



Standard Practice for Preparation of Nickel for Electroplating with Nickel¹

This standard is issued under the fixed designation B343; 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.

^{e1} NOTE—Warning note in 4.2 updated in May 2004.

1. Scope

1.1 This practice summarizes well-known, generally practical methods for producing adherent electrodeposits of nickel on nickel.

1.2 Electrodeposits of nickel on nickel are produced, for example, to improve the performance of decorative coatings, to reclaim electroplated parts that are defective, and to resume nickel electroplating after interruptions in processing. Interruptions may be deliberate, for example, to machine the electrodeposit at an intermediate stage in the electrodeposition of thick nickel coatings. The interruptions may be unintentional, for example, resulting from equipment and power failures.

1.3 To ensure good adhesion of nickel to nickel, precautions should be taken to avoid biopolar effects during nickel electroplating. This is of particular importance in return-type automatic plating machines where one rack follows another rack closely. Bipolar effects can be avoided by making the racks cathodic while they are entering or leaving the nickel tank. Separate current control on entry and exit stations is desirable.

1.4 *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. Types of Nickel

2.1 The types of nickel for which an overplate of nickel may be desired are dull nickel, semi-bright nickel, bright nickel, and nickel strike. Variations in these types may possibly require special handling.

2.2 Surface conditions of the nickel may vary as follows:

2.2.1 Freshly electroplated surfaces that are still wet with electroplating solution or rinse water (see 5.1),

2.2.2 Freshly electroplated surfaces that have been allowed to dry (see 5.2),

2.2.3 Buffed, polished, or machine-ground surfaces (see 5.3), and

2.2.4 Surfaces that have been given a reverse-current treatment in an alkaline solution for cleaning or possibly stripping an overplate of chromium (see 5.4).

3. Cleaning

3.1 The following cleaning treatments may be used for all conditions and types of electrodeposited nickel. The choice of the procedure will be governed largely by the condition of the surface.

3.1.1 *Degreasing*—Degreasing is used to remove the bulk of grease, oil, and buffing compounds that may be present on the surface. The cleaning may be effected with vapor degreasing, organic solvents, emulsion cleaners, or soak cleaner.

3.1.2 *Electrolytic Alkaline Cleaning*—Removal of final traces of dirt, grease, and oil is accomplished best with electrolytic alkaline cleaning. The solution may be either a proprietary cleaner or a formulated one. Since a nickel surface forms an oxide coating if treated anodically in an alkaline solution, this condition must be altered in subsequent steps if it cannot be avoided.

4. Activating

4.1 The procedure used for etching or activating the nickel surface usually determines the soundness of the adhesion. The choice of the procedure may be governed by the condition of the surface and possibly the type of nickel. The milder etching treatment should be used in the case of highly finished surfaces, but it may result in sacrificing maximum adhesion. The thickness of the nickel may militate against the use of certain etching procedures, and therefore the thickness removed is indicated for each procedure described in 4.2 to 4.8.

4.2 *Anodic Treatment in Concentrated Sulfuric Acid*—(Nickel removed nil). A70 mass % sulfuric acid solution containing 661 mL of concentrated, 96 mass % sulfuric acid (density 1.83 mL) diluted to 1 L may be used for activating the nickel surface provided the temperature of the solution is not over 30°C (see **Warning**). When the initial mixture cools, dilute to exact volume. The time of treatment should be about 1 min at a current density of 10 A/dm². At this current density the nickel normally goes passive and a bright surface becomes

¹ This practice is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.02 on Pre Treatment.

Current edition approved April 1, 2004. Published May 2004. Originally approved in 1960. Last previous edition approved in 1998 as B343 – 92a (1998). DOI: 10.1520/B0343-92AR04E01.