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Standard Terminology Relating to Metallic Coated Steel Products¹

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1. Scope

1.1 This standard is a compilation of terminology related to metallic coatings used in the steel industry, and to the steel on which the coatings are applied. Terms that are generally understood or adequately defined in other readily available sources are not included.

1.2 When a term is used in an ASTM document for which Committee A05 is responsible it is included herein only when judged, after review by Subcommittee A05.18, to be a generally usable term.

1.3 Definitions that are identical to those published by other ASTM committees or other standards organizations are identified with the ASTM standard designation (for example, Terminology B 374) or with the abbreviation of the name of the organization.

1.4 A definition is a single sentence with additional information included in notes. The year the definition was adopted, or the year of latest revision, is appended. The responsible subcommittee reviews the definition for each term at five-year intervals, and prepares revisions as needed.

2. Referenced Documents

2.1 ASTM Standards:

- A 641/A 641M Specification for Zinc-Coated (Galvanized) Carbon Steel Wire²
- B 374 Terminology Relating to Electroplating³
- D 2092 Guide for Treatment of Zinc-Coated (Galvanized) Steel Surfaces for Painting⁴

3. Terminology

3.1 Definitions:

aluminized coating, *n*—a coating on steel of aluminum alloy, typically 89 to 99 % aluminum; generally applied to steel sheet and wire by the hot-dip process. (1994)

barb, *n*—as related to *barbed wire*, a short length of wire, with exposed ends cut on a bias to produce sharp points. (1995)

barbed wire, *n*—a fabricated wire product consisting of two line wires twisted to form a two-wire strand, into which 2-point or 4-point barbs are tightly wrapped and locked into place at specified intervals. (1995)

base metal, *n*—as related to *metallic-coated steel*, the steel to which the coating is applied, as distinguished from the coating metal. (1990)

batch coating, *n*—of *metallic coated steel products*, the process of discontinuous-sequential passage of steel articles through the various steps of the coating process, such as, cleaning, pickling, fluxing, and coating. (1995)

breaking strength, *n*—as related to *wire*, the maximum force developed prior to fracture during tension testing of wire and wire products.

DISCUSSION—In testing of stranded wire products, the maximum force may be developed after fracture of one or more individual wires. (1993)

carbon steel, *n*—steel for which (1) no minimum content is specified for chromium, cobalt, molybdenum, nickel, titanium, tungsten, or zirconium, or any other element added to obtain a desired alloying effect; (2) for which the specified minimum for copper does not exceed 0.40 %; (3) for which the specified maximum for any of the following elements does not exceed these percentages: manganese 1.65 %, silicon 0.60 %, or copper 0.60 %; and (4) in which the incidental content of the following elements does not exceed these percentages: nickel, 0.25 %; chromium, 0.20 %; and molybdenum, 0.06 %.

DISCUSSION—Carbon steels typically contain small quantities of certain residual elements from the feed materials. When the quantity of such retained elements exceeds the values listed in (4) above, the characteristics of the steel may differ from that of carbon steel without those elements to a degree that the steel may be unsatisfactory for the intended use. (1998)

cast analysis, *n*—Deprecated term. Use preferred term **heat analysis**. (1997)

check analysis, *n*—Deprecated term. Use preferred term **product analysis**. (1990)

chemical treatment, *n*—a passivating treatment normally applied to metallic coatings to retard the formation of corrosion products (storage stain) during shipment and storage.

DISCUSSION—The inhibiting characteristics of the treatment are

¹ This terminology is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.18 on Editorial and Terminology.

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² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 02.05.

⁴ Annual Book of ASTM Standards, Vol 06.02.



limited and if a lot becomes wet in shipment or storage, the product should be used or dried immediately. Chemical treatment may be undesirable because of further processing, such as phosphatizing or painting. (1991)

continuous coating, *n*—*of metallic coated steel products*, the process of uninterrupted passage of long lengths of steel products, usually steel sheet or wire, through the various processing steps such as cleaning, annealing, and coating.

DISCUSSION—Continuous coating involves the use of equipment that is capable of joining long lengths of product without stoppage of the coating process. (1995)

delamination, *n*—*as related to metallic coated steel*, the separation of a coating (either full or partial thickness) from underlying layers; the separation can occur in small localized areas or large areas of surface.

DISCUSSION—*Flaking*, *peeling*, and *spalling* are colloquial terms sometimes used to describe the separation. (1997)

differentially coated sheet, *n*—metallic coated sheet with specified difference in weight (mass) of metallic coating between the two surfaces. (1991)

electrolytic process, *n*—the application of a metallic coating on a steel product by passing an electric current through a chemical solution in which the product is immersed; the coating may be applied in a continuous process or a batch process. (1995)

embrittlement, *n*—the loss or partial loss of ductility in a steel, such that failure is characteristically by fracture without appreciable deformation. (1990)

extra smooth sheet, *n*—product produced by cold rolling (skin passing) the metallic coated sheet with a small reduction in thickness to smooth the surface and impart resistance to stretcher strain. (Syn. **skin passed sheet**)

DISCUSSION—Extra smooth is frequently specified when fluting or stretcher strains may be a hazard. Extra smooth may not be available in all coating types or weights (masses). (1991)

fabricator, *n*—*as related to corrugated metal pipe*, (1) the organization that produces the finished pipe, or (2) for structural plate pipe, the organization that processes flat sheets and other items needed for the field assembly of the finished products. (1990)

flaking—See **delamination**. (1994)

galvanized coating, *n*—a coating of virtually pure zinc on steel, applied by various methods or processes including hot-dip process and electrodeposition (electrolytic process).

DISCUSSION—For hot-dipped galvanized coatings, the molten bath is typically at least 99 % zinc; as applied to the steel, the coating typically contains intermetallic layers of zinc-iron alloys adjacent to the steel surface. Other methods of applying the zinc coating include metal spraying (metallizing), sherardizing, vacuum deposition, and mechanical deposition, but there is not general agreement that all produce a “galvanized coating”. There is general agreement that the coating produced by application of zinc-rich paint is not a “galvanized coating”. (1999)

galvannealed coating, *n*—a coating on steel of zinc-based alloy, containing about 6 to 15 % iron, produced by hot-dip immersion in a high-zinc content coating bath, followed by

heating the steel to induce diffusion alloying between the molten zinc coating and the steel. (1994)

grain pattern, *n*—Synonym for **spangle**. (1999)

heat, *n*—a specific lot of material representing a single melt of steel produced to a specified chemical analysis. (1991)

heat analysis, *n*—a chemical analysis representative of a specific heat of steel. (1997)

DISCUSSION—The sample on which the analysis is performed is usually taken from the molten steel.

hot-dip process, *n*—the application of a metallic coating on a steel product by immersion of the product in a bath of the molten metal which forms the coating; the coating may be applied in a continuous process or a batch process. (1995)

ladle analysis, *n*—Deprecated term. Use preferred term **heat analysis**. (1997)

lot, *n*—a finite quantity of a given product, produced under conditions that are considered uniform for sampling purposes. (1995)

DISCUSSION—In the case of metallic-coated iron or steel products, the conditions which may be considered necessary for a single lot are similar units, coating at approximately the same time, in the same manner, in a single coating bath. Consideration must also be given to the uniformity of the iron or steel product to which the coating is applied, such as being from a single heat. For material sampled after shipment from the manufacturer's or coaters facility (where the heat or processing identification may have been lost), a lot may consist of all similar material in a given shipment.

manufacturer, *n*—*as related to corrugated metal pipe*, the organization that produces the metal sheet from which pipe is made. (1990)

mechanical polishing, *n*—*of metallic coatings*, the loosening and detachment of superficial, small particles of coating metal during processing or testing, due to mechanical abrasion. (1994)

minimum thickness, *n*—*of steel sheet*, an ordering designation which indicates that the applicable tolerance for thickness is all plus from the ordered thickness.

DISCUSSION—As an example, the thickness tolerance for sheet material ordered as 0.035 in. minimum is +0.008 in., −0.000 in., and the allowable range of thickness is 0.035 in. to 0.043 in. [or ordered as 1.32 mm minimum is +0.26 mm, −0.00 mm, and the allowable range of thickness is 1.32 mm to 1.58 mm]. The total thickness tolerance for sheet ordered to minimum thickness is usually twice the tabular tolerance for sheet ordered to nominal thickness. (1997)

nominal thickness, *n*—*of steel sheet*, an ordering designation which indicates that the applicable tolerance for thickness is both plus and minus from the ordered thickness.

DISCUSSION—As an example, the thickness tolerance for sheet material ordered as 0.035 in. nominal is +0.004 in., −0.004 in., and the allowable range of thickness is 0.031 in. to 0.039 in. [or ordered as 1.32 mm nominal is +0.13 mm, −0.13 mm, and the allowable range of thickness is 1.19 mm to 1.45 mm]. (1997)

oiled, *adj*—describing a coating applied to metallic coated steel sheet alone or in addition to chemical treatment for further protection against the onset of storage corrosion; the oil coating is intended as a corrosion inhibitor only and not