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American National Standard
Alloy and Temper Designation Systems
for Aluminum

Secretariat

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American National Standards Institute

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ON
ALUMINUM AND ALUMINUM ALLOYS

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Foreword

This Standard is a revision of ANSI Standard H35.1/H35.1(M)-2013 Alloy and Temper Designation Systems for Aluminum.

Initially, the Standard consisted of only the alloy designation system for wrought aluminum developed by The Aluminum Association and adopted by that organization in 1954. A booklet describing the system was issued in July 1954 and was approved under the existing standards procedure of the American Standards Association as American Standard H35.1-1957.


The Standard was reissued in 1962 to add the temper designation system that had been in effect in the United States since 1948. Subsequently, MIL-STD-192 was cancelled, since it was the equivalent to American Standard H35.1-1962.

This Standard was originally developed and subsequently revised using the “canvas” method and published under the proprietary sponsorship of the Aluminum Association. At the request of the Aluminum Association, the establishment of Standards Committee H35 on Aluminum Alloys was authorized by the American National Standards Institute on 17 February 1970, with the Association serving as Secretariat.

The 1971 revision of ANSI H35.1 was the first revision developed by Standards Committee H35, under the “Standards Committee” procedures, and the 1972, 1975, 1978, and 1982 revisions were developed under the auspices of that Committee.

Standards Committee H35 was transferred to an Accredited Standards Committee on December 28, 1983, and this revision was developed under the Accredited Standards Committee method.

The latest 2017 edition includes revisions to the definitions of basic H and T tempers, discontinuation of the practice of assigning experimental alloy designations, a revision to the variation requirements, revisions to footnotes 4 and 5 and clarification in section 3.2.1. These changes are indicated by highlights in the text.
Alloy and Temper Designation Systems for Aluminum (ANSI H35.1/H35.1(M)-2017)

1. Scope
This standard provides systems for designating wrought aluminum and wrought aluminum alloys, aluminum and aluminum alloys in the form of castings and foundry ingot, and the tempers in which aluminum and aluminum alloy wrought products and aluminum alloy castings are produced. Specific limits for chemical compositions and for mechanical and physical properties to which conformance is required are provided by applicable product standards.

NOTE: A numerical designation assigned in conformance with this standard should only be used to indicate an aluminum or an aluminum alloy having chemical composition limits identical to those registered with the Aluminum Association and, for wrought aluminum and wrought aluminum alloys, with the signatories of the Declaration of Accord on an International Alloy Designation System for Wrought Aluminum and Wrought Aluminum Alloys.

2. Wrought Aluminum and Aluminum Alloy Designation System
A system of four-digit numerical designations is used to identify wrought aluminum and wrought aluminum alloys. The first digit indicates the alloy group as follows:

<table>
<thead>
<tr>
<th>Alloy Group</th>
<th>First Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum, 99.00 percent and greater</td>
<td>1</td>
</tr>
<tr>
<td>Aluminum alloys grouped by major alloying elements</td>
<td>2</td>
</tr>
<tr>
<td>Copper</td>
<td>2</td>
</tr>
<tr>
<td>Manganese</td>
<td>3</td>
</tr>
<tr>
<td>Silicon</td>
<td>4</td>
</tr>
<tr>
<td>Magnesium</td>
<td>5</td>
</tr>
<tr>
<td>Magnesium and silicon</td>
<td>6</td>
</tr>
<tr>
<td>Zinc</td>
<td>7</td>
</tr>
<tr>
<td>Other element</td>
<td>8</td>
</tr>
<tr>
<td>Unused series</td>
<td>9</td>
</tr>
</tbody>
</table>

NOTE 1—Additional specified elements having limits are inserted in alphabetical order according to their chemical symbols between Titanium and Other Elements, Each, or are listed in footnotes.

Note 2—“Other” includes listed elements for which no specific limit is assigned concomitantly as needed, indicate special control of one or more individual impurities or alloying elements.

The designation assigned shall be in the 1xxx group whenever the minimum aluminum content is specified as 99.00 percent or higher. The alloy designation in the 2xxx through 8xxx groups is determined by the alloying element (Mg, Si for 6xxx alloys) present in the greatest mean percentage, except in cases in which the alloy being registered qualifies as a modification or variation of a previously registered alloy. If the greatest mean percentage is common to more than one alloying element, choice of group shall be in order of group sequence Cu, Mn, Si, Mg, Mg, Si, Zn or others.

The last two digits identify the aluminum alloy or indicate the aluminum purity. The second digit indicates modifications of the original alloy or impurity limits.

2.1 Aluminum
In the 1xxx group for minimum aluminum purities of 99.00 percent and greater, the last two of the four digits in the designation indicate the minimum aluminum percentage.

These digits are the same as the two digits to the right of the decimal point in the minimum aluminum percentage when it is expressed to the nearest 0.01 percent. The second digit in the designation indicates modifications in impurity limits or alloying elements. If the second digit in the designation is zero, it indicates unalloyed aluminum having natural impurity limits; integers 1 through 9, which are assigned consecutively as needed, indicate special control of one or more individual impurities or alloying elements.