



Designation: A 424 – 06

Standard Specification for Steel, Sheet, for Porcelain Enameling¹

This standard is issued under the fixed designation A 424; 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 sheet steel in coils and cut lengths for porcelain enameling. The compositions and processing of these steels are such that articles for porcelain enameling may be fabricated from them and, under proper conditions, enameled. The steels are furnished as Type I, Type II, and Type III. Type I and Type II are supplied in two designations, Commercial Steel and Drawing Steel. Type III steel is interstitial-free and does not require a designation.

2. Referenced Documents

2.1 ASTM Standards:²

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

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

3. Terminology

3.1 *Definitions*—For definitions of other terms used in this specification, refer to Terminology A 941.

3.2 *Definitions of Terms Specific to This Standard:*

3.3 *base coat*—also known as ground coat. This coating layer is applied directly to the steel and promotes adhesion of the coating system to the steel.

3.4 *cover coat*—This coating layer is usually applied over the base or ground coat to improve the appearance and provide the proper color.

3.5 *direct cover coat*—This refers to a single coating application that provides both adequate adhesion and appearance.

4. Classification

4.1 *Types:*

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 For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.1.1 *Type I* steel has an extremely low carbon level achieved through sheet decarburization. This material is suitable for direct cover coat enameling practice, but this requirement must be indicated by the purchaser in accordance with 5.1.6. This material is also suitable for ground and cover coat enameling practice. It has good sag resistance and good formability.

4.1.2 *Type II* steel is suitable for applications where ground and cover coat enameling operations are employed. The composition of the Type II steel is obtained in melting operations.

4.1.3 *Type III* is an interstitial-free steel and is suitable for applications where ground and cover coat enameling operations are employed. The composition of the Type III steel is obtained in melting operations. It has good sag resistance and excellent formability.

4.2 *Product Designations:*

4.2.1 *Commercial Steel* is intended for parts where bending, moderate forming, or moderate drawing may be involved.

4.2.2 *Drawing Steel* is intended for fabricating identified parts where the draw is particularly severe or where the material shall be essentially free of changes in mechanical properties over a period of time. Drawing Steel should be specified where the formed material shall be essentially free of such surface disturbances as stretcher strains or fluting without the need of prior roller leveling.

4.2.3 *Type III* interstitial-free steel is intended for fabricating identified parts where the most severe drawing or forming is involved and where the material must be free of changes in mechanical properties over a period of time and free of such surface disturbances as stretcher strains or fluting without the need of prior roller leveling.

4.3 *Porcelain Enamels:*

4.3.1 Ground coat enamels are glasses used primarily for their bonding characteristics. They may be applied after proper metal preparation (either pickle or pickle-free depending on enamel system). These glasses may be applied as either dry powders or wet slips. This type enamel is suitable for all three types of steel (Type I, II, or III).

4.3.2 Cover coat enamels are appearance glasses applied for specific color, corrosion, alkali resistance, and so forth. These enamels may be applied directly to Type I steels after suitable

*A Summary of Changes section appears at the end of this standard.