Standard Specification for Electrodeposited Coatings of Tin-Nickel Alloy[1]

This standard is issued under the fixed designation B605; 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 specification covers the requirements for electrodeposited tin-nickel alloy coatings from aqueous solutions intended for the corrosion protection of fabricated articles of iron, steel, zinc-base alloys, copper, and copper alloys. The composition of the alloy remains constant at 65/35 tin-nickel in spite of wide fluctuations in both composition and operating conditions. The composition corresponds quite closely to an equiatomic ratio, and the process favors the co-deposition of tin and nickel atoms at identical rates.

1.2 This specification does not apply to sheet, strip, or wire in the fabricated form. It also may not be applicable to threaded articles having basic major diameters up to and including 19 mm because of the nonuniformity of thickness that can be expected on fine threads. However, a decision to use the coating on such components may be made by the purchaser.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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. Referenced Documents

2.1 *ASTM Standards:*[2]

B183 Practice for Preparation of Low-Carbon Steel for Electroplating
B242 Guide for Preparation of High-Carbon Steel for Electroplating
B246 Specification for Tinned Hard-Drawn and Medium-Hard-Drawn Copper Wire for Electrical Purposes
B252 Guide for Preparation of Zinc Alloy Die Castings for Electroplating and Conversion Coatings
B281 Practice for Preparation of Copper and Copper-Base Alloys for Electroplating and Conversion Coatings
B322 Guide for Cleaning Metals Prior to Electroplating
B374 Terminology Relating to Electroplating
B487 Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
B499 Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals
B504 Test Method for Measurement of Thickness of Metallic Coatings by the Coulometric Method
B507 Practice for Design of Articles to Be Electroplated on Racks
B567 Test Method for Measurement of Coating Thickness by the Beta Backscatter Method
B568 Test Method for Measurement of Coating Thickness by X-Ray Spectrometry
B571 Practice for Qualitative Adhesion Testing of Metallic Coatings
B602 Test Method for Attribute Sampling of Metallic and Inorganic Coatings
B634 Specification for Electrodeposited Coatings of Rhodium for Engineering Use
B697 Guide for Selection of Sampling Plans for Inspection of Electrodeposited Metallic and Inorganic Coatings
B762 Test Method of Variables Sampling of Metallic and Inorganic Coatings
B765 Guide for Selection of Porosity and Gross Defect Tests for Electrodeposits and Related Metallic Coatings
B809 Test Method for Porosity in Metallic Coatings by Humid Sulfur Vapor ("Flowers-of-Sulfur")
B849 Specification for Pre-Treatments of Iron or Steel for Reducing Risk of Hydrogen Embrittlement
B850 Guide for Post-Coating Treatments of Steel for Reducing the Risk of Hydrogen Embrittlement
D3951 Practice for Commercial Packaging

3. Terminology

3.1 *Definitions:*

3.1.1 Many terms used in this standard are defined in Terminology B374.

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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.

3.1.2 *significant surface*—that portion of a coated article's surface where the coating is required to meet all the requirements of the coating specification for that article. Significant surfaces are those that are essential to the serviceability or function of the article, or which can be a source of corrosion products or tarnish films that interfere with the function or desirable appearance of the article. Significant surfaces are those surfaces that are identified by the purchaser by, for example, indicating them on an engineering drawing of the product or marking a sample item of the product.

3.1.3 *undercoating*—a metallic coating layer between the basis metal or substrate and the topmost metallic coating. The thickness of an undercoating is usually greater than 0.8 µm. This is in contrast to strikes or flashes, whose thicknesses are generally lower.

4. Classifications

4.1 *Coating Grades*—Six grades of coatings, designated by service condition numbers, are covered by this specification. For each coating grade a coating thickness grade is specified (see Tables 1-3).

4.2 *Service Condition Number*—The service condition number indicates the severity of exposure for which the grade of coating is intended.

SC5—extended severe service
SC4—very severe service
SC3—severe service
SC2—moderate service
SC1—mild service
SC0—mild service (copper and copper alloys only)

NOTE 1—Typical service conditions for which the service condition numbers are appropriate are given in Appendix X1.

4.3 *Coating Thickness Notation*—The coating thickness is specified for each service condition in the following manner: Basis metal/Undercoating (thickness)/Sn-Ni (thickness). For example, Fe/Cu4/Sn-Ni25 would indicate a 25 µm tin-nickel coating over an iron or steel article with a 4-µm thick copper undercoating. All thickness notations are minimum thicknesses.

5. Ordering Information

5.1 To make the application of this standard complete, the purchaser needs to supply the following information to the seller in the purchase order or other government documents.

5.1.1 The name, designation, and date of issue of this standard,

TABLE 1 Tin-Nickel Coatings on Steel

Service Condition Number		Thickness Notation	Minimum Thickness, µm
5	Fe/Cu[A] /Sn-Ni	as specified[B] (above 45)	as specified[B] (above 45)
4	Fe/Cu[A] /Sn-Ni	45	45
3	Fe/Cu[A] /Sn-Ni	25	25
2	Fe/Sn-Ni	15	15
1	Fe/Sn-Ni	8	8

[A] Copper undercoat shall be at least 4.0 µm.

[B] Thickness of Sn-Ni shall be stated in a Thickness Notation. A statement of Service Condition 5 is not sufficient.

TABLE 2 Tin-Nickel Coatings on Copper or Copper Alloys

Service Condition Number		Thickness Notation	Minimum Thickness, µm
5	Cu/Sn-Ni[A]	as specified[B] (above 45)	as specified[B] (above 45)
4	Cu/Sn-Ni[A]	45	45
3	Cu/Sn-Ni[A]	25	25
2	Cu/Sn-Ni[A]	15	15
0	Cu/Sn-Ni[A]	4	4

[A] An undercoating of copper 4.0 µm thick shall be applied on copper-zinc alloys to serve as a zinc diffusion barrier.

[B] Thickness of Sn-Ni shall be stated in a Thickness Notation. A statement of Service Condition 5 is not sufficient.

TABLE 3 Tin-Nickel Coatings on Zinc Alloys

Service Condition Number		Thickness Notation	Minimum Thickness, µm
4	Zn/Cu[A] /Sn-Ni	45	45
3	Zn/Cu[A] /Sn-Ni	25	25
2	Zn/Cu[A] /Sn-Ni	15	15
1	Zn/Cu[A] /Sn-Ni	8	8

[A] An undercoating of copper 4.0 µm thick shall be applied to prevent zinc from contaminating the Sn-Ni plating bath and to serve as a diffusion barrier.

5.1.2 Location of significant surface(s) (see section 3.1.2),

5.1.3 The service number or coating thickness notation (see 4.2 and 4.3),

5.1.4 Undercoating, if required (see 6.2 and Tables 1-3),

5.1.5 Any requirement for submission of sample coated articles (see 7.2.1),

5.1.6 Whether or not location of rack marks is to be defined (see 7.2.1),

5.1.7 Any requirement for porosity testing and the criteria for acceptance (see 7.5.2),

5.1.8 Heat treatment for stress relief, whether it has been performed by the purchaser, or is required (see 7.6),

5.1.9 Heat treatment after electroplating, if required (see 7.7),

5.1.10 Any packaging requirement (see section 7.8),

5.1.11 Inspection procedure to be used (see Section 9),

5.1.12 Any requirement for certification (see Section 11), and

5.1.13 Any requirement for test specimens (see 8.1.1).

6. Material and Process

6.1 *Composition of Coating*—Electrolytes that have been investigated for producing Sn-Ni alloy deposits include cyanide, fluoborate, pyrophosphate, and acetate, but the only one in general commercial use is the fluoride-chloride formulation.[3] The deposit contains 35 ± 5 % nickel with the remainder tin (see Note 2).

NOTE 2—The electrodeposited tin-nickel coating is a single-phase, metastable compound, corresponding approximately to the formula SnNi. It is stable at ordinary temperatures but starts to recrystallize at elevated temperatures. The safe working temperature of the coating is 300°C, although actual melting does not commence below 800°C. The coating is

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[3] Lowenheim, F. A., *Electroplating*, McGraw-Hill Inc., 1978.

hard (700HV100). Like many such compounds, it is inherently somewhat brittle, but if it is free of internal stresses, the brittleness is not sufficient to impair its serviceability or to cause the coating to flake under impact. Because of the brittleness of the tin-nickel, however, it is not possible to fabricate parts by bending coated sheet material, because the compressive stresses in the coating on the inside of the bend usually cause some of the coating to flake off. To provide serviceability, the coating must be deposited in a stress-free condition. In addition, it is generally inadvisable to specify tin-nickel finish for parts subject to deformation in service.

6.2 *Basis Metal*—Tin-nickel can be deposited directly on steel, copper, and copper-base alloys. However, an undercoating of copper can improve performance in some systems and shall be used under the following conditions:

6.2.1 On steel, a copper undercoating with a minimum thickness of 4 µm, shall be used for Service Conditions 3, 4, and 5.

6.2.2 On copper-zinc alloys, a copper undercoating with a minimum thickness of 4 µm shall be used for all service conditions to prevent diffusion of the zinc.

6.2.3 Zinc-base alloys shall have an undercoating of a minimum of 4 µm of copper to prevent diffusion of the zinc into the deposit and to prevent contamination of the electrolyte with zinc.

NOTE 3—Tin-nickel-coated zinc-alloy diecastings shall never be returned for remelting to prevent contamination of the zinc alloy with tin.

7. Coating Requirements

7.1 *Composition of Coating*—The deposit shall contain 65 ± 5 % tin, the balance nickel.

7.2 *Appearance:*

7.2.1 The coating on all readily visible surfaces shall be smooth, fine grained, continuous, adherent, free of visible blisters, pits, nodules, indications of burning, excessive buildup, staining, and other defects. All tin-nickel coated articles shall be clean and undamaged. When necessary, preliminary samples showing the finish shall be supplied for approval. Where a rack contact mark is unavoidable, its location shall be indicated on the article or its drawing.

7.2.2 Defects and variations in appearance in the coating that arise from surface conditions of the substrate (scratches, pores, roll marks, inclusions, and the like) and that persist in the coating despite the observance of good metal finishing practices shall not be cause for rejection.

NOTE 4—Coatings generally perform better in service when the substrate over which they are applied is smooth and free of torn metal, inclusions, pores, and other defects. The specifications covering the unfinished product should provide limits for these defects. A metal finisher can often remove defects through special treatments, such as grinding, polishing, abrasive blasting, chemical etches, and electropolishing. However, these are not normal in the treatment steps preceding the application of the coating. When they are desired, they are the subject of special agreement between the purchaser and the seller.

NOTE 5—Proper preparatory procedures and thorough cleaning are essential to ensure satisfactory adhesion and corrosion resistance performance of the coating. Materials used for cleaning should not damage the basis metal, for example, by causing defects such as pits, intergranular attack, stress corrosion cracking, and unwarranted hydrogen embrittlement. It is recommended that the following Practices, where appropriate for cleaning, be used: B183, B242, B252, B281, and B322.

7.3 *Thickness:*

7.3.1 The thickness of the coating everywhere on the significant surfaces shall conform to the requirements in Tables 1-3 as to minimum thickness.

NOTE 6—The thickness of electrodeposited coatings varies from point to point on the surface of the product. (See Practice B507.) The thickness is less in interior corners and holes. Such surfaces are often exempt from thickness requirements. If the full thickness is required in those locations, the electroplater will have to use special techniques that will probably raise the cost of the process.

NOTE 7—The coating thickness requirement of this specification is a minimum. Variation in the thickness from point to point on an article and from article to article in a production lot is inherent in electroplating. Therefore, if all of the articles in a production are to meet the thickness requirement, the average coating thickness for the production lot as a whole will be greater than the specified minimum.

7.4 *Adhesion*—The coatings shall be adherent to the basis metal when subject to either test, in accordance with 8.5.2 and 8.5.3. There shall be no separation of the coating from the substrate.

7.5 *Integrity of the Coating:*

7.5.1 *Gross Defects/Mechanical Damage*—The coatings shall be free of mechanical damage, large pores, and similar gross defects. For some applications this requirement may be relaxed to allow for a small number of such defects (per unit area), especially if they are outside the significant surfaces.

7.5.2 *Porosity*—Almost all as-plated electrodeposits contain some porosity. The amount of porosity that may be tolerable depends on the severity of the environment that the article is likely to encounter during service or storage. If the pores are few in number or away from significant surfaces, their presence can often be tolerated. Such acceptance (or pass-fail) criteria shall be part of the product specification for the particular article or coating requiring the porosity test (see 8.6 for porosity test methods).

7.6 *Pre-Treatments of Iron and Steel for Reducing the Risk of Hydrogen Embrittlement*—Parts that are made of steels with ultimate tensile strengths of 1000 MPa (hardness of 31 HRC) or greater that have been machined, ground, cold formed, or cold straightened subsequent to heat treatment shall be heat treated prior to processing according to Specification B849. The tensile strength shall be supplied by the purchaser.

7.7 *Post-Coating Treatments of Iron and Steel for Reducing the Risk of Hydrogen Embrittlement*—Parts that are made from steels with ultimate tensile strengths equal to or greater than 1000 MPa (hardness of 31 HRC) and surface hardened parts shall require heat treatment according to Specification B850.

7.8 *Supplementary Requirements*—Packaging—If packaging requirements are to be met under this Specification, they shall be in accordance with Practice D3951.

8. Test Methods

8.1 *Special Test Specimens:*

8.1.1 The permission or the requirement to use special test specimens, the number to be used, the material from which they are to be made, and their shape and size shall be stated by the purchaser.

NOTE 8—Test specimens often are used to represent the coated articles in a test if the articles are of a size, shape, or material that is not suitable for the test, or if it is preferred not to submit articles to a destructive test because, for example, the articles are expensive or few in number. The specimen should duplicate the characteristics of the article that influence the property being tested.

8.1.2 Special test specimens used to represent articles in an adhesion, solderability, porosity, corrosion resistance, or appearance test shall be made of the same material, shall be in the same metallurgical condition, and shall have the same surface condition as the articles they represent, and they shall be placed in the production lot of and be processed along with the articles they represent.

8.1.3 Special test specimens used to represent articles in a coating thickness test may be made of a material that is suitable for the test method even if the represented article is not of the same material. For example, a low-carbon steel specimen may represent a brass article when the magnetic thickness test is used (see Test Method B499). The thickness specimen need not be carried through the complete process with the represented article. If not, it shall be introduced into the process at the point where the coating is applied and it shall be carried through all steps that have a bearing on the coating thickness. In rack plating, the specimen shall be racked in the same way with the same distance from and orientation with the anodes and other items in the process as the article it represents.

NOTE 9—When special test specimens are used to represent coated articles in a thickness test, the specimens will not necessarily have the same thickness and thickness distribution as the articles unless the specimens and the articles are of the same general size and shape. Therefore, before finished articles can be accepted on the basis of a thickness test performed on special test specimens, the relationship between the thickness on the specimen and the thickness on the part needs to be established. The criterion of acceptance is that thickness on the specimen that corresponds to the required thickness on the article.

8.2 *Composition of the Coating*—The deposit continues to have a content of 35 ± 5 % nickel (with the balance tin) over a wide range of solution compositions and operating conditions (see 1.1). For this reason an analysis of the deposit is required infrequently, if at all. A sample of the deposit can be obtained by plating on a passivated stainless steel panel from which the deposit can be peeled. The composition of the deposit can be determined by such methods as volumetric or gravimetric analysis, density measurements, atomic adsorption, X-ray and spectrometry.

8.3 *Appearance*—The coating shall be examined at up to 4× magnification for conformance to the requirements for appearance.

8.4 *Thickness*—The coating thickness shall be measured at locations on the significant surface(s) where the thickness would appear to be a minimum. Several methods of determining the thickness are available, depending upon the thickness of coating, the shape of the article, and the basis metal. They are known as microscopical, magnetic, coulometric, and beta backscatter. X-ray spectrometry may be used, but if the basis metal is a tin-containing alloy, such as bronze, or if a nickel undercoating is present, the measurement instruments must be calibrated on the same substrate material. The following methods are acceptable for measuring local thickness of the coating: Test Methods B487, B499, B504, B567, and B568.

8.5 *Adhesion:*

8.5.1 Adhesion shall be determined by either the burnishing test or the heat-quench test.

8.5.2 *Burnishing Test*—The adhesion of thinner deposits can be determined by the burnishing test described in Section 4 of Practice B571.

8.5.3 *Heat-Quench Test*—The heat-quench test is described in Section 9 of Practice B571. For tin-nickel alloy coatings the temperatures of test for various substrates shall be the same as those shown in Table 1 of the test method for chromium, nickel plus chromium, and copper coatings (see Note 11).

NOTE 10—This test may have an adverse effect on the mechanical properties of the article tested.

8.6 *Porosity and Gross Defects Testing:*

8.6.1 Coatings on articles of steel (or iron) having a local thickness of 10 µm or greater should be subjected to the test given in Appendix X2, and the results evaluated according to the procedure described.

8.6.2 For coatings on articles made from copper or copper alloy as the substrate metal, the following tests can be used.

8.6.2.1 To determine mechanical damage or gross defects as defined in Guide B765 *only*, subject samples to the sodium polysulfide immersion test outlined in Specification B246. Black spots or lines are evidence of mechanical damage or gross defects.

8.6.2.2 To determine *all* porosity to the copper or copper alloy substrate, the humid sulfur vapor test (see Test Method B809) shall be used.

8.7 *Post-Coating Treatment for Reducing the Risk of Hydrogen Embrittlement*—If required by the purchaser, the effectiveness of the post-coating heat treatment performed under 7.7 shall be determined by the method described in 8.4 of Specification B634 entitled "Hydrogen Embrittlement Relief."

9. Sampling

9.1 The sampling plan used for the inspection of a quantity of the coated articles shall be as agreed upon between the purchaser and the seller.

NOTE 11—Usually, when a collection of coated articles (the inspection lot, see 9.2) is examined for compliance with the requirements placed on the articles, a relatively small number of the articles, the sample, is selected at random and is inspected. The inspection lot is then classified as complying or not complying with the requirements based on the results of the inspection of the sample. The size of the sample and the criteria of compliance are determined by the application of statistics. The procedure is known as sampling inspection. Three standards, Test Method B602, Guide B697, and Test Method B762, contain sampling plans that are designed for the sampling inspection of coatings.

Test Method B602 contains four sampling plans, three for use with tests that are non-destructive and one when they are destructive. The buyer and seller may agree on the plan or plans to be used. If they do not, Test Method B602 identifies the plan to be used.

Guide B697 provides a large number of plans and also gives guidance in the selection of a plan. When Guide B697 is specified, the buyer and seller need to agree on the plan to be used.

Test Method B762 can be used only for coating requirements that have a numerical limit, such as coating thickness. The test must yield a numerical value and certain statistical requirements must be met. Test Method B762 contains several plans and also gives instructions for calculating plans to meet special needs. The buyer and the seller may agree on the plan or plans to be used. If they do not, Test Method B762 identifies the plan to be used.

NOTE 12—When both destructive and non-destructive tests exist for the measurement of a characteristic, the purchaser needs to state which is to be used so that the proper sampling plan is selected. A test may destroy the coating but in a non-critical area; or, although it may destroy the coating, a tested part can be reclaimed by stripping and recoating. The purchaser needs to state whether the test is to be considered destructive or nondestructive.

9.2 An inspection lot shall be defined as a collection of coated articles that are of the same kind, that have been produced to the same specifications, that have been coated by a single seller at one time or at approximately the same time under essentially identical conditions, and that are submitted for acceptance or rejection as a group.

9.3 If special test specimens are used to represent the coated articles in a test, the number used shall be that required in 8.1.1.

10. Rejection and Rehearing

10.1 Articles that fail to conform to the requirements of this specification may be rejected. Rejection shall be reported to the producer or seller promptly and in writing. In case of dissatisfaction with the results of a test, the producer or seller may make a claim for a rehearing. Coatings that show imperfections during subsequent manufacturing operations may be rejected.

11. Certification

11.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed in this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished.

12. Keywords

12.1 alloys; electrodeposited; tin-nickel; coatings; electrodeposited; nickel alloy; coatings; electrodeposited; tin-nickel alloy; tin-nickel alloy

APPENDIXES

(Nonmandatory Information)

X1. DESCRIPTION OF SERVICE CONDITIONS AND EXAMPLES OF END USES

X1.1 *SC5*—Extended severe service conditions. The coating is subjected to continuous abrasion or exposure to corrosive liquids or gases. Complete coverage of tin-nickel is required. Typical applications are chemical pumps, valves, and flow control devices.

X1.2 *SC4*—Very severe service conditions. The coating is subjected to abrasion or exposure conditions, or both, that are less severe than those of *SC5*, or is exposed for intermittent periods. The applications are similar to those of *SC5*.

X1.3 *SC3*—Severe service conditions. Includes exposure to dampness and to industrial atmospheres. Typical applications are cooking utensils, analytical weights, and surgical instruments.

X1.4 *SC2*—Moderate service conditions. Includes dry or interior atmosphere. Typical applications are electronic parts, watch parts, and printed circuit board etch resist coating.

X1.5 *SC1 and SC0*—Mild service conditions. Less severe conditions than *SC2*. Typical applications are electronic parts, printed circuit board etch resist coating, and final coating when given a gold flash to assure solderability.

X2. SULFUR DIOXIDE POROSITY TEST

X2.1 *Principle*—Exposure to a moist atmosphere containing a low concentration of sulfur dioxide causes no corrosion of tin-nickel alloy of the correct composition, but causes spots of corrosion product to appear at discontinuities in the coating. If the sulfur dioxide concentration is too high, the corrosion product is too fluid to permit easy identification of pore sites. The method, which depends on the production of sulfur dioxide from the reaction between sodium thiosulfate and sulfuric acid within the test chamber, ensures suitable conditions for the development of immobile corrosion products at discontinuities.

X2.2 *Apparatus:*

X2.2.1 *Chamber*—The test shall be performed in a chamber fitted with a lid or door and preferably made of glass or of a transparent plastic. The chamber shall be large enough to hold the test specimens with their lowest parts at least 75 mm above the surface of a solution occupying at least 2 % of the chamber capacity. The chamber shall be gas-tight but need not be capable of resisting pressure. A glass plate makes an adequate joint with a lubricated ground edge of a glass tank. The chamber shall have a uniform cross section and the solution placed in it shall cover the base completely.

X2.2.2 *Glass or Plastic Stand*—to support the specimens under test inside the cabinet. The significant surfaces may be inclined at any angle, but the same inclination should be used for similar articles.

X2.3 *Corrosive Medium*—The corrosive medium shall be moist air containing sulfur dioxide produced by a solution occupying 2 % of the capacity of the chamber and prepared by adding 1 part by volume of 0.1 N sulfuric acid to 4 parts of a solution containing 10 g of sodium thiosulfate crystals in 1 litre of water. The chemicals shall be analytical reagent grade.

X2.4 *Temperature of Test*—Conduct the test at 20 ± 2°C, taking precautions against rapid temperature fluctuation in the course of the test.

X2.5 *Procedure:*

X2.5.1 Before testing, clean the specimens with an organic solvent (for example, 1,1,1-trichloroethane), wipe them with a lint-free cloth, and allow them to attain room temperature.

X2.5.2 Introduce into the test chamber a volume of the sodium thiosulfate solution equal to 2 % of the volume of the chamber. Suspend the test specimens above this solution with the surface of the specimens at least 25 mm apart, at least 25 mm from any wall of the chamber, and at least 75 mm from the surface of the solution. Add to the solution a volume of 0.1 N sulfuric acid equal to a quarter of the volume of the thiosulfate solution and close the chamber, keeping it shielded from drafts and other causes of rapid temperature change. The addition of the sulfuric acid may be made before the test specimens are placed in position, provided that the chamber is closed within five minutes of the addition of the acid.

X2.5.3 Leave the specimen in the chamber for 24 h. After removing the specimens from the corrosive atmosphere, allow them to dry without wiping or cleaning in any way. They should then be examined and evaluated, using the options outlined in Guide B765, Sections 6 and 7.

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