <sup>U</sup>	T7352 <sup>U</sup>

\*Continued on next page.

**B918/B918M – 20a****TABLE 1** *Continued*

Product	Solution Heat Treatment			Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>	Temper	Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>7049 Alloy (Continued)<sup>A</sup></b>						
Die and hand forgings (Continued)	875 [468] <sup>U</sup>		W <sup>I</sup>	room temperature <sup>U</sup> 250 [121] <sup>U</sup> 325 [163] <sup>U</sup>	48 min <sup>U</sup> 24 min plus <sup>U</sup> 13–14 <sup>U</sup>	T732 <sup>U</sup>
<b>7050 Alloy<sup>A</sup></b>						
Plate	880–900 [471–482]    890 [477] <sup>U</sup>	110 [43] max	W51 <sup>I</sup>	250 [121] 350 [177]	4–24 plus 8–16	T7351
			W51 <sup>I</sup>	250 [121] 325 [163]	3–6 plus 24–30	T7451
			W51 <sup>I</sup>	250 [121] 325 [163]	3–6 plus 12–15	T7651
			W51 <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 6–8 <sup>U</sup>	T742 <sup>U</sup>
			W51 <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 6.5–7 <sup>U</sup>	T762 <sup>U</sup>
			W51 <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 6.5–7 <sup>U</sup>	T762 <sup>U</sup>
Cold-finished wire, rod	880–900 [471–482]	110 [43] max	W <sup>I</sup>	250 [121] 350 [177]	4–24 plus 6–12	T7
Extruded rod, bar, and profiles	880–900 [471–482]	110 [43] max	W510 <sup>I</sup>	250 [121] 350 [177]	24 plus 12–15	T73510
			W510 <sup>I</sup>	250 [121] 340 [171]	24 plus 8–12	T74510
			W510 <sup>I</sup>	250 [121] 325 [163]	3–8 plus 15–18	T76510
			W511 <sup>I</sup>	250 [121] 350 [177]	24 plus 12–15	T73511
			W511 <sup>I</sup>	250 [121] 340 [171]	24 plus 18–12	T74511
			W511 <sup>I</sup>	250 [121] 325 [163]	3–8 plus 15–18	T76511
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 11.5–12.5 <sup>U</sup>	T732 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 6–8 <sup>U</sup>	T742 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 3.5–4.5 <sup>U</sup>	T762 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 3.5–4.5 <sup>U</sup>	T762 <sup>U</sup>
Die forgings & hand forgings	880–900 [471–482]	140–160 [60–71]	W <sup>I</sup>	250 [121] 350 [177]	3–6 plus 6–12	T74
			W51 <sup>I</sup>	250 [121] 350 [177]	3–6 plus 6–10	T7451
			W52 <sup>I</sup>	250 [121] 350 [177]	3–6 plus 6–10	T7452
			W <sup>I</sup>	room temperature 250 [121]	72 plus 48	T6
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 6–8 <sup>U</sup>	T742 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 3.5–4.5 <sup>U</sup>	T762 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 3.5–4.5 <sup>U</sup>	T762 <sup>U</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup> 350 [177] <sup>U</sup>	6–8 plus <sup>U</sup> 3.5–4.5 <sup>U</sup>	T762 <sup>U</sup>
<b>7075 Alloy<sup>A</sup></b>						
Sheet, bare or Alclad	860–930 [460–499] <sup>J</sup>	110 [43] max	W <sup>I</sup>	250 [121]	24	T6
			W <sup>I</sup>	225 [107] 325 [163]	6–8 plus 24–30	T73 <sup>M</sup>
			W <sup>I</sup>	or 225 [107] 335 [168] <sup>K</sup>	6–8 plus 14–18	T76 <sup>M</sup>
			W <sup>I</sup>	250 [121] 325 [163]	3–5 plus 15–18	T76 <sup>M</sup>
			W <sup>I</sup>	250 [121] <sup>U</sup>	23–25 <sup>U</sup>	T62 <sup>U</sup>
Plate, bare or Alclad*	860–930 [460–499] <sup>J,N</sup>	110 [43] max	W51 <sup>I</sup>	250 [121] or 205 [96] 315 [157]	24 4 plus 8	T651
			W51 <sup>I</sup>	225 [107] 325 [163]	6–8 plus 24–30	T7351 <sup>M</sup>
			W51 <sup>I</sup>	or 225 [107] 335 [168] <sup>K</sup>	6–8 plus 14–18	T7651 <sup>M</sup>
			W51 <sup>I</sup>	250 [121] or 250 [121]	24 3–5 plus	T7651 <sup>M</sup>
			W51 <sup>I</sup>	325 [163]	15–18	T7651 <sup>M</sup>

\* *Continued on next page.*

**B918/B918M – 20a****TABLE 1** *Continued*

Product	Solution Heat Treatment		Temper	Precipitation Heat Treatment <sup>B</sup>		
	Metal Temperature, ±10 °F [±6 °C] <sup>C,D,V</sup>	Quench Temperature, °F [°C] <sup>E</sup>		Metal Temperature, ±10 °F [±6 °C] <sup>V</sup>	Time at Temperature, h	Temper
<b>7075 Alloy<sup>A</sup> (Continued)</b>						
Plate, bare or Alclad* (Continued)	870 [466] <sup>R,U</sup>		W <sup>I</sup>	250 [121] <sup>U</sup> or 205 [96] <sup>U</sup> 315 [157] <sup>U</sup>	23–25 <sup>U</sup> 4 plus <sup>U</sup> 8 <sup>U</sup>	T62 <sup>U</sup>
Cold-finished wire, rod, and bar	860–930 [460–499] <sup>J,N</sup>	110 [43] max	W <sup>I</sup>	250 [121]	24	T6
			W <sup>I</sup>	225 [107]	6–8 plus	T73 <sup>M</sup>
			W51 <sup>I</sup>	350 [177]	8–10	
			W51 <sup>I</sup>	250 [121]	24	T651
			W51 <sup>I</sup>	225 [107]	6–8 plus	T7351 <sup>M</sup>
			W51 <sup>I</sup>	350 [177]	8–10	
	870 [466] <sup>U</sup>		W <sup>I</sup>	225 [107] <sup>U</sup>	23–25 <sup>U</sup>	T62 <sup>U</sup>
Extruded rod, bar, profiles, tube, and pipe	860–930 [460–499] <sup>J,N</sup>	110 [43] max	W <sup>I</sup>	250 [121]	24	T6
				or 210 [99]	5 plus	
				250 [121]	4 plus	
				300 [149]	4	
			W <sup>I</sup>	225 [107]	6–8 plus	T73 <sup>M</sup>
				350 [177]	6–8	
				or 225 [107]	6–8 plus	
				335 [168] <sup>K</sup>	14–18	
			W <sup>I</sup>	250 [121]	3–5 plus	T76 <sup>M</sup>
				325 [163]	15–18	
				or 250 [121]	3–5 plus	
				320 [160]	18–21	
			W510 <sup>I</sup>	250 [121]	24	T6510
				or 210 [99]	5 plus	
	250 [121]	4 plus				
	300 [149]	4				
W510 <sup>I</sup>	225 [107]	6–8 plus	T73510 <sup>M</sup>			
	350 [177]	6–8				
	or 225 [107]	6–8 plus				
	335 [168] <sup>K</sup>	14–18 plus				
W510 <sup>I</sup>	250 [121]	3–5 plus	T76510 <sup>M</sup>			
	325 [163]	15–18				
	or 250 [121]	3–5 plus				
	320 [160]	18–21				
W511 <sup>I</sup>	250 [121]	24	T6511			
	or 210 [99]	5 plus				
	250 [121]	4 plus				
	300 [149]	4				
W511 <sup>I</sup>	225 [107]	6–8 plus	T73511 <sup>M</sup>			
	225 [107]	6–8				
	350 [177]	6–8				
	or 225 [107]	6–8 plus				
	335 [168] <sup>K</sup>	14–18				
W511 <sup>I</sup>	250 [121]	3–5 plus	T76511 <sup>M</sup>			
	325 [163]	15–18				
	or 225 [107]	3–5 plus				
	320 [160]	18–21				
W <sup>I</sup>	250 [121] <sup>U</sup>	23–25 <sup>U</sup>	T62 <sup>U</sup>			
Drawn tube and pipe	870 [466]	110 [43] max	W <sup>I</sup>	250 [121]	24	T6
			W <sup>I</sup>	225 [107]	6–8 plus	T73 <sup>M</sup>
				350 [177]	6–8	
				or 225 [107]	6–8 plus	
				335 [168] <sup>K</sup>	14–18	
	870 [466] <sup>U</sup>		W <sup>I</sup>	250 [121] <sup>U</sup>	23–25 <sup>U</sup>	T62 <sup>U</sup>
Die forgings	860–900 [460–482]	140–160 [60–71]	W <sup>I</sup>	250 [121]	24	T6
			W <sup>I</sup>	225 [107]	6–8 plus	T73 <sup>M</sup>
				350 [177]	8–10	
			W51 <sup>I</sup>	225 [107]	6–8 plus	T7351 <sup>M</sup>
				350 [177]	6–8	
			W52 <sup>I</sup>	225 [107]	6–8 plus	T7352 <sup>M</sup>
				350 [177]	6–8	
	W <sup>I</sup>	225 [107]	6–8 plus	T74		
			350 [177]	6–8		
	870 [466] <sup>U</sup>		W <sup>I</sup>	250 [121] <sup>U</sup>	23–25 <sup>U</sup>	T62 <sup>U</sup>
Hand forgings*	860–900 [460–482]	140–160 [60–71]	W <sup>I</sup>	250 [121]	24	T6
			W <sup>I</sup>	225 [107]	6–8 plus	T73 <sup>M</sup>
				350 [177]	8–10	

\*Continued on next page.