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1. Scope

1.1 This specification covers chromium-nickel-molybdenum-iron UNS N08366 and UNS N08367* plate, sheet, and strip for use in corrosive service and heat-resisting applications.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 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 become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

E8/E8M Test Methods for Tension Testing of Metallic Materials

E10 Test Method for Brinell Hardness of Metallic Materials

E18 Test Methods for Rockwell Hardness of Metallic Materials

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications


E4140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness

E354 Test Methods for Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 sheet, n—material under 3/16 in. (5 mm) in thickness and 24 in. (610 mm) and over in width.

3.1.2 strip, n—material under 3/16 in. (5 mm) in thickness and under 24 in. (610 mm) in width.

3.1.3 plate, n—material 3/16 in. (5 mm) and over in thickness and over 10 in. (254 mm) in width.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information, as required:

4.1.1 Quantity (feet, metres, or number of pieces),

4.1.2 Alloy name or UNS number,

4.1.3 Finish (hot-rolled or cold-rolled),

4.1.4 Dimensions (thickness, width, and length if cut-length),

4.1.5 Certification, if required,

4.1.6 Purchaser’s inspection, if required,

4.1.7 ASTM designation and year of issue, and

4.1.8 Samples for product analysis, if required.

5. Chemical Composition

5.1 The material shall conform to the composition limits specified in Table 1.

5.2 If a product (check) analysis is made by the purchaser, the material shall conform to the permissible variations for product (check) analysis in Table 1.

6. Mechanical Properties and Other Requirements

6.1 The material shall conform to the mechanical property requirements specified in Table 2.
7. Dimensions and Permissible Variations

7.1 Sheet—Material shall conform to the variations specified in Tables 3-9, inclusive. There will be no flatness requirements for non-stretcher leveled sheet.

7.2 Strip—Material shall conform to the variations specified in Tables 10-13, inclusive. Note that strip of all sizes may be ordered to cut lengths in which case a variation of ½ in. (13 mm) over the specified length shall be permitted. There shall be no flatness requirements for non-stretcher leveled strip.

8. Workmanship, Finish, and Appearance

8.1 The material shall be uniform in quality and condition, smooth, commercially straight or flat, and free of injurious imperfections.

9. Sampling

9.1 Lot for Chemical Analysis and Mechanical Testing:

9.1.1 For thickness under 0.131 (3.33):

- Widths up to 48 (1219) excl
- Widths 48 (1219) and over
- Lengths up to 120 (3048) excl
- Lengths 120 (3048) and over

9.1.2 For thicknesses 0.131 (3.33) and over:

- All widths and lengths

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9.2 Test Material Selection:

9.2.1 Chemical Analysis:

9.2.1.1 An analysis of each lot shall be made by the manufacturer from a representative sample obtained during the pouring of the heat or subsequent processing.

9.2.1.2 If samples for product (check) analysis are specified, a representative sample shall be taken from each lot (see 9.1.1) of finished material.

9.2.2 Sampling for Mechanical Properties—Samples of the material to provide test specimens for mechanical testing shall be taken from such locations in each lot (see 9.1.2) as to be representative of that lot.

10. Number of Tests

10.1 Chemical Analysis—One test per lot.

10.2 Mechanical Tests—One test per lot.

10.3 Retests—If the specimen used in the mechanical test of any lot fails to meet the specified requirements, two additional specimens shall be taken from different sample pieces and
12.3 **Hardness Test**—Test Method E10 or Test Methods E18, as applicable.

12.4 **Hardness Conversion**—Hardness Conversion Tables E140.

12.5 **Determination of Significant Places**—For purposes of determining compliance with the specified limits for the requirements of the properties listed in the following table, round an observed or a calculated value as indicated, in accordance with the rounding methods of Practice E29.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>rounded unit for observed or calculated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical composition</td>
<td>nearest unit in the last right-hand place of figures of the specified limit</td>
</tr>
<tr>
<td>Tensile strength and yield strength</td>
<td>nearest 1000 psi (7 MPa)</td>
</tr>
<tr>
<td>Elongation</td>
<td>nearest 1 %</td>
</tr>
<tr>
<td>Brinell hardness</td>
<td>tabular value&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Rockwell hardness</td>
<td>1 Rockwell number</td>
</tr>
</tbody>
</table>

<sup>A</sup> Round the mean diameter of the Brinell impression to the nearest 0.05 mm and report the corresponding hardness number read from the table without further rounding.

13. **Inspection**

13.1 Inspection of the material shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

14. **Rejection and Rehearing**

14.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

15. **Certification**

15.1 Upon request of the purchaser in the contract or purchase order, a manufacturer’s certification that the material was manufactured and tested in accordance with this specification together with a report of the test results shall be furnished at the time of the shipment.
### TABLE 14 Permissible Variations in Thickness for Plates

<table>
<thead>
<tr>
<th>Specified Thickness, in. (mm)</th>
<th>Width, in. (mm)</th>
<th>Tolerance Over Specified Thickness, in. (mm)</th>
<th>( \frac{3}{8} ) (7.62) to ( \frac{1}{2} ) (12.70), excl</th>
<th>( \frac{1}{2} ) (12.70) to 1 (25.40), excl</th>
<th>Over 108 (2734) to 144 (3658), incl</th>
<th>Over 144 (3658) and Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.075 (1.91)</td>
<td>0.085 (2.16)</td>
<td>0.100 (2.54)</td>
<td>0.100 (2.54)</td>
<td>0.100 (2.54)</td>
<td>0.100 (2.54)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.060 (1.52)</td>
<td>0.065 (1.65)</td>
<td>0.070 (1.78)</td>
<td>0.070 (1.78)</td>
<td>0.070 (1.78)</td>
<td>0.070 (1.78)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.045 (1.14)</td>
<td>0.050 (1.27)</td>
<td>0.055 (1.39)</td>
<td>0.055 (1.39)</td>
<td>0.055 (1.39)</td>
<td>0.055 (1.39)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.030 (0.76)</td>
<td>0.035 (0.89)</td>
<td>0.040 (1.02)</td>
<td>0.040 (1.02)</td>
<td>0.040 (1.02)</td>
<td>0.040 (1.02)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.015 (0.38)</td>
<td>0.020 (0.51)</td>
<td>0.025 (0.63)</td>
<td>0.025 (0.63)</td>
<td>0.025 (0.63)</td>
<td>0.025 (0.63)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
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<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
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<td>0.000 (0.00)</td>
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<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
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<td>0.000 (0.00)</td>
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<td>0.000 (0.00)</td>
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<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
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<td>0.000 (0.00)</td>
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<td>0.000 (0.00)</td>
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<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>( \frac{3}{8} ) (9.52) to 1 (25.40), excl</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
</tbody>
</table>

**NOTE:** The tolerance under specified width and length is 0.01 in. (0.25 mm).
16. Product Marking

16.1 Each bundle or shipping container shall be marked with the name of the material, heat number, condition (temper), the specification number, the size, gross, tare and net weights, consignor and consignee address, contract or order number, or such other information as may be defined in the contract or purchase order.

16.2 When agreed upon between purchaser and manufacturer, material shall be marked individually with the name of the material, heat number, condition (temper), the specification number, size, and producer’s name or mark.

17. Keywords

17.1 plate; sheet; strip; UNS N08367

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### TABLE 17 Permissible Variations in Camber for Sheared Mill and Universal Mill Plates

| Maximum camber | ~1/4 in. in any 5 ft | ~3 mm in any 1.524 m |

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### TABLE 18 Permissible Variations in Diameter for Circular Plates

<table>
<thead>
<tr>
<th>Specified Diameter, in. (mm)</th>
<th>Tolerance Over Specified Diameter for Given Diameter and Thickness, A in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 1/8 (9.52) in., excl, in Thickness</td>
<td>% (9.52) to % (15.88) to 1/2 (25.4) in. (15.88)</td>
</tr>
<tr>
<td>60 (1524) mm to 84 (2134 mm), excl</td>
<td>1/4 (6)</td>
</tr>
<tr>
<td>84 (2134 mm) to 108 (2743 mm), excl</td>
<td>1/4 (6)</td>
</tr>
<tr>
<td>108 (2743 mm) to 180 (4572 mm), excl</td>
<td>7/32 (11)</td>
</tr>
</tbody>
</table>

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### TABLE 19 Recommended Flame Cutting Allowances to Clean Up in Machining Plates, Circles, Rings, and Sketches

<table>
<thead>
<tr>
<th>Specified Thickness, in. (mm)</th>
<th>Machining Allowance per Edge, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 (13) and under</td>
<td>1/8 (6)</td>
</tr>
</tbody>
</table>

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### TABLE 20 Permissible Variations in Abrasive Cutting Width and Length for Plates

<table>
<thead>
<tr>
<th>Specified Thickness, in. (mm)</th>
<th>Tolerance Over Specified Width and Length, A</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 1/4 (6), incl</td>
<td>% (3)</td>
</tr>
</tbody>
</table>

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A Camber is the deviation of a side edge from a straight line, and measurement is taken by placing a 5-ft straightedge on the concave side and measuring the greatest distance between the plate and the straightedge.

A No tolerance under.

A Supplier assumes the appropriate clean-up allowances have been included in ordered dimension.

A No tolerance under.

A Circular and sketch plates over 1/4 in. (15.88 mm) in thickness are not commonly sheared but are machined or flame cut.

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The specification number, the size, gross, tare and net weights, consignor and consignee address, contract or order number, or such other information as may be defined in the contract or purchase order.

16.2 When agreed upon between purchaser and manufacturer, material shall be marked individually with the name of the material, heat number, condition (temper), the specification number, size, and producer’s name or mark.

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