



Standard Practice for Monitoring Atmospheric SO₂ Deposition Rate for Atmospheric Corrosivity Evaluation¹

This standard is issued under the fixed designation G91; 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 two methods of monitoring atmospheric sulfur dioxide, SO₂ deposition rates with specific application for estimating or evaluating atmospheric corrosivity as it applies to metals commonly used in buildings, structures, vehicles and devices used in outdoor locations.

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

1.3 *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

D516 Test Method for Sulfate Ion in Water

D1193 Specification for Reagent Water

D2010/D2010M Test Methods for Evaluation of Total Sulfation Activity in the Atmosphere by the Lead Dioxide Technique

G16 Guide for Applying Statistics to Analysis of Corrosion Data

G84 Practice for Measurement of Time-of-Wetness on Surfaces Exposed to Wetting Conditions as in Atmospheric Corrosion Testing

G140 Test Method for Determining Atmospheric Chloride Deposition Rate by Wet Candle Method

G193 Terminology and Acronyms Relating to Corrosion

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 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.

2.2 ISO Standards:³

ISO 9225 Corrosion of metals and alloys- Corrosivity of atmospheres – Measurement of environmental parameters affecting corrosivity of atmospheres

3. Terminology

3.1 *Definitions*—The terminology used herein shall be in accordance with Terminology and Acronyms G193.

4. Summary of Practice

4.1 Sulfation plates consisting of a lead peroxide reagent in an inverted dish are exposed for 30-day intervals. The plates are recovered and sulfate analyses performed on the contents to determine the extent of sulfur capture. Lead peroxide cylinders are also used for monitoring atmospheric SO₂ in a similar manner. The results are reported in terms of milligrams of SO₂ per square metre per day.

5. Significance and Use

5.1 Atmospheric corrosion of metallic materials is a function of many weather and atmospheric variables. The effect of specific corrodants, such as sulfur dioxide, can accelerate the atmospheric corrosion of metals significantly. It is important to have information available for the level of atmospheric SO₂ when many metals are exposed to the atmosphere in order to determine their susceptibility to corrosion damage during their life time in the atmosphere.

5.2 Volumetric analysis of atmospheric SO₂ concentration carried out on a continuous basis is considered by some investigators as the most reliable method of estimating the effects caused by this gas. However, these methods require sophisticated monitoring devices together with power supplies and other equipment that make them unsuitable for many exposure sites. These methods are beyond the scope of this practice.

5.3 The sulfation plate method provides a simple technique to independently monitor the level of SO₂ in the atmosphere to yield a weighted average result. The lead peroxide cylinder is

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.