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An American National Standard

Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled[1]

This standard is issued under the fixed designation A 980; 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.

1. Scope

1.1 This specification covers a cold rolled ultra high strength carbon steel sheet in coils or cut lengths. The product is available in four strength levels. The steel's strength is obtained by water quenching from an austenitic temperature resulting in a martensitic microstructure. This product is intended for miscellaneous applications where ultra high strength, weight saving, and good weldability are important.

2. Referenced Documents

2.1 *ASTM Standards:*

A 568/A 568M Specification for Steel, Sheet, Carbon, and High-Strength Low-Alloy, Hot-Rolled and Cold Rolled, General Requirements for[2]

3. Ordering Information

3.1 It is the purchaser's responsibility to specify in the purchase order all ordering information necessary to purchase the needed material. Examples of such information include, but are not limited to:

3.1.1 ASTM specification number and year of issue,

3.1.2 Name of material (cold rolled ultra high strength steel sheet),

3.1.3 Grade (see Table 1),

3.1.4 Specify oiled or not oiled as required,

3.1.5 Dimensions (thickness, width and whether cut lengths or coils),

3.1.6 Coil size (must include inside diameter, outside diameter and maximum mass),

3.1.7 Quantity,

3.1.8 Application (show part identification and description),

3.1.9 Special Requirements (if required), and

3.1.10 Cast or heat analysis report (request if required).

4. Materials and Manufacture

4.1 *Melting Practice*—This sheet shall be produced from aluminum killed steel.

TABLE 1 Chemical Requirements

Composition - Weight % Heat Analysis

Element	Grade			
	130	160	190	220
Carbon, max	0.10	0.15	0.23	0.28
Manganese, max	0.60	0.60	0.60	0.60
Phosphorus, max	0.030	0.030	0.030	0.030
Sulfur, max	0.035	0.035	0.035	0.035
Aluminum, min	0.01	0.01	0.01	0.01

4.2 *Annealing*—The material shall be continuous annealed to austenitic temperatures and water quenched.

5. General Requirements

5.1 Materials furnished under this specification shall conform to the applicable requirements of the current edition of Specification A 568/A 568M unless otherwise provided herein.

6. Chemical Composition

6.1 The cast or heat analysis shall conform to the requirements prescribed in Table 1 and Table 2.

6.1.1 Each of the elements listed in Table 2 shall be included in the report of the cast or heat analysis. Where the amount of copper nickel, chromium or molybdenum is less than 0.02 %, the analysis may be reported as <0.02 %. When the amount of vanadium or columbium is less than 0.008 %, the analysis may be reported as <0.008 %.

7. Mechanical Properties

7.1 *Tension Tests*:

7.1.1 *Requirements*—Materials as represented by the test specimen shall conform to the tensile requirements specified in Table 3.

7.1.2 *Number of Tests*—Two tests shall be made from each heat or from each lot of 50 tons. When the amount of finished material from a heat or lot is less than 50 tons, one test shall be made. When material rolled from one heat differs by 0.050 in. or more in thickness, one tension test shall be made from the thickest and thinnest material regardless of the weight represented.

7.1.3 *Location and Orientation*:

7.1.3.1 Tension test specimens shall be taken at a point immediately adjacent to the material to be qualified.

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.19 on Steel Sheet and Strip.

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[2] *Annual Book of ASTM Standards*, Vol 01.03.

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TABLE 2 Limits on Unspecified Elements

Element[A]	Composition Weight % Heat Analysis
Copper	
When specified, min	.20
When not specified, max	.20
Nickel, max	0.20
Chromium, max	0.15
Molybdenum, max	0.06
Vanadium, max	0.008
Columbium, max	0.008

[A] Minimum copper added.

TABLE 3 Mechanical Requirements

	Tensile Strength
Grade	Min, ksi
130	130
160	160
190	190
220	220

7.1.3.2 Tension test samples shall be taken from the full thickness of the sheet as rolled.

7.1.3.3 Tension test specimens shall be taken from a location approximately halfway between the center of the sheet and the edge of the material as-rolled.

7.1.4 *Retests*:

7.1.4.1 A retest shall be permitted if the results of an original tension specimen are within 2 ksi of the required tensile strength.

7.1.4.2 A retest shall consist of one random specimen from the same heat or lot as the original specimen.

7.1.4.3 If the results of the retest specimen meet the specified requirements, the cast or test lot shall be accepted.

8. Finish and Appearance

8.1 *Surface Finish*—The sheet shall have a matte surface texture.

8.2 *Oiling*:

8.2.1 Unless otherwise specified, the sheet shall be oiled.

8.2.2 When required, the sheet may be specified to be not oiled (dry).

8.3 *Edges*—The sheet shall have cut edges.

9. Certification and Reports

9.1 When required by the purchase order, the producer shall furnish the test results of the cast or heat analysis or the mechanical properties, or both. The report shall include the purchase order number, ASTM designation number and year issue, and cast or lot number correlating the test data with the material represented.

10. Keywords

10.1 carbon steel sheet; cold rolled steel sheet; steel sheet; ultra high-strength

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