



## Standard Test Method for Calibration of Atmospheric Corrosion Test Chambers by Change in Mass of Copper Coupons<sup>1</sup>

This standard is issued under the fixed designation B 810; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the calibration of atmospheric corrosion test chambers for electrical contacts that produce an adherent film of corrosion product on copper, such as a test comprised of a mixture of flowing gases that react with copper.

1.2 This test method is not applicable to tests where corrosion products may be removed from a copper surface during the test by fluids.

1.3 This test method is not applicable to tests where airborne solid or liquid material may be deposited on a copper surface during the test, as in a test which includes particulates suspended in the atmosphere.

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.*

1.5 The values stated in SI units are to be regarded as the standard.

### 2. Summary of Test Method

2.1 Copper coupon samples of a well-defined size are prepared and each is labeled for identification. All such coupons are cleaned by a standard process. Each coupon is weighed and the value is recorded. All coupons are exposed to the corrosion test for a specified time. The coupons are removed from the test and weighed and the new values are recorded. The change in weight for each coupon is calculated. The coupons are subjected to additional analysis as appropriate to determine the composition and thickness of any films present on the surface.

### 3. Significance and Use

3.1 Electrical devices that contain electrical contacts generally contain some copper-based materials. Atmospheric corrosion of copper parts in such devices often occurs in service environments. A quantitative measure of the effect of a laboratory corrosion test on copper permits assessment of the severity of the test. In addition, corrosion tests may be defined

in terms of their effect on copper; this test method provides a way of comparing one test against a standard defined elsewhere, or allows a comparison of the performance of a test over a period of time. Although this test method provides for a relatively simple check of a test, the user is advised that additional analysis of the test chamber ambient is generally required to reproduce test conditions.

3.2 Atmospheric corrosion tests are used on a variety of materials besides copper. Care should be exercised in drawing conclusions about the effects on such materials of apparently equivalent tests if the composition of gases or experimental conditions are different. The primary use of this calibration test method is to assure correlation among nominally identical tests.

### 4. Apparatus

4.1 *Racks or Fixtures* suitable for holding the copper coupons in the test chamber are required. Make these fixtures from a material that is not attacked by the corrosion test. The fixtures shall be designed to:

4.1.1 Hold the coupons in a vertical orientation,

4.1.2 Hold the coupons so that they do not show any perceptible motion when observed with the unaided eye during the test,

4.1.3 Cover less than 5 % of the entire coupon surface area,

4.1.4 Touch the coupon only with electrically insulating parts and,

4.1.5 Allow free circulation of the ambient on both sides of the coupon.

4.2 In general, design all parts of the fixture to permit maximum circulation of the ambient around the coupon surfaces. The size and positioning of the holding fixtures depends on the chamber size. Section 6 of this test method gives requirements on the number and spacing of coupons; the holding fixtures must be designed to comply with these requirements.

4.3 *Balance*, with a capacity of at least 2 g and a resolution of 5  $\mu\text{g}$  is required. Maintain the ambient in the vicinity of the balance between 20 and 50 % relative humidity.

4.4 *Fume Hood*, to conduct the chemical cleaning procedure of the coupons is required.

### 5. Reagents and Materials

5.1 *Purity of Reagents*—Reagent grade chemicals shall be

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