



SURFACE VEHICLE RECOMMENDED PRACTICE

J1392™

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Superseding J1392 FEB2001

Steel, High Strength, Hot Rolled Sheet and Strip,
Cold Rolled Sheet, and Coated Sheet¹

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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NOTE 1—This document shall not be used on new designs—Superseded by SAE J2340.

NOTE 2—NOTE—High-strength, low-alloy Sheet and Strip products formerly were included in SAE J410c (Cancelled), but are now detailed in this separate SAE Recommended Practice.

1. **Scope**—This SAE Recommended Practice covers seven levels of high strength carbon and low-alloy hot rolled sheet and strip, cold rolled sheet, and coated sheet steels. The strength is achieved through chemical composition and special processing.

2. References

- 2.1 **Applicable Publications**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

- 2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J410c (Cancelled)—High Strength, Low Alloy Steel

SAE J2340—Categorization and Properties of Dent Resistant, High Strength, and Ultra High Strength Automotive Sheet Steel

- 2.1.2 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM A 308—Specification for Steel, Sheet, Cold-Rolled, Long Terne Coated

ASTM A 370—Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM A 463—Specification for Steel Sheet, Cold-Rolled, Aluminum-Coated Type I and Type II

ASTM A 568—Specification for General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet

ASTM A 568M—Specification for General Requirements for Steel, Carbon, and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet (Metric)

ASTM A 591—Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications

ASTM A 924—Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip-Process

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1. The values stated in U.S. customary units are to be regarded as the standard recommended practice.

3. **Introduction**—High strength steel discussed in this document involves hot rolled sheet and strip and cold rolled sheet as dimensionally described in ASTM A 568 (A 568M) latest revision (Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet, Hot-Rolled Strip and Cold-Rolled Sheet, General Requirements). It also includes coated sheet, that is, sheet coated by hot dipping, electroplating, or vapor deposition of zinc, terne, aluminum, and organic compounds normally applied by coil coating. Public specifications related to these coated products are the latest revisions of ASTM A 924 (Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements), A 591 (Steel Sheet, Cold Rolled, Electrolytic Zinc-Coated), A 463 (Steel Sheet, Cold-Rolled, Aluminum-Coated Type 1), and A 308 (Steel, Sheet, Cold-Rolled, Long Terne Coated).

The strength is achieved through chemical composition and special processing. Special processing includes mechanical rolling techniques, and temperature control in hot rolling and subsequent heat treatments. The primary use of high strength steel is based on the increased yield and tensile properties which are higher than those of conventional sheet and strip for which minimum mechanical properties are not normally specified.

The seven strength levels are 240 (35), 280 (40), 310 (45), 340 (50), 410 (60), 480 (70), and 550 (80) MPa (ksi) minimum yield strength. Different chemical compositions are normally used to achieve the specified mechanical properties. These compositions are significantly different at the same strength level depending on additional material requirements, that is, weldability, formability, toughness, fatigue life, atmospheric corrosion resistance, and economics. The correct type of high strength sheet or strip should be specified to establish compatibility of the producers' chemical composition with the fabrication and application requirements.

Because high strength steel is characterized by special mechanical properties, consultation of producer and user in grade selection is recommended to insure compatibility of the strength and forming requirements. Care must be taken in designing parts, tooling, and fabrication processes to obtain the greatest benefit from the high strength sheet and strip steels. It is advisable that the purchaser furnish information to the producer relating the individual requirements of an identified part; this may be accomplished by visual examination of the part, by prints, through a description, or a combination of these. Also, it is highly desirable for the producer to observe the fabricating practices, or at least be provided with a detailed description of the operations.

The steels discussed in this document are characterized by their special mechanical properties achieved through chemical composition and special processing. They normally are not intended for any heat treatment by the purchaser. Subjecting these steels to such heat treatments will modify the original mechanical properties. For certain applications these steels may be annealed, normalized, or stress relieved with some effect on the mechanical properties. It is recommended that prior to such heat treatments the producer and purchaser consult to determine the need for a heat treatment and its effect on mechanical properties.

All grades and chemical compositions in this practice are weldable despite the differences in carbon, manganese, and alloying additions. However, as variations in composition from one producer to another do exist, it is advisable to discuss with the producers the features of their chemical composition relative to specific types of welding and any special considerations for each application.

These steels, because of their strength-to-weight ratio, may be adapted for use in mobile equipment and other structures where substantial weight savings are generally desirable.