



Designation: A 980 – 97

## Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled<sup>1</sup>

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 ( $\epsilon$ ) 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<sup>2</sup>

### 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.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.19 on Steel Sheet and Strip.

Current edition approved Nov. 10, 1997. Published June 1998.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.03.

**TABLE 1 Chemical Requirements**

Element	Composition - Weight % Heat Analysis			
	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.