



Designation: **B918/B918M—09 B918/B918M – 17**

## 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\*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 AMS 2772.<sup>2</sup>

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 2,~~ Table 2, 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. (Refer to Practice B807 for extrusion press solution heat treatment of aluminum alloys and to Practice B947 for hot rolling mill solution heat treatment of aluminum alloys.)<sup>3</sup>

1.4 *Units*—The values stated in either SI units or inch-pound 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 appropriate safety and health 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 specification to the extent referenced herein:

2.2 *ASTM Standards:*<sup>3</sup>

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

B881 Terminology Relating to Aluminum- and Magnesium-Alloy Products

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

G69 Test Method for Measurement of Corrosion Potentials of Aluminum Alloys

G110 Practice for Evaluating Intergranular Corrosion Resistance of Heat-Treatable Aluminum Alloys by Immersion in Sodium Chloride + Hydrogen Peroxide Solution

2.3 *American National Standard:*

H35.1/H35.1(M) Alloy and Temper Designation Systems for Aluminum<sup>4</sup>

<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.

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<sup>2</sup> Available from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.

<sup>3</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.

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

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



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### TABLE 2 Recommended Heat Treatment for Wrought Aluminum Alloys<sup>A</sup>

| Product                                     | Product                        | Solution Heat Treatment                        |   | Precipitation Heat Treatment <sup>B</sup>   |                                    |   |
|---|--------------------------------|--|---|---|------------------------------------|---|
|   |                                | Metal Temperature, ±10°F [±6°C] <sup>C,D</sup> | Quench Temperature, °F [°C] <sup>E</sup>        | Temper  | Metal Temperature, ±10°F [±6°C]    | Time at Temperature, Temper h                   |
| <b>2011 Alloy<sup>A</sup></b>               |                                |  |   |   |                                    |   |
| Cold-finished wire, rod, and bar            | 945-995 [507-535]              | 110 [43] max                                   | T3 <sup>F</sup>                                 | 320 [160]   | 14                                 | T8 <sup>F</sup>                                 |
|   |                                |  | T4<br>T451 <sup>G</sup>                         | ...   | ...                                | ...   |
| Cold-finished wire, rod, and bar            | 945-995 [507-535]              | 110 [43] max                                   | T3 <sup>F</sup>                                 | 320 [160]   | 14                                 | T8 <sup>F</sup>                                 |
|   |                                |  | T4<br>T451 <sup>G</sup>                         | ...   | ...                                | ...   |
| Drawn tube                                  | 975 [524]                      | 110 [43] max                                   | T3 <sup>F</sup><br>T4511 <sup>G</sup>           | ...   | ...                                | ...   |
| Drawn tube                                  | 975 [524]                      | 110 [43] max                                   | T3 <sup>F</sup><br>T4511 <sup>G</sup>           | 320 [160]   | 14                                 | T8 <sup>F</sup>                                 |
| <b>2014 Alloy<sup>A</sup></b>               |                                |  |   |   |                                    |   |
| Flat sheet, bare or Alclad                  | 935 [502]                      | 110 [43] max                                   | T3 <sup>F</sup>                                 | ...   | ...                                | ...   |
|   |                                |  | T42   | 320 [160]   | 18                                 | T62   |
| Flat sheet, bare or Alclad                  | 925-945 [496-507]<br>935 [502] | 110 [43] max                                   | T3 <sup>F</sup>                                 | ...   | ...                                | ...   |
|   |                                |  | T42   | 320 [160]   | 18-20                              | T62   |
| Coiled sheet, bare                          | 925-945 [496-507]              | 110 [43] max                                   | T4  | 320 [160]   | 18                                 | T6  |
| Coiled sheet, bare or Alclad or Alclad      | 935 [502]                      | 110 [43] max                                   | T4  | 320 [160]   | 18                                 | T6  |
|   |                                |  | T42   | 320 [160]   | 18                                 | T62   |
| Plate, bare or Alclad                       | 935 [502]                      | 110 [43] max                                   | T42   | 320 [160]   | 18-20                              | T62   |
|   |                                |  | T451 <sup>G</sup><br>T42                        | 320 [160]   | 18                                 | T651 <sup>G</sup>                               |
| Plate, bare or Alclad                       | 925-945 [496-507]<br>935 [502] | 110 [43] max                                   | T451 <sup>G</sup>                               | 320 [160]   | 18                                 | T651 <sup>G</sup>                               |
|   |                                |  | T42   | 350 [177]   | 8-9                                | T62   |
| Cold-finished wire, rod, and bar            | 925-945 [496-507]<br>935 [502] | 110 [43] max                                   | T4  | 350 [177]   | 9                                  | T6  |
|   |                                |  | T451 <sup>H</sup><br>T42                        | 350 [177]   | 9                                  | T651 <sup>H</sup>                               |
| Gold-finished wire, rod, and bar            | 935 [502]                      | 110 [43] max                                   | T4  | 320 [160]   | 18                                 | T6  |
|   |                                |  | T451 <sup>H</sup><br>T42                        | or 350 [177]<br>320 [160]<br>or 350 [177]<br>320 [160]<br>or 350 [177]                              | 8<br>18<br>8<br>18<br>8            | T651 <sup>H</sup><br>T62                        |
| Extruded wire, rod, bar, profiles, and tube | 925-945 [496-507]<br>935 [502] | 110 [43] max                                   | T4  | 350 [177]   | 9                                  | T6  |
|   |                                |  | T4510 <sup>H</sup><br>T4511 <sup>H</sup><br>T42 | 350 [177]<br>350 [177]<br>350 [177]   | 9<br>9<br>8-9                      | T6510 <sup>H</sup><br>T6511 <sup>H</sup><br>T62 |
| Extruded wire, rod, bar, profiles, and tube | 935 [502]                      | 110 [43] max                                   | T4  | 320 [160]   | 18                                 | T6  |
|   |                                |  | T4510 <sup>H</sup><br>T4511 <sup>H</sup><br>T42 | or 350 [177]<br>320 [160]<br>or 350 [177]<br>320 [160]<br>or 350 [177]<br>320 [160]<br>or 350 [177] | 8<br>18<br>8<br>18<br>8<br>18<br>8 | T6510 <sup>H</sup><br>T6511 <sup>H</sup><br>T62 |
| Drawn tube                                  | 925-945 [496-507]              | 110 [43] max                                   | T4  | 350 [177]   | 9                                  | T6  |
| Drawn tube                                  | 935 [502]                      |  | T42   | 350 [177]   | 8-9                                | T62   |
| Die forgings                                | 935 [502]                      | 140-180 [60-82]                                | T4  | 340 [171]   | 10                                 | T6  |
| Die forgings                                | 925-945 [496-507]              | 140-180 [60-82]                                | T4  | 350 [177]   | 9                                  | T6  |
| Hand forgings and rolled                    | 925-945 [496-507]              | 140-180 [60-82]                                | T4  | 350 [177]   | 9                                  | T6  |
| Hand forgings and rolled rings              | 935 [502]                      | 140-180 [60-82]                                | T452 <sup>I</sup>                               | 340 [171]   | 10                                 | T652 <sup>I</sup>                               |
|   |                                |  | T4  | 340 [171]   | 10                                 | T6  |
| rings                                       | 935 [502]                      |  | T452 <sup>I</sup>                               | 350 [177]   | 10                                 | T652 <sup>I</sup>                               |
| <b>2017 Alloy<sup>A</sup></b>               |                                |  |   |   |                                    |   |
| Gold-finished wire, rod, and bar            | 925-950 [496-510]              | 110 [43] max                                   | T4  | ...   | ...                                | ...   |
|   |                                |  | T451 <sup>H</sup><br>T42                        | ...   | ...                                | ...   |
| Cold-finished wire, rod,                    | 925-950 [496-510]              | 110 [43] max                                   | T4  | ...   | ...                                | ...   |

**B918/B918M - 17****TABLE 2 Continued**

| Product  | Product                        | Solution Heat Treatment                           |  | Precipitation Heat Treatment <sup>B</sup> |                                    |                                     |
|--|--------------------------------|---|--|---|------------------------------------|-------------------------------------|
|  |                                | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup> | Temper                                    | Metal Temperature,<br>±10°F [±6°C] | Time at<br>Temperature, Temper<br>h |
| and bar  |                                |   | T451 <sup>H</sup>                              | ...                                       | ...                                | ...                                 |
|  |                                |   | T42  | ...                                       | ...                                | ...                                 |
| <b>2018 Alloy<sup>A</sup></b>                  |                                |   |  |   |                                    |                                     |
| Die forgings                                   | 940-970 [504-521]              | 212 [100]   | T4   | 340 [171]                                 | 40                                 | T64                                 |
| Die forgings                                   | 940-970 [504-521]              | 212 [100]   | T4   | 340 [171]                                 | 10                                 | T61                                 |
| <b>2024 Alloy<sup>A</sup></b>                  |                                |   |  |   |                                    |                                     |
| Flat sheet, bare or<br>Alclad                  | 920 [493]                      | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 42                                 | T81 <sup>F</sup>                    |
|  |                                |   | T361 <sup>J</sup>                              | 375 [191]                                 | 8                                  | T861 <sup>J</sup>                   |
|  |                                |   | T42  | 375 [191]                                 | 9                                  | T62                                 |
|  |                                |   | T42  | 375 [191]                                 | 16                                 | T72                                 |
| Flat sheet, bare<br>or Alclad                  | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 12                                 | T81 <sup>F</sup>                    |
|  |                                |   | T361 <sup>J</sup>                              | 375 [191]                                 | 8                                  | T861 <sup>J</sup>                   |
|  |                                |   | T42  | 375 [191]                                 | 9-10                               | T62                                 |
|  |                                |   | T42  | 375 [191]                                 | 16-18                              | T72                                 |
| Coiled sheet, bare<br>or Alclad                | 910-930 [488-499]<br>920 [493] | 110 [43] max<br>110 [43] max                      | T4   | 375 [191]                                 | 9-10                               | T6                                  |
|  |                                |   | T4   | ...                                       | ...                                | ...                                 |
| Coiled sheet, bare or<br>Alclad<br>or Alclad   | 920 [493]                      |   | T42  | 375 [191]                                 | 9                                  | T62                                 |
|  |                                |   | T42  | 375 [191]                                 | 9                                  | T62                                 |
|  |                                |   | T42  | 375 [191]                                 | 16-18                              | T72                                 |
| Plate, bare or Alclad                          | 920 [493]                      | 110 [43] max                                      | T351 <sup>G</sup>                              | 375 [191]                                 | 42                                 | T851 <sup>G</sup>                   |
|  |                                |   | T361 <sup>J</sup>                              | 375 [191]                                 | 8                                  | T861 <sup>J</sup>                   |
|  |                                |   | T42  | 375 [191]                                 | 9                                  | T62                                 |
|  |                                |   | T42  | 375 [191]                                 | 16                                 | T72                                 |
| Plate, bare or Alclad                          | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T351 <sup>G</sup>                              | 375 [191]                                 | 12                                 | T851 <sup>G</sup>                   |
|  |                                |   | T361 <sup>J</sup>                              | 375 [191]                                 | 8                                  | T861 <sup>J</sup>                   |
|  |                                |   | T42  | 375 [191]                                 | 9-10                               | T62                                 |
| Gold finished wire, rod,<br>and bar            | 920 [493]                      | 110 [43] max                                      | T351 <sup>H</sup>                              | 375 [191]                                 | 42                                 | T851 <sup>H</sup>                   |
|  |                                |   | T361 <sup>J</sup>                              | ...                                       | ...                                | ...                                 |
|  |                                |   | T4   | 375 [191]                                 | 42                                 | T6                                  |
|  |                                |   | T42  | 375 [191]                                 | 16                                 | T62                                 |
| Cold finished wire, rod,<br>and bar            | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T351 <sup>H</sup>                              | 375 [191]                                 | 12                                 | T851 <sup>H</sup>                   |
|  |                                |   | T361 <sup>J</sup>                              | ...                                       | ...                                | ...                                 |
|  |                                |   | T4   | 375 [191]                                 | 12                                 | T6                                  |
|  |                                |   | T42  | 375 [191]                                 | 12-13                              | T62                                 |
| Extruded wire, rod, bar,<br>profiles, and tube | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 12                                 | T81 <sup>F</sup>                    |
|  |                                |   | T3510 <sup>H</sup>                             | 375 [191]                                 | 12                                 | T8510 <sup>H</sup>                  |
|  |                                |   | T3511 <sup>H</sup>                             | 375 [191]                                 | 12                                 | T8511 <sup>H</sup>                  |
|  |                                |   | T42  | 375 [191]                                 | 12-13                              | T62                                 |
| Extruded wire, rod, bar,<br>profiles, and tube | 920 [493]                      | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 42                                 | T81 <sup>F</sup>                    |
|  |                                |   | T3510 <sup>H</sup>                             | 375 [191]                                 | 42                                 | T8510 <sup>H</sup>                  |
|  |                                |   | T3511 <sup>H</sup>                             | 375 [191]                                 | 42                                 | T8511 <sup>H</sup>                  |
|  |                                |   | T42  | ...                                       | ...                                | ...                                 |
| Drawn tube                                     | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 12                                 | T8 <sup>F</sup>                     |
|  |                                |   | T42  | 375 [191]                                 | 9-10                               | T62                                 |
| Drawn tube                                     | 920 [493]                      | 110 [43] max                                      | T3 <sup>F</sup>                                | ...                                       | ...                                | ...                                 |
|  |                                |   | T42  | ...                                       | ...                                | ...                                 |
| Die Forgings                                   | 910-930 [488-499]              | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 11                                 | T81 <sup>F</sup>                    |
| <b>2025 Alloy<sup>A</sup></b>                  |                                |   |  |   |                                    |                                     |
| Die forgings                                   | 960 [516]                      | 140-160 [60-71]                                   | T4   | 340 [171]                                 | 40                                 | T6                                  |
| Die forgings                                   | 950-970 [510-521]              | 140-160 [60-71]                                   | T4   | 350 [177]                                 | 9                                  | T6                                  |
| <b>2117 Alloy<sup>A</sup></b>                  |                                |   |  |   |                                    |                                     |
| Gold finished, wire or<br>rod                  | 925-950 [496-510]              | 110 [43] max                                      | T4   | ...                                       | ...                                | ...                                 |
| Cold finished, wire<br>or rod                  | 925-950 [496-510]              | 110 [43] max                                      | T4   | ...                                       | ...                                | ...                                 |
| <b>2124 Alloy<sup>A</sup></b>                  |                                |   |  |   |                                    |                                     |
| Plate  | 920 [493]                      | 110 [43] max                                      | T351 <sup>G</sup>                              | 350 [177]                                 | 42                                 | T851 <sup>G</sup>                   |
| Plate  | 910-930 [488-499]<br>920 [493] | 110 [43] max                                      | T3 <sup>F</sup>                                | 375 [191]                                 | 12                                 | T8 <sup>F</sup>                     |
|  |                                |   | T31 <sup>G</sup>                               | 370 [188]                                 | 12                                 | T8151 <sup>G</sup>                  |
|  |                                |   | T4   | 375 [191]                                 | 9                                  | T6                                  |
|  |                                |   | T3 <sup>F</sup>                                | 375 [191]                                 | 12                                 | T82 <sup>F</sup>                    |

**B918/B918M - 17****TABLE 2 Continued**

| Product  | Product                         | Solution Heat Treatment                           |   | Precipitation Heat Treatment <sup>B</sup>        |                                    |   |
|--|---------------------------------|---|---|--|------------------------------------|---|
|  |                                 | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup>                      | Temper   | Metal Temperature,<br>±10°F [±6°C] | Time at<br>Temperature, Temper<br>h                                 |
| <b>2218 Alloy<sup>A</sup></b>                  |                                 |   |   |  |                                    |   |
| Die forgings                                   | 950 [510]                       | 212 [100]   | T4  | 340 [171]  | 10                                 | T62   |
| Die forgings                                   | 940-960 [504-516]               | 212 [100]   | T4  | 340 [171]  | 10                                 | T61   |
|  | 950 [510]                       |   | T4  | 460 [238]  | 6                                  | T7  |
|  |                                 |   | T4  | 340 [171]  | 10                                 | T62   |
|  |                                 |   | T4  | 460 [238]  | 6                                  | T72   |
| <b>2219 Alloy<sup>A</sup></b>                  |                                 |   |   |  |                                    |   |
| Flat sheet, bare or<br>Alclad                  | 995 [535]                       | 110 [43] max                                      | T31 <sup>F</sup><br>T37 <sup>K</sup><br>T42                         | 350 [177]<br>325 [163]<br>375 [191]              | 18<br>24<br>36                     | T81 <sup>F</sup><br>T87 <sup>K</sup><br>T62                         |
| Flat sheet, bare<br>or Alclad                  | 985-1005 [529-541]              | 110 [43] max                                      | T31 <sup>F</sup>  | 350 [177]  | 18                                 | T81 <sup>F</sup>  |
|  | 995 [535]                       |   | T37 <sup>K</sup><br>T42   | 325 [163]<br>375 [191]                           | 24<br>17-19                        | T87 <sup>K</sup><br>T62   |
| Plate  | 985-1005 [529-541]              | 110 [43] max                                      | T37 <sup>K</sup>  | 325 [163]  | 17-19                              | T87 <sup>K</sup>  |
| Plate  | 995 [535]                       | 110 [43] max                                      | T37 <sup>K</sup><br>T351 <sup>G</sup><br>T42<br>T351 <sup>G</sup>   | 350 [177]<br>350 [177]<br>375 [191]<br>350 [177] | 18<br>18<br>36<br>18               | T87 <sup>K</sup><br>T851 <sup>G</sup><br>T62<br>T851 <sup>G</sup>   |
|  | 995 [535]                       |   | T42   | 375 [191]  | 35-37                              | T62   |
| Cold-finished wire, rod,<br>and bar            | 985-1005 [529-541]              | 110 [43] max                                      | T4  | 375 [191]  | 18                                 | T6  |
| Cold-finished wire, rod,<br>and bar            | 995 [535]                       | 110 [43] max                                      | T4<br>T351 <sup>H</sup><br>T351 <sup>H</sup>                        | 375 [191]<br>375 [191]<br>375 [191]              | 18<br>18<br>18                     | T6<br>T851 <sup>H</sup><br>T851 <sup>H</sup>                        |
| Extruded wire, rod, bar,<br>profiles, and tube | 995 [535]                       | 110 [43] max                                      | T31 <sup>F</sup><br>T3510 <sup>H</sup><br>T3511 <sup>H</sup><br>T42 | 375 [191]<br>375 [191]<br>375 [191]<br>375 [191] | 18<br>18<br>18<br>36               | T81 <sup>F</sup><br>T8510 <sup>H</sup><br>T8511 <sup>H</sup><br>T62 |
| Extruded wire, rod, bar,<br>profiles, and tube | 985-1005 [529-541]              | 110 [43] max                                      | T31 <sup>F</sup>  | 375 [191]  | 18                                 | T81 <sup>F</sup>  |
|  | 995 [535]                       |   | T3510 <sup>H</sup><br>T3511 <sup>H</sup><br>T42<br>T3               | 375 [191]<br>375 [191]<br>375 [191]<br>375 [191] | 18<br>18<br>35-37<br>17-19         | T8510 <sup>H</sup><br>T8511 <sup>H</sup><br>T62<br>T82              |
| Die forgings and rolled<br>rings               | 985-1005 [529-541]<br>995 [335] | 110 [43] max                                      | T4<br>T42<br>T352 <sup>I</sup>                                      | 375 [191]<br>375 [191]<br>350 [177]              | 26<br>25-27<br>17-19               | T6<br>T62<br>T82 <sup>I</sup>                                       |
| Die forgings and rolled<br>rings               | 995 [535]                       | 110 [43] max                                      | T4  | 375 [191]  | 26                                 | T6  |
| Hand forgings                                  | 985-1005 [529-541]<br>995 [335] | 110 [43] max                                      | T4<br>T42   | 375 [191]<br>375 [191]                           | 26<br>25-27                        | T6<br>T62   |
| Hand forgings                                  | 995 [535]                       | 110 [43] max                                      | T4<br>T352 <sup>I</sup><br>T352 <sup>I</sup>                        | 375 [191]<br>350 [177]<br>350 [177]              | 26<br>18<br>17-19                  | T6<br>T852 <sup>I</sup><br>T852 <sup>I</sup>                        |
| <b>2618 Alloy<sup>A</sup></b>                  |                                 |   |   |  |                                    |   |
| Die, hand, and rolled<br>ring forgings         | 985 [529]                       | 212 [100]   | T4  | 390 [199]  | 20                                 | T64   |
| Die, hand, and rolled<br>ring forgings         | 975-995 [524-535]<br>985 [529]  | 212 [100]   | T4<br>T42   | 390 [199]<br>390 [199]                           | 20<br>19-21                        | T61<br>T62  |
| <b>4032 Alloy</b>                              |                                 |   |   |  |                                    |   |
| Die forgings                                   | 940-970 [504-521]               | 140-180 [60-82]                                   | T4  | 340 [171]  | 10                                 | T6  |
| Die forgings                                   | 940-970 [504-521]<br>955 [513]  | 140-180 [60-82]                                   | T4<br>T42   | 340 [171]<br>340 [171]                           | 10<br>9-11                         | T6<br>T62   |
| <b>6005 Alloy</b>                              |                                 |   |   |  |                                    |   |
| Extruded rod, bar,<br>profiles, and tube       | ...                             | ...   | T1  | 350 [177]  | 8                                  | T5  |
| <b>6005A Alloy</b>                             |                                 |   |   |  |                                    |   |
| Extruded rod, bar,<br>profiles, and tube       | ...                             | ...   | T1  | 350 [177]  | 8                                  | T5  |
| Extruded rod, bar,<br>profiles, and tube       | ...                             | ...   | T1  | 350 [177]  | 8                                  | T5  |
| <b>6005A Alloy</b>                             |                                 |   |   |  |                                    |   |
| Extruded rod, bar,<br>profiles, and tube       | ...                             | ...   | T1  | 350 [177]  | 8                                  | T5  |
| <b>6013 Alloy<sup>A</sup></b>                  |                                 |   |   |  |                                    |   |
| Extruded rod, bar,<br>profiles, and tube       | ...                             | ...   | T4  | 350 [177]  | 8                                  | T61   |

**B918/B918M - 17****TABLE 2 Continued**

| Product   | Solution Heat Treatment         |   |  | Precipitation Heat Treatment <sup>B</sup> |                                    |                                      |        |
|---|---------------------------------|---|--|---|------------------------------------|--------------------------------------|--------|
|   | Product                         | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup> | Temper                                    | Metal Temperature,<br>±10°F [±6°C] | Time at<br>Temperature,<br>h         | Temper |
| Sheet, bare   | 1055 [568]                      | 110 [43] max                                      | T4   | 375 [191]<br>or 345 [174]                 | 4<br>8                             | T6                                   |        |
| Sheet, bare   | 1045-1065 [563-574]             | 110 [43] max                                      | T4   | 375 [191]<br>or 345 [174]                 | 4<br>8                             | T6                                   |        |
|   | 1000 [538]                      |   | T42  | 375 [191]                                 | 4-5                                | T62                                  |        |
| Plate, bare   | 1020-1050 [549-566]             | 110 [43] max                                      | ...  | 345 [174]                                 | 8-16                               | T651 <sup>G</sup>                    |        |
| Plate, bare   | 1020-1050 [549-566]             | 110 [43] max                                      | ...  | 345 [174]                                 | 8-16                               | T651 <sup>G</sup>                    |        |
| Cold-finished wire, rod,<br>and bar                       | 1040-1060 [560-571]             | 110 [43] max                                      | ...  | 375 [191]<br>375 [191]                    | 4<br>4                             | T651 <sup>H</sup><br>T8 <sup>F</sup> |        |
| <b>6020 Alloy<sup>A</sup></b>                             |                                 |   |  |   |                                    |                                      |        |
| Gold-finished wire, rod,<br>and bar                       | 1050 [566]                      | 110 [43] max                                      | ...  | 375 [191]<br>375 [191]                    | 4<br>4                             | T651 <sup>H</sup><br>T8 <sup>F</sup> |        |
| Rod, bar & extrusion                                      | 1010-1050 [543-566]             | 110 [43] max                                      | W<br>U   | 355 [176]                                 | 8-10                               | T6511 <sup>H</sup>                   |        |
| Wire, rod, & bar  | 1010-1050 [543-566]             | 110 [43] max                                      | W <sup>U</sup>                                 | 355 [176]                                 | 8-10                               | T8 <sup>F</sup>                      |        |
| <b>6053 Alloy<sup>A</sup></b>                             |                                 |   |  |   |                                    |                                      |        |
| Gold-finished wire and<br>rod                             | 970 [524]                       | 110 [43] max                                      | T4   | 355 [179]                                 | 8                                  | T64                                  |        |
| Cold-finished wire and<br>rod                             | 960-980 [516-527]               | 110 [43] max                                      | T4   | 355 [179]                                 | 8                                  | T61                                  |        |
| Die forgings  | 970 [524]                       | 110 [43] max                                      | T4   | 340 [174]                                 | 10                                 | T6                                   |        |
| Die forgings  | 960-980 [516-527]               | 110 [43] max                                      | T4   | 340 [174]                                 | 10                                 | T6                                   |        |
|   | 970 [524]                       |   | T42  | 340 [174]                                 | 10                                 | T62                                  |        |
| <b>6061 Alloy<sup>A</sup></b>                             |                                 |   |  |   |                                    |                                      |        |
| Sheet, bare or Alclad                                     | 960-1075 [516-579] <sup>M</sup> | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                                   |        |
|   |                                 |   | F42  | 320 [160]                                 | 18                                 | T62                                  |        |
| Sheet, bare or Alclad                                     | 960-1075 [516-579] <sup>M</sup> | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                                   |        |
|   | 985 [529]                       |   | T42  | 350 [177]                                 | 8-10                               | T62                                  |        |
|   |                                 |   | T42 <sup>Z</sup>                               | 320 [160] <sup>Z</sup>                    | 17-19 <sup>Z</sup>                 | T62 <sup>Z</sup>                     |        |
| <b>6061 Alloy<sup>A</sup> (Continued)</b>                 |                                 |   |  |   |                                    |                                      |        |
| Plate   | 960-1075 [516-579]              | 110 [43] max                                      | T451 <sup>G</sup>                              | 320 [160]                                 | 18                                 | T651 <sup>G</sup>                    |        |
|   |                                 |   | F42  | 320 [160]                                 | 18                                 | T62                                  |        |
| Plate   | 960-1075 [516-579]              | 110 [43] max                                      | T451 <sup>G</sup>                              | 320 [160]                                 | 18                                 | T651 <sup>G</sup>                    |        |
|   | 985 [529]                       |   | T42  | 350 [177]                                 | 18                                 | T62                                  |        |
| Tread Sheet and<br>Plate <sup>N,O</sup>                   | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                                   |        |
| Tread Sheet and<br>Plate <sup>N,O</sup>                   | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                                   |        |
| Cold-finished wire, rod,<br>and bar                       | 960-1075 [516-579]              | 110 [43] max <sup>P</sup>                         | T4   | 350 [177]<br>or 320 [160]                 | 8<br>18                            | T6                                   |        |
|   |                                 |   | T3 <sup>F</sup>                                | 340 [174]                                 | 8                                  | T89 <sup>Q,R</sup>                   |        |
|   |                                 |   | T4   | 350 [177]                                 | 8                                  | T94 <sup>S</sup>                     |        |
|   | 985 [529]                       |   | T451 <sup>H</sup>                              | 350 [177]                                 | 8                                  | T651 <sup>H</sup>                    |        |
|   |                                 |   | T42  | 350 [177]                                 | 8-10                               | T62                                  |        |
| Extruded rod, bar,<br>Gold-finished wire, rod,<br>and bar | 960-1075 [516-579]              | 110 [43] max <sup>P</sup>                         | T1   | 350 [177]                                 | 8                                  | T51                                  |        |
|   |                                 |   | F4   | 340 [174]                                 | 8                                  | T6                                   |        |
|   |                                 |   | F3 <sup>E</sup>                                | or 320 [160]                              | 18                                 | T89 <sup>Q,R</sup>                   |        |
|   |                                 |   | F4   | 340 [174]                                 | 8                                  | T94 <sup>S</sup>                     |        |
|   |                                 |   | T451 <sup>H</sup>                              | or 320 [160]                              | 18                                 | T651 <sup>H</sup>                    |        |
|   |                                 |   | F42  | 340 [174]                                 | 8                                  | T62                                  |        |
|   |                                 |   |  | or 320 [160]                              | 18                                 |                                      |        |
|   |                                 |   |  | 340 [174]                                 | 8                                  |                                      |        |
|   |                                 |   |  | or 320 [160]                              | 18                                 |                                      |        |
|   |                                 |   |  | 340 [174]                                 | 8                                  |                                      |        |
|   |                                 |   |  | or 320 [160]                              | 18                                 |                                      |        |
| profiles, and tube  | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>P</sup>                         | T4   | 350 [177]                                 | 8                                  | T6                                   |        |
|   |                                 |   | T4510 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6510 <sup>H</sup>                   |        |
|   |                                 |   | T4511 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6511 <sup>H</sup>                   |        |
|   | 985 [529]                       |   | T42  | 350 [177]                                 | 8-10                               | T62                                  |        |
| Structural profiles                                       | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>P</sup>                         | T4   | 350 [177]                                 | 8                                  | T6                                   |        |

**B918/B918M - 17****TABLE 2 Continued**

| Product                                  | Product                         | Solution Heat Treatment                           |  | Precipitation Heat Treatment <sup>B</sup> |                                    |                                     |
|--|---------------------------------|---|--|---|------------------------------------|-------------------------------------|
|  |                                 | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup> | Temper                                    | Metal Temperature,<br>±10°F [±6°C] | Time at<br>Temperature, Temper<br>h |
| Extruded rod, bar,<br>profiles, and tube | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>E</sup>                         | T4   | 350 [177]                                 | 8                                  | T51                                 |
|  |                                 |   | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  |                                 |   | T4510 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6510 <sup>H</sup>                  |
|  |                                 |   | T4511 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6511 <sup>H</sup>                  |
| Pipe                                     | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>P</sup>                         | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  |                                 |   | T42  | 350 [177]                                 | 8                                  | T62                                 |
| Drawn tube                               | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 320 [160]<br>or 340 [171]                 | 18<br>8                            | T6                                  |
|  | 985 [529]                       |   | T42  | 340 [171]                                 | 8                                  | T62                                 |
| Die and hand forgings                    | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 350 [177]<br>or 340 [171]                 | 8<br>10                            | T6                                  |
| Rolled rings                             | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  | 985 [529]                       |   | T452 <sup>T</sup>                              | 350 [177]                                 | 8-10                               | T652 <sup>T</sup>                   |
| <b>6063 Alloy</b>                        |                                 |   |  |   |                                    |                                     |
| Extruded rod, bar, tube,<br>and profiles | ... <sup>L</sup>                | ...   | T1   | 400 [204]<br>or 360 [182]                 | 1-2<br>3                           | T5                                  |
|  |                                 |   | T1   | 400 [204]<br>or 360 [182]                 | 1-2<br>3                           | T52                                 |
| Structural profiles                      | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>E</sup>                         | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  | 960-1010 [516-543] <sup>L</sup> | 110 [43] max <sup>P</sup>                         | T4   | 350 [177]<br>or 360 [182]                 | 8<br>6                             | T6                                  |
|  | 985 [529]                       |   | T42  | 350 [177]                                 | 8-10                               | T62                                 |
| Pipe                                     | 960-1075 [516-579] <sup>L</sup> | 110 [43] max <sup>E</sup>                         | T4   | 350 [177]                                 | 8                                  | T6                                  |
| Drawn tube                               | 960-1010 [516-543]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |
| Drawn tube                               | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 340 [171]                                 | 8                                  | T6                                  |
|  |                                 |   | T42  | or 320 [160]                              | 18                                 | T62                                 |
|  |                                 |   |  | 340 [171]                                 | 8                                  |                                     |
|  |                                 |   |  | or 320 [160]                              | 18                                 |                                     |
|  |                                 |   |  | 350 [177]                                 | 8                                  | T83 <sup>R</sup>                    |
|  |                                 |   |  | T3 <sup>F</sup>                           | 350 [177]                          | 8                                   |
|  | T3 <sup>F</sup>                 | 350 [177]   | 8  | T832 <sup>R</sup>                         |                                    |                                     |
|  | 985 [529]                       |   | T31 <sup>F</sup>                               | 350 [177]                                 | 8                                  | T831 <sup>F</sup>                   |
|  |                                 |   | T42  | 350 [177]                                 | 8-10                               | T62                                 |
| Die and hand forgings                    | 960-1075 [516-579]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  |                                 |   | T452 <sup>T</sup>                              | 350 [177]                                 | 8                                  | T652 <sup>T</sup>                   |
| <b>6063 Alloy</b>                        |                                 |   |  |   |                                    |                                     |
| Extruded rod, bar, tube,<br>and profiles | 970 [521] <sup>L</sup>          | 110 [43] max <sup>E</sup>                         | T1   | 400 [204]<br>or 360 [182]                 | 1 to 2<br>3                        | T5                                  |
|  |                                 |   | T1   | 400 [204]<br>or 360 [182]                 | 1 to 2<br>3                        | T52                                 |
|  |                                 |   | T4   | 360 [182]                                 | 6                                  | T6                                  |
|  |                                 |   | T42  | or 350 [177]<br>360 [182]                 | 8<br>6                             | T62                                 |
| Drawn tube                               | 970 [521]                       | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  |                                 |   | T3 <sup>E</sup>                                | 350 [177]                                 | 8                                  | T83 <sup>E</sup>                    |
|  |                                 |   | T3 <sup>E</sup>                                | 350 [177]                                 | 8                                  | T831 <sup>E</sup>                   |
|  |                                 |   | T3 <sup>E</sup>                                | 350 [177]                                 | 8                                  | T832 <sup>E</sup>                   |
|  |                                 |   | T31 <sup>E</sup>                               | 350 [177]                                 | 8                                  | T831 <sup>E</sup>                   |
|  |                                 |   | T42  | 350 [177]                                 | 8                                  | T62                                 |
| Pipe                                     | 970 [521] <sup>L</sup>          | 110 [43] max <sup>E</sup>                         | T4   | 360 [182]                                 | 6                                  | T6                                  |
| Pipe                                     | 960-1010 [516-543] <sup>L</sup> | 110 [43] max <sup>P</sup>                         | T4   | or 350 [177]<br>360 [182]                 | 8<br>6                             | T6                                  |
|  |                                 |   |  | or 350 [177]                              | 8                                  | T6                                  |
| <b>6066 Alloy</b>                        |                                 |   |  |   |                                    |                                     |
| Extruded rod, bar,<br>profiles, and tube | 960-1010 [516-543]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |
|  |                                 |   | T4510 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6510 <sup>H</sup>                  |
|  |                                 |   | T4511 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6511 <sup>H</sup>                  |
|  |                                 |   | T42  | 350 [177]                                 | 8                                  | T62                                 |
| Extruded rod, bar,                       | 960-1010 [516-543]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                                  |

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960-1075-110-1  
[516-579]

**B918/B918M - 17****TABLE 2 Continued**

| Product   | Product                         | Solution Heat Treatment                           |  | Precipitation Heat Treatment <sup>B</sup> |                                    |                              |
|---|---------------------------------|---|--|---|------------------------------------|------------------------------|
|   |                                 | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup> | Temper                                    | Metal Temperature,<br>±10°F [±6°C] | Time at<br>Temperature,<br>h |
| profiles, and tube  | 985 [529]                       |   | T4510 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6510 <sup>H</sup>           |
|   |                                 |   | T4511 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6511 <sup>H</sup>           |
|   |                                 |   | T42  | 350 [177]                                 | 8-10                               | T62                          |
| Die forgings  | 960-1010 [516-543]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                           |
| Die forgings  | 960-1010 [516-543]              | 110 [43] max                                      | T4   | 350 [177]                                 | 8                                  | T6                           |
| <b>6070 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Extruded rod, bar,<br>profiles, and tube                    | 1015 [546]                      | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                           |
| Extruded rod, bar,<br>profiles, and tube                    | 1015 [546] <sup>L</sup>         | 110 [43] max                                      | T42  | 320 [160]                                 | 18                                 | T62                          |
| Extruded rod, bar,<br>profiles, and tube                    | 1015 [546] <sup>L</sup>         | 110 [43] max                                      | T4   | 320 [160]                                 | 18                                 | T6                           |
| Extruded rod, bar,<br>profiles, and tube                    | 1015 [546] <sup>L</sup>         | 110 [43] max                                      | T42  | 320 [160]                                 | 18                                 | T62                          |
| <b>6101 Alloy</b>   |                                 |   |  |   |                                    |                              |
| <b>6082 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Extruded rod, bar,<br>profiles, and tube                    | 980 [527] <sup>L</sup>          | ...   | T4   | 350 [177]                                 | 8                                  | T6                           |
| Extruded rod, bar,<br>profiles, and tube                    | 980 [527] <sup>L</sup>          | ...   | T4511 <sup>H</sup>                             | 350 [177]                                 | 8                                  | T6511 <sup>H</sup>           |
| <b>6101 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Extruded rod, bare tube,<br>pipe and<br>structural profiles | 970 [521] <sup>L</sup>          | 110 [43] max <sup>E</sup>                         | T4   | 390 [199]                                 | 10                                 | T6                           |
|   |                                 |   | T4   | 440 [227]                                 | 5                                  | T64                          |
|   |                                 |   | T4   | 410 [210]                                 | 9                                  | T63                          |
|   |                                 |   | T4   | 535 [279]                                 | 7                                  | T64                          |
|   |                                 |   | T4   | 430 [221]                                 | 3                                  | T65                          |
| Extruded rod, bar,<br>profiles, and tube                    | 970 [521] <sup>L</sup>          | 110 [43] max <sup>P</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,<br>profiles, and tube                    | ...                             | ...   | T1   | 350 [177]                                 | 8                                  | T5                           |
| Extruded rod, bar,<br>profiles, and tube                    | ...                             | ...   | T1   | 350 [177]                                 | 8                                  | T5                           |
| Extruded rod, bar,<br>profiles, and tube                    | ...                             | ...   | T4   | 350 [177]                                 | 8                                  | T6                           |
| <b>6110 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Gold finished wire, rod,<br>and bar                         | 980-1050 [527-566]              | 110 [43] max                                      | T4   | 380 [193]                                 | 8                                  | T9 <sup>S</sup>              |
| Cold finished wire, rod,<br>and bar                         | 980-1050 [527-566]              | 110 [43] max                                      | T4 <sup>S</sup>                                | 380 [193]                                 | 8                                  | T9 <sup>S</sup>              |
| <b>6151 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Die forgings  | 950-980 [510-527]               | 110 [43] max                                      | T4   | 340 [171]                                 | 10                                 | T6                           |
| Die forgings  | 950-980 [510-527]               | 110 [43] max                                      | T4   | 340 [171]                                 | 10                                 | T6                           |
| <b>6162 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Extruded rod, bar,<br>profiles, and tube                    | 980 [527] <sup>L</sup>          | ...   | T1   | 350 [177]                                 | 8                                  | T5                           |
|   |                                 |   | T1510  | 350 [177]                                 | 8                                  | T5510                        |
|   |                                 |   | T1511  | 350 [177]                                 | 8                                  | T5511                        |
|   |                                 |   | T4   | 350 [177]                                 | 8                                  | T6                           |
|   |                                 |   | T4510  | 350 [177]                                 | 8                                  | T6510                        |
| <b>6201 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Wire  | 950 [510]                       | 110 [43] max                                      | T3   | 320 [160]                                 | 4                                  | T81 <sup>R</sup>             |
| <b>6262 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Gold finished wire, rod,<br>and bar                         | 960-1050 [516-566]              | 110 [43] max                                      | T4   | 340 [171]                                 | 8                                  | T6                           |
|   |                                 |   | T4   | 340 [171]                                 | 8                                  | T9 <sup>S</sup>              |
|   |                                 |   | T451 <sup>H</sup>                              | 340 [171]                                 | 8                                  | T651 <sup>H</sup>            |
| Cold finished wire,<br>rod, and bar                         | 960-1050 [516-566]              | 110 [43] max                                      | T4   | 340 [171]                                 | 8                                  | T6                           |
|   |                                 |   | T4   | 340 [171]                                 | 8                                  | T9 <sup>S</sup>              |
|   |                                 |   | T451 <sup>H</sup>                              | 340 [171]                                 | 8                                  | T651 <sup>H</sup>            |
| <b>6262 Alloy</b>   |                                 |   |  |   |                                    |                              |
| Extruded rod, bar,<br>profiles, and tube                    | 960-1050 [516-566] <sup>L</sup> | 110 [43] max                                      | T4   | 350 [177]                                 | 12                                 | T6                           |
|   |                                 |   | T4510 <sup>H</sup>                             | 350 [177]                                 | 12                                 | T6510 <sup>H</sup>           |
|   |                                 |   | T4511 <sup>H</sup>                             | 350 [177]                                 | 12                                 | T6511 <sup>H</sup>           |
| Extruded rod, bar,<br>profiles, and tube                    | 960-1050 [516-566] <sup>L</sup> | 110 [43] max                                      | T42  | 350 [177]                                 | 12                                 | T62                          |
|   |                                 |   | T4   | 350 [177]                                 | 12                                 | T6                           |
|   |                                 |   | T4   | 350 [177]                                 | 12                                 | T6                           |



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## TABLE 2 Continued

| Product  | Solution Heat Treatment   |  |  | Precipitation Heat Treatment <sup>B</sup>  |  |   |
|--|---|--|--|--|--|---|
|  | Product   | Metal Temperature, ±10°F [±6°C] <sup>C,D</sup> | Quench Temperature, °F [°C] <sup>E</sup>               | Temper   | Metal Temperature, ±10°F [±6°C]                                  | Time at Temperature, h                                |
| profiles, and tube   |   |  | T4510 <sup>H</sup><br>T4511 <sup>H</sup>               | 350 [177]<br>350 [177]   | 12<br>12   | T6510 <sup>H</sup><br>T6511 <sup>H</sup>              |
|  | 1005 [541]  |  | T42  | 350 [177]  | 11-13  | T62   |
| Drawn tube   | 960-1050 [516-566]  | 110 [43] max                                   | T4<br>T4<br>T42  | 340 [171]<br>340 [171]<br>340 [171]  | 8<br>8<br>8  | T6<br>T9 <sup>S</sup><br>T62                          |
| Drawn tube   | 960-1050 [516-566]  | 110 [43] max                                   | T4<br>T4 <sup>S</sup><br>T42                           | 340 [171]<br>340 [171]   | 8<br>8   | T6<br>T9 <sup>S</sup><br>T62                          |
|  | 1005 [541]  |  |  |  |  |   |
| <b>6351 Alloy</b>  |   |  |  |  |  |   |
| Extruded rod, bar,<br>Extruded rod, bar,<br>profiles, and tube | ... <sup>L</sup><br>... <sup>L</sup><br>960-1010 [516-543] <sup>L</sup> | ...<br>...<br>110 [43] max <sup>P</sup>        | T1<br>T1<br>T11<br>T4                                  | 350 [177]<br>350 [177]<br>350 [177]<br>250 [121]<br>or 350 [177]                         | 8<br>8<br>8<br>10<br>8   | T5<br>T5<br>T51<br>T54<br>T6                          |
| profiles, and tube   |   |  |  | 350 [177]  | 8  | T51   |
| <b>6463 Alloy</b>  |   |  |  |  |  |   |
| Extruded rod, bar,<br>profiles, and tube                       | ... <sup>L</sup><br>... <sup>L</sup><br>970 [521] <sup>L</sup>          | ...<br>...<br>110 [43] max <sup>P</sup>        | T11<br>T1<br>T4  | 250 [121]<br>or 350 [177]<br>400 [204]<br>or 360 [182]<br>350 [177]<br>or 360 [182]      | 10<br>8<br>4<br>3<br>8<br>6                                      | T54<br>T5<br>T6<br>T6                                 |
|  | 960-1010 [516-543] <sup>L</sup>   | 110 [43] max <sup>P</sup>                      | T4   | 350 [177]  | 8  | T6  |
| <b>7001 Alloy<br/>6463 Alloy</b>                               |   |  |  |  |  |   |
| Extruded rod, bar,<br>profiles, and tube                       | ... <sup>L</sup>  | ...  | T1   | 400 [204]<br>or 360 [182]  | 1<br>3   | T5  |
| Extruded rod, bar,<br>profiles, and tube                       | 870 [466]   | 110 [43] max                                   | WU<br>W510 <sup>H,U</sup><br>W511 <sup>H,U</sup><br>WU | 250 [121]<br>250 [121]<br>250 [121]<br>250 [121]   | 24<br>24<br>24<br>24   | T6<br>T6510 <sup>H</sup><br>T6511 <sup>H</sup><br>T62 |
|  | 970 [521] <sup>L</sup>  | 110 [43] max <sup>P</sup>                      | T4   | 350 [177]<br>or 360 [182]  | 8<br>6   | T6  |
| <b>7005 Alloy</b>  |   |  |  |  |  |   |
| Extruded rod, bar, and<br>profiles                             | ... <sup>L</sup>  | ...  | T1   | room temperature<br>225 [107]<br>300 [149]   | 72 plus<br>8 plus<br>16  | T53   |
| Extruded rod, bar,<br>and profiles                             | ... <sup>L</sup>  | ...  | T1   | room temperature<br>225 [107]<br>300 [149]   | 72 plus<br>8 plus<br>16  | T53   |
| <b>7049 Alloy<sup>A</sup></b>                                  |   |  |  |  |  |   |
| Extruded rod, bar, and<br>profiles                             | 875 [468]   | 110 [43] max                                   | W511 <sup>H,U</sup><br>W511 <sup>H,U</sup>             | room temperature<br>250 [121]<br>325 [163]<br>room temperature<br>250 [121]<br>300 [149] | 48 plus<br>24 plus<br>12 to 14<br>48 plus<br>24 plus<br>12 to 24 | T76511 <sup>H</sup><br>T73511 <sup>H</sup>            |
| Extruded rod, bar,<br>and profiles                             | 860-900 [460-482]   | 110 [43] max                                   | W511 <sup>H,U</sup><br>W511 <sup>H,U</sup>             | room temperature<br>250 [121]<br>375 [163]<br>room temperature<br>250 [121]<br>330 [166] | 48 plus<br>24 plus<br>13<br>48 plus<br>24 plus<br>17             | T76511 <sup>H</sup><br>T73511 <sup>H</sup>            |
| Die and hand forgings  | 875 [468]   | 140-160 [60-71]                                | WU<br>W52 <sup>LU</sup>                                | room temperature<br>250 [121]<br>330 [166]<br>room temperature<br>250 [121]<br>330 [166] | 48 plus<br>24 plus<br>10 to 16<br>48 plus<br>24 plus<br>10 to 16 | T73<br>T7352 <sup>L</sup>                             |
| Die and hand forgings  | 860-900 [460-482]   | 140-160 [60-71]                                | WU   | room temperature   | 48 plus  | T73   |





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**TABLE 2** *Continued*

| Product                         | Product           | Solution Heat Treatment                           |  | Precipitation Heat Treatment <sup>B</sup>                                  |  |  |
|---------------------------------|-------------------|---|--|--|--|--|
|                                 |                   | Metal Temperature,<br>±10°F [±6°C] <sup>C,D</sup> | Quench<br>Temperature,<br>°F [°C] <sup>E</sup>   | Temper   | Metal Temperature,<br>±10°F [±6°C]                                   | Time at<br>Temperature, Temper<br>h  |
|                                 |                   |   |  | 250 [121]<br>340 [171]   | 8-24<br>6-16   |  |
|                                 |                   |   | W51 <sup>L,U</sup>   | room temperature   | 8-24 plus  | T7351 <sup>I</sup>   |
|                                 |                   |   |  | 250 [121]<br>335 [168]   | 8-24 plus<br>6-16  |  |
|                                 | 875 [468]         |   | W52 <sup>L,U</sup>   | room temperature   | 24 plus  | T7352 <sup>I</sup>   |
|                                 |                   |   |  | 250 [151]<br>330 [166]   | 8-24 plus<br>6-16  |  |
|                                 |                   |   | W <sup>U</sup>   | room temperature   | 48 min<br>24 min<br>13-14  | T732   |
| <b>7050 Alloy</b>               |                   |   |  |  |  |  |
| Plate                           | 890 [477]         | 110 [43] max                                      | W51 <sup>G,U</sup><br>W51 <sup>G,U</sup>   | 250 [121]<br>330 [166]   | 3 to 6 plus<br>24 to 30  | T7451 <sup>G</sup><br>T7651 <sup>G</sup>   |
|                                 |                   |   |  | 250 [121]<br>330 [166]   | 3 to 6 plus<br>12 to 15  |  |
| Plate                           | 880-900 [471-482] | 110 [43] max                                      | W51 <sup>G,U</sup>   | 250 [121]  | 4-24 plus  | T7351 <sup>G</sup>   |
|                                 |                   |   |  | 350 [177]<br>250 [121]   | 8-16<br>3-6 plus   | T7451 <sup>G</sup>   |
|                                 |                   |   | W51 <sup>G,U</sup>   | 325 [163]  | 24-30  |  |
|                                 |                   |   | W51 <sup>G,U</sup>   | 250 [121]  | 3-6 plus   | T7651 <sup>G</sup>   |
|                                 |                   |   |  | 250 [121]<br>325 [163]   | 12-15  |  |
|                                 | 890 [477]         |   | W51 <sup>G,U</sup>   | 250 [121]  | 6-8 plus   | T742   |
|                                 |                   |   |  | 350 [177]  | 6-8  |  |
|                                 |                   |   | W51 <sup>G,U</sup>   | 250 [121]  | 6-8 plus   | T762   |
|                                 |                   |   |  | 350 [177]  | 6.5-7  |  |
| Gold-finished wire, rod         | 890 [477]         | 110 [43] max                                      | W <sup>U</sup>   | 250 [121]<br>355 [179]   | 4 plus<br>8 to 12  | T7   |
| Cold-finished wire, rod         | 880-900 [471-482] | 110 [43] max                                      | W <sup>U</sup>   | 250 [121]<br>350 [177]   | 4-24 plus<br>6-12  | T7   |
| Extruded rod, bar, and profiles | 890 [477]         | 110 [43] max                                      | W510 <sup>H,U</sup><br>W510 <sup>H,U</sup><br>W510 <sup>H,U</sup><br>W511 <sup>H,U</sup><br>W511 <sup>H,U</sup><br>W511 <sup>H,U</sup> | 250 [121]<br>350 [177]<br>250 [121]<br>340 [171]<br>250 [121]<br>315 [154] | 24 plus<br>12 to 15<br>24 plus<br>8 to 12<br>3 to 6 plus<br>15 to 18 | T73510 <sup>H</sup><br>T74510 <sup>H</sup><br>T76510 <sup>H</sup><br>T73511 <sup>H</sup><br>T74511 <sup>H</sup><br>T76511 <sup>H</sup> |
|                                 |                   |   |  | 250 [121]<br>350 [177]<br>250 [121]<br>340 [171]                           | 24 plus<br>12 to 15<br>24 plus<br>8 to 12                            |  |
|                                 |                   |   |  | 250 [121]<br>315 [154]   | 3 to 6 plus<br>15 to 18  |  |
| Extruded rod, bar, and profiles | 880-900 [471-482] | 110 [43] max                                      | W510 <sup>H,U</sup>  | 250 [121]  | 24 plus  | T73510 <sup>H</sup>  |
|                                 |                   |   |  | 350 [177]<br>250 [121]   | 12-15<br>24 plus   | T74510 <sup>H</sup>  |
|                                 |                   |   | W510 <sup>H,U</sup>  | 340 [171]  | 8-12   |  |
|                                 |                   |   | W510 <sup>H,U</sup>  | 250 [121]  | 3-8 plus   | T76510 <sup>H</sup>  |
|                                 |                   |   |  | 325 [163]  | 15-18  |  |
|                                 |                   |   | W511 <sup>H,U</sup>  | 250 [121]  | 24 plus  | T73511 <sup>H</sup>  |
|                                 |                   |   |  | 350 [177]  | 12-15  |  |
|                                 |                   |   | W511 <sup>H,U</sup>  | 250 [121]  | 24 plus  | T74511 <sup>H</sup>  |
|                                 |                   |   |  | 340 [171]  | 18-12  |  |
|                                 |                   |   | W511 <sup>H,U</sup>  | 250 [121]  | 3-8 plus   | T76511 <sup>H</sup>  |
|                                 |                   |   |  | 325 [163]  | 15-18  |  |
|                                 | 890 [477]         |   | W <sup>U</sup>   | 250 [121]  | 6-8 plus   | T732   |
|                                 |                   |   |  | 350 [177]  | 11.5-12.5  |  |
|                                 |                   |   | W <sup>U</sup>   | 250 [121]  | 6-8 plus   | T742   |
|                                 |                   |   |  | 350 [177]  | 6-8  |  |
|                                 |                   |   | W <sup>U</sup>   | 250 [121]  | 6-8 plus   | T762   |
|                                 |                   |   |  | 350 [177]  | 3.5-4.5  |  |
| Die forgings                    | 890 [477]         | 140-160 [60-71]                                   | W <sup>U</sup>   | 250 [121]<br>350 [177]   | 1 to 6 plus<br>4 to 12   | T74  |
| Die forgings &                  | 880-900 [471-482] | 140-160 [60-71]                                   | W <sup>U</sup>   | 250 [121]  | 3-6 plus   | T74  |

**B918/B918M - 17****TABLE 2 Continued**

| Product                                   | Product                          | Solution Heat Treatment                        |  | Precipitation Heat Treatment <sup>B</sup> |                                 |                        |
|---|----------------------------------|--|--|---|---------------------------------|------------------------|
|   |                                  | Metal Temperature, ±10°F [±6°C] <sup>C,D</sup> | Quench Temperature, °F [°C] <sup>E</sup> | Temper                                    | Metal Temperature, ±10°F [±6°C] | Time at Temperature, h |
| hand forgings                             |                                  |  |  | 350 [177]                                 | 6-12                            |                        |
|   |                                  |  | W51 <sup>L,U</sup>                       | 250 [121]                                 | 3-6 plus                        | T7451                  |
|   |                                  |  |  | 350 [177]                                 | 6-10                            |                        |
| Hand forgings                             | 890 [477]                        | 140-160 [60-74]                                | W52 <sup>L,U</sup>                       | 250 [121]                                 | 1 to 6 plus                     | T7462                  |
|   |                                  |  |  | 350 [177]                                 | 4 to 8                          |                        |
|   |                                  |  | W52 <sup>L,U</sup>                       | 250 [121]                                 | 3-6 plus                        | T7452                  |
|   |                                  |  |  | 350 [177]                                 | 6-10                            |                        |
|   |                                  |  | W <sup>U</sup>                           | room temperature                          | 72 plus                         | T6                     |
|   |                                  |  |  | 250 [121]                                 | 48                              |                        |
|   | 890 [477]                        |  | W <sup>U</sup>                           | 250 [121]                                 | 6-8 plus                        | T742                   |
|   |                                  |  |  | 350 [177]                                 | 6-8                             |                        |
|   |                                  |  | W <sup>U</sup>                           | 250 [121]                                 | 6-8 plus                        | T762                   |
|   |                                  |  |  | 350 [177]                                 | 3.5-4.5                         |                        |
| <b>7075 Alloy<sup>A</sup></b>             |                                  |  |  |   |                                 |                        |
| Sheet, bare or Alclad                     | 860-930 [460-499] <sup>V</sup>   | 110 [43] max                                   | W <sup>U</sup>                           | 250 [121]                                 | 24                              | T6                     |
|   |                                  |  | W <sup>U</sup>                           | or 205 [96]                               | 4 plus                          | T73 <sup>X</sup>       |
|   |                                  |  | W <sup>U</sup>                           | 315 [157]                                 | 8                               | T76 <sup>X</sup>       |
|   |                                  |  | W <sup>U</sup>                           | 225 [107]                                 | 6 to 8 plus                     | T62                    |
|   |                                  |  |  | 325 [163]                                 | 24 to 30                        |                        |
|   |                                  |  |  | or 225 [107]                              | 6 to 8 plus                     |                        |
|   |                                  |  |  | 335 [168] <sup>W</sup>                    | 14 to 18                        |                        |
|   |                                  |  |  | 250 [121]                                 | 3 to 5 plus                     |                        |
|   |                                  |  |  | 325 [163]                                 | 15 to 18                        |                        |
|   |                                  |  |  | 250 [121]                                 | 24                              |                        |
|   |                                  |  |  | or 205 [96]                               | 4 plus                          |                        |
|   |                                  |  |  | 315 [157]                                 | 8                               |                        |
| Sheet, bare or Alclad                     | 860-930 [460-499] <sup>V</sup>   | 110 [43] max                                   | W <sup>U</sup>                           | 250 [121]                                 | 24                              | T6                     |
|   |                                  |  | W <sup>U</sup>                           | 225 [107]                                 | 6-8 plus                        | T73 <sup>X</sup>       |
|   |                                  |  |  | 325 [163]                                 | 24-30                           |                        |
|   |                                  |  |  | or 225 [107]                              | 6-8 plus                        |                        |
|   |                                  |  |  | 335 [168] <sup>W</sup>                    | 14-18                           |                        |
|   |                                  |  | W <sup>U</sup>                           | 250 [121]                                 | 3-5 plus                        | T76 <sup>X</sup>       |
|   |                                  |  |  | 325 [163]                                 | 15-18                           |                        |
|   | 870 [466] <sup>V,Y</sup>         |  | W <sup>U</sup>                           | 250 [121]                                 | 23-25                           | T62                    |
| <b>7075 Alloy<sup>A</sup> (Continued)</b> |                                  |  |  |   |                                 |                        |
| Plate, bare or Alclad                     | 860-930 [460-499] <sup>V,Y</sup> | 110 [43] max                                   | W51 <sup>G,U</sup>                       | 250 [121]                                 | 24                              | T651 <sup>G</sup>      |
|   |                                  |  | W51 <sup>G,U</sup>                       | or 205 [96]                               | 4 plus                          | T7351 <sup>G,X</sup>   |
|   |                                  |  | W51 <sup>G,U</sup>                       | 315 [157]                                 | 8                               | T7651 <sup>G,X</sup>   |
|   |                                  |  | W <sup>U</sup>                           | 225 [107]                                 | 6 to 8 plus                     | T62                    |
|   |                                  |  |  | 325 [163]                                 | 24 to 30                        |                        |
|   |                                  |  |  | or 225 [107]                              | 6 to 8 plus                     |                        |
|   |                                  |  |  | 335 [168] <sup>W</sup>                    | 14 to 18                        |                        |
|   |                                  |  |  | 250 [121]                                 | 3 to 5 plus                     |                        |
|   |                                  |  |  | 325 [163]                                 | 15 to 18                        |                        |
|   |                                  |  |  | 250 [121]                                 | 24                              |                        |
|   |                                  |  |  | or 205 [96]                               | 4 plus                          |                        |
|   |                                  |  |  | 315 [157]                                 | 8                               |                        |
| Plate, bare or Alclad                     | 860-930 [460-499] <sup>V,Y</sup> | 110 [43] max                                   | W51 <sup>G,U</sup>                       | 250 [121]                                 | 24                              | T651 <sup>G</sup>      |
|   |                                  |  |  | or 205 [96]                               | 4 plus                          |                        |
|   |                                  |  |  | 315 [157]                                 | 8                               |                        |
|   |                                  |  | W51 <sup>G,U</sup>                       | 225 [107]                                 | 6-8 plus                        | T7351 <sup>G,X</sup>   |
|   |                                  |  |  | 325 [163]                                 | 24-30                           |                        |
|   |                                  |  |  | or 225 [107]                              | 6-8 plus                        |                        |
|   |                                  |  |  | 335 [168] <sup>W</sup>                    | 14-18                           |                        |
|   |                                  |  | W51 <sup>G,U</sup>                       | 250 [121]                                 | 24                              | T7651 <sup>G,X</sup>   |
|   |                                  |  |  | or 250 [121]                              | 3-5 plus                        |                        |
|   |                                  |  |  | 325 [163]                                 | 15-18                           |                        |
|   | 870 [466] <sup>V,Y,AA</sup>      |  | W <sup>U</sup>                           | 250 [121]                                 | 23-25                           | T62                    |
|   |                                  |  |  | or 205 [96]                               | 4 plus                          |                        |
|   |                                  |  |  | 315 [157]                                 | 8                               |                        |
| <b>7075 Alloy<sup>A</sup> (Continued)</b> |                                  |  |  |   |                                 |                        |
| Cold-finished wire, rod, and bar          | 860-930 [460-499] <sup>V,Y</sup> | 110 [43] max                                   | W <sup>U</sup>                           | 250 [121]                                 | 24                              | T6                     |
|   |                                  |  | W <sup>U</sup>                           | 225 [107]                                 | 6-8 plus                        | T73 <sup>X</sup>       |
|   |                                  |  |  | 350 [177]                                 | 8-10                            |                        |
|   |                                  |  | W51 <sup>G,U</sup>                       | 250 [121]                                 | 24                              | T651 <sup>H</sup>      |
|   |                                  |  | W51 <sup>G,U</sup>                       | 225 [107]                                 | 6-8 plus                        | T7351 <sup>H,X</sup>   |