



Standard Practice for Conducting Atmospheric Corrosion Tests on Metals¹

This standard is issued under the fixed designation G 50; 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 defines conditions for exposure of metals and alloys to the weather. It sets forth the general procedures that should be followed in any atmospheric test. It is presented as an aid in conducting atmospheric corrosion tests so that some of the pitfalls of such testing may be avoided. As such, it is concerned mainly with panel exposures to obtain data for comparison purposes.

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 whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 380 Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment, and Systems²

D 2010/D 2010M Test Methods for Evaluation of Total Sulfation Activity in the Atmosphere by the Lead Dioxide Technique³

G 1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens⁴

G 33 Practice for Recording Data from Atmospheric Corrosion Tests of Metallic-Coated Steel Specimens⁴

G 46 Guide for Examination and Evaluation of Pitting Corrosion⁴

3. Significance and Use

3.1 The procedures described herein can be used to evaluate the corrosion resistance of metals when exposed to the weather, as well as to evaluate the relative corrosivity of the atmosphere at specific locations. Because of the variability and complexity of weather effects and the industrial and natural factors influencing the atmospheric corrosivity of a test site, a multi-year exposure period should be considered to minimize their influence. Also, as corrosivity may vary at a site from season to

season, exposures should be made either at the same time of the year to minimize variability or these differences should be established by multiple exposures.

3.2 Control specimens should always be employed in weathering tests. The control specimens should be from a material having established weathering characteristics. A substantial amount of corrosion data shall have been accumulated for the control specimens. It is also good practice to retain samples of all materials exposed so that possible effects of long-term aging can be measured.

4. Test Sites

4.1 Test sites should be chosen at a number of locations representative of the atmospheric environments where the metals or alloys are likely to be used. If such information is not available, the selection should include sites typical of industrial, rural, and marine atmospheres.

4.2 Exposure racks should be located in cleared, well-drained areas such that the exposed specimens will be subjected to the full effects of the atmosphere at the location of the test site. Shadows of trees, buildings, or structures should not fall on the specimens, and local contamination of the atmosphere should be avoided, unless the specific influences of such conditions are intended to be assessed.

4.3 In special cases, the exposure racks may be partially sheltered to allow accumulation of corrosive materials from the air but at the same time prevent washing by rain. If sheltering is used, its purpose and configuration should be described in detail.

4.4 If local pollution effects are to be investigated, the samples should be exposed at different distances from the source and at different elevations. Where it is particularly important to obtain corrosion rates involving a micro-environment, samples should be mounted directly on the structure involved. Suitable attachment must be devised for each case.

5. Exposure Racks and Frames

5.1 Test racks and frames should be constructed of a material that will remain intact for the entire proposed period of exposure. Galvanized pipe has been found adequate for rack construction in most environments (Note 1). Type 304 stainless steel is adequate as a frame material for all environments. For marine exposures, alloy 400 UNS No. N04400 or Type 316

¹ This practice is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals, and is the direct responsibility of Subcommittee G01.04 on Atmospheric Corrosion.

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² Annual Book of ASTM Standards, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 11.03.

⁴ Annual Book of ASTM Standards, Vol 03.02.