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# Guidelines for Data Collection and Analysis of Railroad Tank Car Interior Coating/Lining Condition

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## ABSTRACT

*This NACE International standard is specifically targeted for use by tank car owners, operators, and repairers who are seeking guidance in complying with federal regulations regarding interior coating/lining condition data collection and analysis. This standard provides guidelines for inspecting, rating, and documenting the condition of interior coatings and linings in tank cars. Additionally, procedures for determining disposition of coatings/linings in various stages of distress are outlined, as well as a mechanism for constructive reaction when it becomes apparent that interval lengths require adjustment. There are three nonmandatory Appendixes that provide an example of a coating condition ratings system; an example of a disposition schedule based on the example coating condition rating system; and an example of a coating inspection form as well as a tank car map. It should be noted that issues similar to those discussed here may arise with other bulk liquid transportation containers, and this document may find applicability in those areas as well.*

## KEYWORDS

*Association of American Railroads (AAR), chemical processing, coating condition, coating inspection, data analysis, data collection, dry film thickness (DFT), Federal Railroad Administration (FRA), inspection intervals, interior coatings, linings, railroad tank cars, spray coatings, steel tank cars, substrate corrosion, TG 444*

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## Foreword

***In NACE standards, the terms shall, must, should, and may are used in accordance with the definitions of these terms in the NACE Publications Style Manual. The terms shall and must are used to state a requirement, and are considered mandatory. The term should is used to state something good and is recommended, but is not considered mandatory. The term may is used to state something considered optional.***

Representatives of the chemical processing industries, railroads, government authorities, railroad tank car (hereafter referred to as "tank cars") builders and owners, as well as lining manufacturers and applicators, have been working together to address and eliminate accidental releases of tank car ladings. A portion of these efforts have focused on the use of coatings and linings to combat the potentially corrosive effects of ladings on the tank car tank. The U.S. Code of Federal Regulations (CFR)[1] Title 49, Part 180[1] requires that an inspection and maintenance plan be incorporated into coated/lined packaging schemes for ladings considered corrosive to steel tank car tanks.[1]

The Association of American Railroads (AAR)[2] standard AAR M-1002 Appendix L defines "corrosive" and gives some general guidance regarding development and length of coating/lining inspection/maintenance intervals.[2] NACE Publication 43108 lists inspection intervals typically used by shippers of these chemicals for various interior coating and lining types.[3] How the coating/lining condition is evaluated, and what actions are taken are the purview of the coating/lining owner (as distinguished from and not necessarily the same as the tank car owner), and defined as the party responsible for bearing the cost of the maintenance of the lining or coating.[3]

This NACE International standard is specifically targeted for use by tank car owners, operators, and repairers who are seeking guidance in complying with federal regulations regarding interior coating/lining condition data collection and analysis. It should be noted that issues similar to those discussed here may arise with other bulk liquid transportation containers, and this document may find applicability in those areas as well.

With reference to rubber and other sheet linings: Although this standard is intended primarily for spray coatings, the concepts presented can be applied to sheet linings as well. However, details for the assessment of sheet lining conditions are not specifically included in this standard.

This standard was prepared in 2016 by NACE Task Group (TG) 444, "Guidelines for Data Collection and Analysis of Railroad Tank Car Interior Coating/Lining Condition." This TG is administered by Specific Technology Group (STG) 43, "Land Transportation"; and is sponsored by STG 02, "Coatings and Linings, Protective: Atmospheric"; and STG 03, "Coatings and Linings, Protective: Immersion and Buried Service." This standard is issued by NACE under the auspices of STG 43.

[1] U.S. Government Printing Office, 732 N. Capitol Street, NW, Washington, DC 20401.
[2] Association of American Railroads (AAR), 50 F Street, NW, Washington, DC 20001-1564.

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## Section 1: General

This standard provides guidelines for inspecting, rating, and documenting the condition of interior coatings and linings in tank cars. Additionally, procedures for determining disposition of coatings/linings in various stages of distress are outlined, as well as a mechanism for constructive reaction when it becomes apparent that interval lengths require adjustment. Appendix A (nonmandatory) provides an example of a coating condition ratings system. Appendix B (nonmandatory) gives an example of a disposition schedule based on the example coating condition rating system. Appendix C (nonmandatory) provides an example of a coating inspection form as well as a tank car map.

## Section 2: Instructions/Technique

**2.1** The training and qualification of personnel performing and assessing coating/lining examinations as described in this document shall, at a minimum, be in accordance with AAR M-1002 or NACE SP0398.[4]

**2.2** All applicable safety and health regulations and procedures should be followed when entering railcars. Pertinent documents such as local and national government regulations, safety data sheets (SDS), and company facility-specific policies should be consulted for more detail.

**2.3** Any residues or objects that interfere with proper examination of the coated/lined surfaces shall be removed.

**2.4** Precautions should be taken to avoid damaging the existing coating/lining during the inspection. (Example: Using protective covers/cushions for shoes, ladders, stepboards, tools, etc.)

**2.5** The coating/lining shall be visually examined and documentation of its condition recorded. A two-step procedure shall be used:

**2.5.1** An initial inspection in which a general impression of the coating/lining condition is ascertained and recorded;

**2.5.2** Followed by a detailed inspection conducted using a bright viewing light (e.g., 500 lx/50 foot candles) impinging at a highly acute angle (almost parallel) to the surface.

**2.6** The condition inspection documentation shall encompass all coated/lined interior surfaces; record all types, sizes, and locations of defects or degradation, such as but not limited to the following:

(a) Substrate corrosion
(b) Rust spots
(c) Discolorations
(d) Cracking
(e) Delamination or disbonding
(f) Abrasion/erosion/wear
(g) Pitting or other localized attack
(h) Undercutting
(i) Softening/hardening
(j) Loss of gloss/dulling/etching
(k) Swelling/blistering
(l) Loss of film continuity

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