



Standard Practice for Applying Coil Coatings Using The Wire-Wound Drawdown Bar¹

This standard is issued under the fixed designation D 4147; 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 coating film of uniform thickness on a flat panel using the wire-wound drawdown bar.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

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.

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.

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 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 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 is obtained along the edges of the panel and possibly at the top of the panel where the coating was poured. For a two-coat system, the side edges must be trimmed to eliminate the heavier areas on the first coat before applying the second coat.

7. Keywords

7.1 coil coatings; drawdown bars

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

Current edition approved May 10, 1999. Published July 1999. Originally published as D 4147 – 82. Last previous edition D 4147 – 93.

 **D 4147**

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.