This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: G101 – 04 (Reapproved 2020)

Standard Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels[1]

This standard is issued under the fixed designation G101; 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 guide presents two methods for estimating the atmospheric corrosion resistance of low-alloy weathering steels, such as those described in Specifications A242/A242M, A588/A588M, A606/A606M Type 4, A709/A709M grades 50W, HPS 70W, and 100W, A852/A852M, and A871/A871M. One method gives an estimate of the long-term thickness loss of a steel at a specific site based on results of short-term tests. The other gives an estimate of relative corrosion resistance based on chemical composition.

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 international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A242/A242M Specification for High-Strength Low-Alloy Structural Steel

A588/A588M Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance

A606/A606M Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance

A709/A709M Specification for Structural Steel for Bridges

A852/A852M Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi [485 MPa] Minimum Yield Strength to 4 in. [100 mm] Thick (Withdrawn 2010)[3]

A871/A871M Specification for High-Strength Low-Alloy Structural Steel Plate With Atmospheric Corrosion Resistance

G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

G16 Guide for Applying Statistics to Analysis of Corrosion Data

G50 Practice for Conducting Atmospheric Corrosion Tests on Metals

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *low-alloy steels*—iron-carbon alloys containing greater than 1.0 % but less than 5.0 %, by mass, total alloying elements.

3.1.1.1 *Discussion*—Most "low-alloy weathering steels" contain additions of both chromium and copper, and may also contain additions of silicon, nickel, phosphorus, or other alloying elements which enhance atmospheric corrosion resistance.

4. Summary of Guide

4.1 In this guide, two general methods are presented for estimating the atmospheric corrosion resistance of low-alloy weathering steels. These are not alternative methods; each method is intended for a specific purpose, as outlined in 5.2 and 5.3.

4.1.1 The first method utilizes linear regression analysis of short-term atmospheric corrosion data to enable prediction of long-term performance by an extrapolation method.

4.1.2 The second method utilizes predictive equations based on the steel composition to calculate indices of atmospheric corrosion resistance.

5. Significance and Use

5.1 In the past, ASTM specifications for low-alloy weathering steels, such as Specifications A242/A242M, A588/

[1] This guide is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.04 on Corrosion of Metals in Natural Atmospheric and Aqueous Environments.

Current edition approved Nov. 1, 2020. Published November 2020. Originally approved in 1989. Last previous edition approved in 2015 as G101–04 (2015). DOI: 10.1520/G0101-04R20.

[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] The last approved version of this historical standard is referenced on www.astm.org.

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