



Designation: D4147 – 18 (Reapproved 2023)

Standard Practice for Applying Coil Coatings Using Wire-Wound Drawdown Bars¹

This standard is issued under the fixed designation D4147; 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 practice covers a procedure for applying a coil coating film of uniform thickness on a flat metal panel using wire-wound drawdown bars.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Summary of Practice

2.1 A flat panel is secured on a firm horizontal surface. An ample amount of coating is poured across one end of the panel and the drawdown bar placed behind the coating. The bar is then drawn with uniform pressure and speed along the length of the panel toward the operator to apply a uniform film. The wet and dry film coating thickness obtained is dependent on the combination of the bar used, the volume solids of the coating, and the speed of the drawdown motion.

3. Significance and Use

3.1 This practice is useful in the laboratory to simulate roll-coated films.

4. Apparatus

4.1 **Wire-Wound Drawdown Bars**—A set of stainless steel wire-wound drawdown bars of sufficient diameter to prevent bowing during application. These bars are manufactured so that the diameter of the wire wound on the bar controls thickness of the wet film applied. The choice of specific drawdown bar is dependent on the dry film thickness required

and the volume solids of the coating under test. Each bar is provided a numeric identifier to help in selecting the correct bar to provide a specific dry film thickness.

4.2 Devices for Securing Panels:

4.2.1 **Magnetic Chuck** for securing steel panels to eliminate bowing.

4.2.2 **Vacuum Plate** for securing very lightweight nonmagnetic panels.

4.2.3 **Tape** for securing the top of thin-gage panels.

4.2.4 **Mechanical Drives** for securing panels and automating the drawdown procedure.

5. Hazards

5.1 The flash points of most solvents used in coatings and related products are low enough that adequate ventilation is needed to avoid exceeding 25 % of the lower explosive limits of the solvent when preparing and baking the panels. These solvents could be toxic, care should be taken to avoid inhalation of the vapors and unnecessary contact of the solvents with the skin. Consult the corresponding SDS for the specific coating to be applied for additional hazards.

6. Procedure

6.1 Deburr panels so edges are smooth. Secure a flat panel to be coated on a firm, uniform, level surface. To provide sufficient testing surface pour an ample amount of coating across the top end of the panel. Place the drawdown bar behind the coating and pull into the coating. Rotate the drawdown bar in the coating to ensure complete wetting of the coating in the threads of the bar. Apply uniform pressure across the contact length of the drawdown bar and hold it firmly without allowing rotation. Using only one pass, draw the bar along the length of and off the panel at a uniform speed and pressure so that a continuous film is produced. Application of the coating is dependent upon the rheology, type of coating, and speed and pressure to achieve the uniform desired film. Remove the coated panel and bake, force dry, or air dry the coating in accordance with its type so its dry film thickness can be measured. A heavier film thickness may be obtained along the edges of the panel and at the top of the panel where the coating was poured. For each additional coating layer, the side edges must be trimmed to eliminate the heavier areas on the previous coat before applying an additional coat.

¹ This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.53 on Coil Coated Metal.

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