Standard Specification for
Stainless and Heat-Resisting Chromium Steel Plate, Sheet,
and Strip

This standard is issued under the fixed designation A176; 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 (ε) indicates an editorial change since the last revision or reapproval.

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

1. Scope

1.1 This specification covers stainless and heat-resisting chromium steel plate, sheet, and strip available in a wide
variety of surface finishes.

1.2 The values stated in inch-pound units are to be regarded as the standard.

Note 1—Grades that were previously covered in both Specifications A176 and A240/A240M have been removed from this specification and
may now be supplied and purchased in compliance with Specification A240/A240M. The chemical and mechanical property requirements of
these grades were identical in Specifications A176 and A240/A240M at the time of removal from Specification A176.

2. Referenced Documents

2.1 ASTM Standards:

A240/A240M Specification for Chromium and Chromium-
Nickel Stainless Steel Plate, Sheet, and Strip for Pressure
Vessels and for General Applications
A370 Test Methods and Definitions for Mechanical Testing
of Steel Products
A480/A480M Specification for General Requirements for
Flat-Rolled Stainless and Heat-Resisting Steel Plate,
Sheet, and Strip
E527 Practice for Numbering Metals and Alloys in the
Unified Numbering System (UNS)

2.2 SAE Standard:3

J1086 Practice for Unified Numbering for Metals and Alloys
(UNS)

3. Chemical Composition

3.1 The steel shall conform to the requirements as to
chemical composition specified in Table 1, and shall conform
to applicable requirements specified in Specification A480/
A480M.

4. Mechanical Properties

4.1 The material shall conform to the mechanical properties
specified in Table 2.

5. General Requirements

5.1 The following requirements for orders for material
furnished under this specification shall conform to the appli-
cable requirements of the current edition of Specification
A480/A480M.

5.1.1 Definitions,
5.1.2 General requirements for delivery,
5.1.3 Ordering information,
5.1.4 Process,
5.1.5 Special tests,
5.1.6 Heat treatment,
5.1.7 Dimensions and permissible variations,
5.1.8 Workmanship, finish, and appearance,
5.1.9 Number of tests/test methods,
5.1.10 Specimen preparation,
5.1.11 Retreatment,
5.1.12 Inspection,
5.1.13 Rejection and rehearing,
5.1.14 Material test report, and
5.1.15 Certification.

3 Available from Society of Automotive Engineers (SAE), 400 Commonwealth
<table>
<thead>
<tr>
<th>UNS Designation</th>
<th>Type</th>
<th>Composition, %</th>
<th>Chemical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>S40300</td>
<td>403</td>
<td>0.15</td>
<td>Carbon Manganese Phosphorus Sulfur Silicon Chromium Nickel Nitrogen Other Elements</td>
</tr>
<tr>
<td>S42000</td>
<td>420</td>
<td>0.15 min</td>
<td>1.00 0.040 0.030 0.50 11.5–13.0 0.60 . . . . . .</td>
</tr>
<tr>
<td>S42200</td>
<td>422</td>
<td>0.20–0.25</td>
<td>0.50–1.00 0.025 0.025 0.50 11.0–12.5 0.50–1.00 . . . Mo 0.90–1.25</td>
</tr>
<tr>
<td>S43100</td>
<td>431</td>
<td>0.20</td>
<td>1.00 0.040 0.030 1.00 15.0–17.0 1.25–2.50 . . . . . .</td>
</tr>
<tr>
<td>S44200</td>
<td>442</td>
<td>0.20</td>
<td>1.00 0.040 0.040 1.00 18.0–23.0 0.60 . . . . . .</td>
</tr>
<tr>
<td>S44600</td>
<td>446</td>
<td>0.20</td>
<td>1.50 0.040 0.030 1.00 23.0–27.0 0.75 0.25 . . . . . .</td>
</tr>
</tbody>
</table>

* Maximum unless range or minimum is indicated.

** New designation established in accordance with Practice E527 and SAE J1086.

The terms Columbium (Cb) and Niobium (Nb) both relate to the same element.

Carbon + nitrogen = 0.030 max.

<table>
<thead>
<tr>
<th>UNS Designation</th>
<th>Type</th>
<th>Tensile Strength, min</th>
<th>Yield Strength, min</th>
<th>Elongation in 2 in. or 50 mm, min, %</th>
<th>Hardness, max</th>
<th>Cold Bend, deg</th>
</tr>
</thead>
<tbody>
<tr>
<td>S40300</td>
<td>403</td>
<td>70</td>
<td>485</td>
<td>30 205</td>
<td>25.0</td>
<td>217 96 180</td>
</tr>
<tr>
<td>S42000</td>
<td>420</td>
<td>100&lt;sup&gt;a&lt;/sup&gt;</td>
<td>690</td>
<td>. . .</td>
<td>. . .</td>
<td>217 96</td>
</tr>
<tr>
<td>S42200</td>
<td>422</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>248 24&lt;sup&gt;b&lt;/sup&gt; not required</td>
</tr>
<tr>
<td>S43100</td>
<td>431</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>285 29&lt;sup&gt;b&lt;/sup&gt; not required</td>
</tr>
<tr>
<td>S44200</td>
<td>442</td>
<td>65</td>
<td>515</td>
<td>40 275</td>
<td>20.0</td>
<td>217 96 180</td>
</tr>
<tr>
<td>S44600</td>
<td>446</td>
<td>65</td>
<td>515</td>
<td>40 275</td>
<td>20.0</td>
<td>217 96 135</td>
</tr>
</tbody>
</table>

<sup>a</sup> Yield strength shall be determined by the offset method at 0.2 % in accordance with Test Methods and Definitions A370. Unless otherwise specified (see 5.1.10), an alternative method of determining yield strength may be based on a total extension under load of 0.5 %.

<sup>b</sup> Either Brinell or Rockwell B hardness is permissible.

<sup>c</sup> Bend test not required for steels thicker than 1 in. (25.4 mm) unless specified by the purchaser.

<sup>d</sup> Material 0.050 in. (1.27 mm) and under in thickness shall have a minimum elongation of 20.0 %.

<sup>e</sup> Maximum. Type 420 is usually used in the heat-treated condition (quenched and tempered to a specified range of hardness or tensile strength).

<sup>f</sup> Rockwell C scale.

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